1996

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Garcia Perez, Jose Domingo

http://hdl.handle.net/10026.1/385

http://dx.doi.org/10.24382/3290

University of Plymouth

SOCIOECONOMIC PROCESSES OF LAND DEGRADATION IN GUADALAJARA PROVINCE (SPAIN)

by

José Domingo García Pérez

A thesis submitted to the University of Plymouth
as partial fulfilment for the degree of

DOCTOR OF PHILOSOPHY

Department of Geographical Sciences
Faculty of Science

July 1996

DAMAGED TEXT IN ORIGINAL

Abstract of the Thesis submitted for Ph.D. degree

by José Domingo García Pérez

on

Socioeconomic Processes of Land Degradation in Guadalajara Province (Spain)

Despite the great growth and interest in the study of socioeconomic processes of land degradation in many parts of the world, relatively little attention has been paid to these in Spain. Foresters play an important part in the national strategy to solve the problems of land degradation. It might be expected that after the changes which restored political democracy in Spain in the late 1970s, a reorganization of the way the planning and implementation of soil and water conservation projects through reforestation would be effected. The reforestation agencies of the Government could have improved the effectiveness of conservation by acknowledging and dealing with the need to study the socioeconomic processes of land degradation and involve affected people in the decision making process in planning. This is the main problematic which the thesis addresses.

The thesis considers the way issues of land degradation are studied, and how the results of these studies have been adopted and put into practice by Spanish foresters. The workings of the Spanish State and powerful economic interests are considered to be major players determining forestry practice and the outcome of conservation. Some of the most relevant methods in current planning for soil and water conservation, namely those stemming from practice and research into the promotion of participation of affected people, are largely absent from Spanish academic studies and/or planning circles for reforestation projects. The thesis considers the advantages and disadvantages of participatory and multidisciplinary approaches to research with the aim of providing an improved understanding of land degradation processes. The participatory approach is also appraised for its practical value to those involved in planning reforestation projects.

The thesis concludes that the dilemma faced by successive Spanish Governments regarding reforestation is one of decision making in planning, involving not only powerful interests, but also those of the people affected. The mismatch between what in Governmental circles is acknowledged as necessary (the participation of the people affected in the decision making process for conservation) and its practice, is the result of the inadequate professional composition of planning teams. The introduction of social science specialists to all the stages of the planning cycle is necessary to improve understanding of the socioeconomic processes of land degradation. For such improvement to occur the perceptions of land users must be included. In so doing it will increase the possibilities of more successful soil and water conservation projects.

CONTENTS

Abbreviations

ACS	Agrarian Marketing Services (*Servicio de Comercializacion Agraria*)
ACDS	Agrarian Cooperation and Development Services (*Servicio de Cooperacion y Desarrollo Agrario*)
ADENA	Association for the Defense of Nature (*Asociación para la Defensa de la Naturaleza*)
ADENEX	Asociation for the Defense of Nature in Extremadura (*Asociacion para la Defensa de la Naturaleza en Extremadura*)
APS	Agrarian Production Services (*Servicio de Produccion Agraria*)
ASAJA	Agrarian Young Farmers' Association (*Association Agraria de Jovenes Agricultores*)
BFF	Beyond farmer first
CAP	Common Agricultural Policy
CEGA	Galician Celusose (*Celulosas de Galicia*)
CESP	Provincial Sindicate Economic Council (*Consejo Economico Sindical Provincial*)
CLCAPV	Commission for Land Consolidation and Afforestation of Puebla de Valles (*Comision Gestora para la Concentracion Parcelaria y Forestación de Puebla de Valles*)
CAE	Council for Agriculture and Environment (*Consejeria de Agricultura y Medio Ambiente*)
CODA	Coordinator of Organizations for the Defense of the Environment (*Coordinadora de Organizaciones de Defensa Ambiental*)
CPAES	Landowners Community for Social and Ecological Action (*Comunidad de Propietarios Accion Ecologica Social*)
CPAGG	Provincial Cooperative of Agriculturalists and Cattle-raisers in Guadalajara (*Cooperativa Provincial de Agricultores y Ganaderos de Guadalajara*)
CPP	Community of Land Owners of Palancares (*Comunidad de Propietarios de Palancares*)
CSIC	Council for Scientific Research (*Consejo Superior de Investigaciones Cientificas*)
DPCA	Provincial Delegation of the Council for Agriculture y Medio Ambiente (*Delegación Provincial de la Consejería de Agricultura y Medio Ambiente*)

EAGGF	European Agricultural Guidance and Guarantee Fund
EU	European Union
FF	Farmer first
ERDF	European Regional Development Fund
ESF	European Social Fund
GIS	Geographical Information Systems
ICONA	Instituto Nacional para la Conservacion de la Naturaleza
IBERLIM	Land Management and Erosion Limitation in the Iberian Peninsula
IIED	International Institute for Environment and Development
INE	National Institute of Statistics (*Instituto Nacional de Estadistica*)
INI	Institute of National Industry (*Instituto Nacional de Industria*)
JCCLM	Autonomous Government of Castilla-la-Mancha (*Junta de Comunidades de Castilla-la-Mancha*)
LAM	Law of Mountainous Agriculture (*Ley de Agricultura de Montaña*)
LD	Land degradation
LUCDEME	Fight Against Desertification in the Mediterranean (*Lucha Contra la Desertificación en el Mediterráneo*)
MAES	Mauntainous Areas and Environment Services (*Servicio de Montes y Medio Ambiente*)
MAPA	Ministry of Agriculture Fisheries and Food (*Ministerio de Agricultura, Pesca y Alimentación*)
MEDALUS	Mediterranean Desertification and Land Use
PDI	Master Plan for Infrastructure (*Plan Director de Infraestructuras*)
PNI	National Plan of Irrigation (*Plan Nacional de Regadíos*)
PFE	State Forestry Heritage (*Patrimonio Forestal del Estado*)
PRA	Participatory rural appraisal
PROPROM	Program for the Planning and Promotion of Mountainous Agrarian Resources (*Programas de Ordenación y Promoción de Recursos Agrarios de Montaña*)
RPK	Rural people's knowledge

RRA	Rapid Rural Appraisal
SCS	Soil Conservation Service
SEOPAN	National Association of Construction Firms (*Asociación de Empresas Constructoras de Ámbito Nacional*)
SNIACE	National Society of Applied Celusose Industries (*Sociedad Nacional de Industrias Aplicadas de la Celulosa*)
SWC	Soil and Water Conservation
TAGLOSA	*Tableros Aglomerados S. A.*
USLE	Universal Soil Loss Equation
ZAM	Mountainous Agricultural Zones (*Zonas de Agricultura de Montaña*)

List of tables

List of figures

List of plates

ACKNOWLEDGEMENT

To my first and second supervisors, Clive Charlton and Les Ternan for their comments, guidance, and encouragement.

To the staff of Plymouth University Library for their helpful attitude, and to the Cartography Department of Geographical Science for their help in map making.

To the numerous people and organisations involved in the protection of nature in Spain who were interested in my research and helped me with documentation and/or gave me their time. Particular thanks are due to Alfredo Pérez González of the Consejo Superior de Investigaciones Cientificas (CSIC), Juan Pedro Ruíz of the Universidad Autonoma de Madrid, and to Leopoldo Rojo Serrano of the Instituto Nacional para la Conservación de la Naturaleza. To, Pablo Matín Ruíz of Puebla de Valles village, for his valuable comments in my research during field work, and to Rosendo and Esperanza for adding many of the accents missing in my bibliography.

To, especially, my partner Irene, for encouraging me to enter Higher Education as a mature student for my first and second degrees and this research for a Ph.D., and for her valuable comments, and finally to our son Martín for providing the level of distraction 'reasonably necessary' during this work.

AUTHOR'S DECLARATION

At no time during the registration for the degree of Doctor of Philosophy has the author been registered for any other University award.

This study was financed with the aid of a studentship from the Faculty of Science of the University of Plymouth, and a travelling bursary from the British Council in Madrid.

Relevant scientific seminars and conferences were regularly attended at which work was often presented; external institutions were visited for consultational purposes, and a paper prepared for publication.

Publications:

García Pérez, J. D., Charlton, C., and Martín Ruiz, P. (1995). "Landscape changes as visible indicators in the social, economic and political process of soil erosion: a case study of the municipality of Puebla de Valles (Guadalajara Province), Spain", *Land Degradation & Rehabilitation*, 6, pp.149-161.

Presentations and Conferences attended:

García Pérez, J. D. (1995). "The Use of Pair-Wise Photographs in Data Gathering Amongst Rural Communities for Forestry Planning: A Case Study of Guadalajara (Spain)", *Conference on Erosion and Land Degradation in the Mediterranean.* (Proceedings), pp451-474, Aveiro.

External contacts:

Consejo Superior de Investigaciones Cientificas,
Centro de Ciencias Medioambientales,
Madrid

Universidad Autonoma de Madrid,
Departamento de Ecología,
Madrid

Instituto Nacional para la Conservación de la Naturaleza,
Sección de Estudios y Proyectos,
Madrid

Signed........................

Date......16 July 1996......

MEMORANDUM

The work contained in this dissertation is my own. Where reference or the work of others has been used, my source is indicated in brackets.

Where I have translated from Spanish, I have endeavoured to keep to the spirit of the original source. Should there be any inaccuracies, I accept responsibility for them.

Introduction

i. Context of the study

For centuries issues of land degradation (LD) have been one of the main concerns of peasants and pastoralists. Knowledge about the productivity and condition of land has been passed down from generation to generation. Land management practices such as intercropping, fallow and production cycles, the combination of pastoralism and agricultural activities and careful water management, indicate an awareness about the condition of land related to its productive capacity. These practices were the result of careful observation and a process of elimination of methods that were harmful to nature, and detrimental to survival. This allowed a relatively balanced coexistence between people working the land and nature.

The assured results given by well tried farming methods were vital for stability of production. Instability often meant crop failure, and that may in some instances have been the cause of death. New practices, it can be argued, were slow to evolve while the known ones were kept in use. New practices adding to uncertainty had to be tried on a limited scale on an 'experimental' basis. 'Innovative' modern methods, only tried in the laboratory, are quickly rejected by today's peasants[1] if they pose a threat to a secure production result. For these reasons peasants are often regarded as conservative and rejecting innovation by policy makers, agricultural technicians, urban dwellers etc.

The extent of 'damage' inflicted upon land under peasant conditions is to a large degree unknown. Peasant studies have been related to a history of agricultural production and transformation rather than to specific studies of the processes of LD and erosion[2]. Studies of

[1] In this thesis the term peasant is used to indicate a condition of subsistence production for consumption and exchange, while the term farmer indicates an economic activity operating within the money economy, in which 'commodities' are produced and capital is accumulated.

[2] Hereafter in this thesis the terms 'LD and erosion' will be simplified by just referring to them as LD. This simplification is discussed further in Part i of the next Chapter.

changes in the agrarian relations of production are well documented and will not be elaborated here. Examples of these are Harriss (1982), Goodman and Redclift (1981), Lipton (1977), Chayanov, (1966), Hill (1970). These studies focus on changes in agricultural practices due to diverse factors - the emerging new forces in relations of production, such as changes from subsistence peasant economies to capitalist farmer economies, and on ownership and access to the means of production such as land, implements, machinery, seeds, capital, etc. The position of individuals or groups to the means of production refers to the access these have in terms of their ownership, degree of control or influence.

There is, however, a dearth of studies which, in a historical perspective, focus on the disruption of the balance between land users and nature causing land degradation. Blaikie and Brookfield (1987) explain that in the literature examining changes in agricultural practices, "...the environment is considered ...as a passive background to human interaction" (p.xviii). Napier (1988) explains that the shortage of historical studies is mainly because issues related to LD were not perceived as being important by historians and therefore they have not been well, if at all, recorded throughout history.

The processes underlying LD are both physical and socioeconomic. Both are studied by specialised disciplines often 'unable' to understand each other's findings or to integrate them, although, as Blaikie and Brookfield (Ibid) explain, it is acknowledged that studies of LD are *par excellence*, multidisciplinary. Lopez Bermudez (1995) confirms with reference to Spain that there are insufficient such multidisciplinary studies which provide an explanation of the physical, socioeconomic and political processes of LD. Barrow argues that although there is an increasing interest in the institutional, political and economic causes of land degradation, "...the picture is still far from complete" (Barrow, 1991: 207). Therefore it is also important to explore how well or in what form processes are understood and what are the conditioning factors affecting that understanding. In other words, how are these processes perceived by land users, governments and other actors, and what are the disciplinary, ideological, political, or economic conditions that affect the understanding, policies and actions for soil and water conservation (SWC).

Soil and water are critical elements of LD, and are also two of the most important factors of agrarian production. They are perceived differently by various social sectors, such as land users and government officials. These alternative perceptions of soil and water conditions as factors of production by land users and governments in turn determine measures of SWC. These measures, along with the working practices of land users, must be taken into consideration in the examination of processes of LD. The decision making process concerning SWC by land users and government must also be examined.

The high rate of failure of conservation programmes devised by governments (Blaikie, 1985), affecting not only the condition of soil or the availability of water, but inevitably the wellbeing of many rural dwellers, is the concern of many researchers and policy makers. Blaikie (1989) emphasizes that conservation activities by governments usually fall short of their target, but that this failure cannot be just attributed to their lack of political will. To understand the reasons behind these failures Blaikie (1988) proposes a comprehensive analysis of the State and the working of its bureaucracy, from the ministry in charge of these matters to that of implementation at village level (p.73-74).

The examination of the State and the working of its bureaucracy, in relation to its programme of SWC must include a study of the political, economic and social postulates applied in planning for SWC. Planning for SWC by governments mostly include land use restrictions (Pretty and Shah, 1994), especially in the case of reforestation. Reforestation is identified by Ostermeier and Yu (1991), as in need of further research. These authors suggest that there has been inadequate evaluation of the theoretical and empirical basis of forestry policy making processes (Ibid: 82). These policies have had a considerable impact on conservation, in terms of both failures and successes. An improvement in reforestation planning should translate into better conservation and social wellbeing.

A critical element in any successful measure for conservation is that the processes through which LD occur are well understood by researchers and planners. A more comprehensive understanding of these processes can be provided by looking at the physical and socioeconomic factors in a particular place and time.

There are multiple socioeconomic and physical causes and effects of LD in a variety of times and places. A major difficulty in providing an explanation of the extent and importance of LD is that the causes are highly conjunctural (Blaikie, 1995, Blaikie and Brookfield, 1997). 'Conjunctural' is explained by these authors as referring to the many interrelated variables, including climate, land use, and type of soil, which makes it difficult to theorise these processes. One of the main problems in explanation and planning is that 'mainstream' land management physical scientists and practitioners may object to such explanations by land management social scientists such as Blaikie above.

The effects of LD can be both on and off site. What may be serious soil and productivity loss in the higher part of a catchment could amount to an increase in fertility due to deposition of nutrients lower downstream, especially in the case of flooded lands. Other effects of LD may be detrimental to non agricultural practices, such as siltation of hydroelectric dams generating power for industrial and urban areas, or infrastructure being washed away by gullying. What in these examples are the 'effects' can at other times be the causes of LD. Because of the possible interchangeability of causes and effects, they require careful classification if they are to an improved explanation of the processes of LD. The construction of big dams or roads can be the cause of erosion, as can be the use of earth moving machinery for reforestation (as an example of a result diametrically opposed to its expected SWC objective).

Studies of the processes of LD in Spain generally emphasise physical aspects leaving socioeconomic ones relatively unexplored. The severe situation of LD in Spain has stimulated many studies of processes by national and foreign scientists. Examples include those conducted by CSIC (*Consejo Superior de Investigaciones Cientificas*), the MEDALUS project (*Mediterranean Desertification and Land Use*), IBERLIM (*Land Management and Erosion Limitation in the Iberian Peninsula*) and LUCDEME (*Lucha Contra la Desertificación en el Mediterráneo*) programmes. The collection of papers presented at the Conference on Erosion and Land Degradation in the Mediterranean, at the University of Aveiro in Portugal in 1995, show that the main focus is on the physical processes of LD. Opinions of the severity of LD in Spain extend to a maximum depiction of desertification in the Centre/South East of the Peninsula, including areas of Guadalajara province (see Figure 1, page 6). According to Lopez Bermudez (1995), Mediterranean lands are the most fragile on Earth, after those in the tropics, because of their characteristics and environmental conditions, such as aridity, intense irregular precipitations with great erosive potential, frequent drought, repeated and intensive fires, and salinization of soil and water. Under these conditions only vegetation particularly well adapted is able to survive (p.41)

Although the focus of this study is Guadalajara Province, it is grounded within the wider framework of explanations of socioeconomic processes of LD. In this way a study of Guadalajara, within the context of Spain, contributes to a more general understanding of the nature of such processes. The reasons for the choice of Guadalajara are two fold. Firstly, it exemplifies the socioeconomic processes of LD which are general across much of Spain and secondly it provides the opportunity of making use of and integrating physical and socioeconomic studies. The socioeconomic part of the study comprises the examination of agrarian practices, such as pastoralism and agriculture, the structure of the State and the workings of its bureaucracy, and the elaboration of policy for SWC through reforestation. The great majority of the efforts for SWC made by successive Governments in Spain have been through reforestation. The effects State policies and agrarian practices have on the condition of land and availability of water are part of the explanation of the processes of LD.

The study of socioeconomic processes of LD in Guadalajara is complimentary to studies of physical processes recently undertaken in the area[3]. The objective of adding a socioeconomic dimension to the IBERLIM study is to provide a fuller explanation of LD processes in Spain. Conversely the IBERLIM project presents the opportunity of making use of findings of the physical processes to provide a more

[3] The research for this thesis was, in part, a 'spin-off' the IBERLIM project carried out by Coelho et al., (1994). This study is seeking to demonstrate the value of integrating socioeconomic and physical studies of the processes of LD.

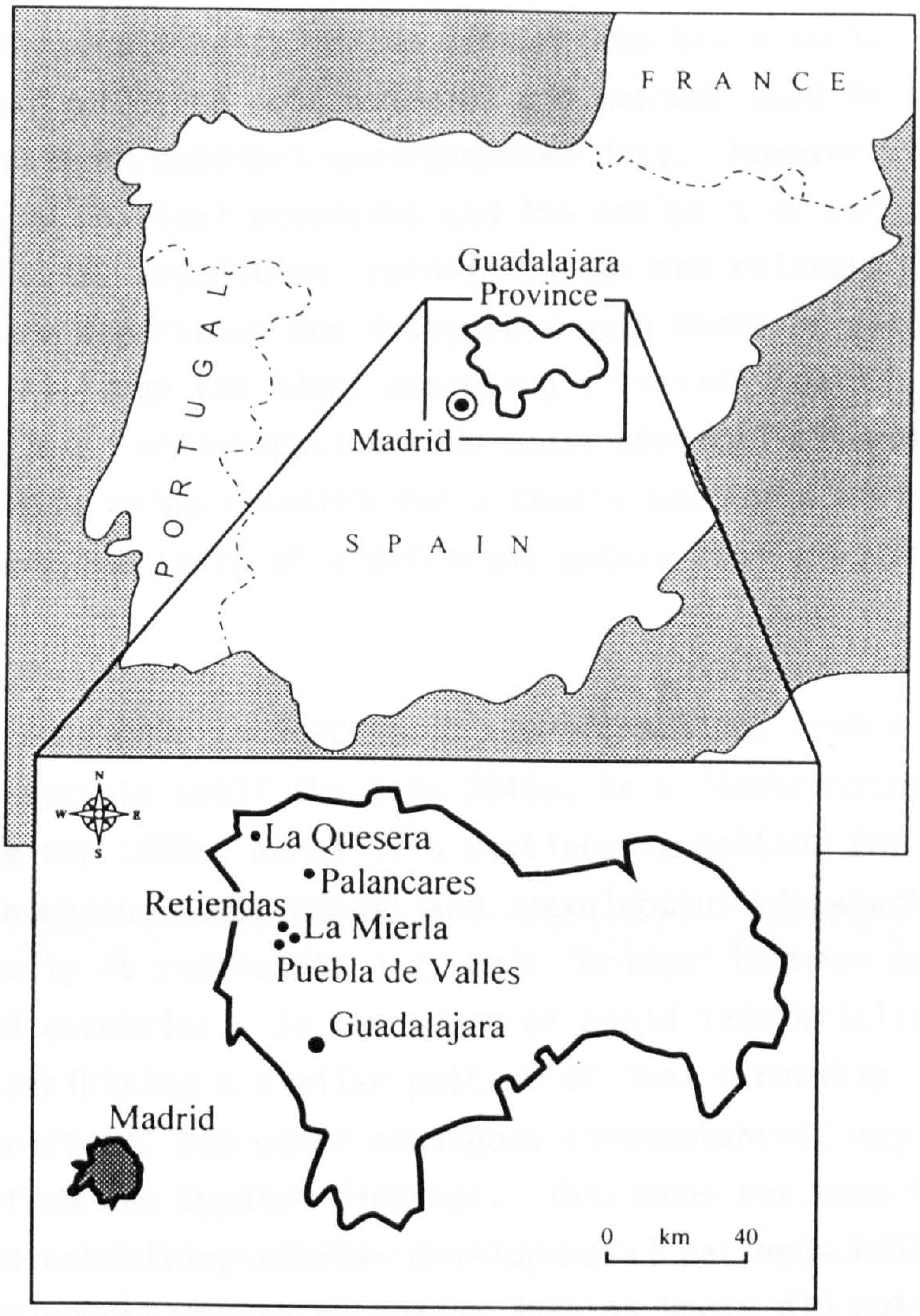

Figure 1: Location of Guadalajara Province in Spain and field study location within Guadalajara

comprehensive explanation in this thesis. The extent to which the findings of IBERLIM are integrated in this study are constrained in part by the familiarity of the author (who has a social scientific background) with the methodologies and methods used in the collection and analysis of physical environmental data. However, the principal findings on physical processes and the analysis of natural factors such as soils, vegetation, rainfall, that are relevant for this thesis, are understood and integrated with those of a socioeconomic nature. Although the ideal operating situation would have been to work in closer collaboration with those physical scientists involved in IBERLIM [4], doing research for a thesis and for a working research report, are two tasks of a different nature that are difficult to reconcile.

Spain's remarkable socioeconomic transformation, from a mainly agrarian society until the late 1940s, to a 'modernizing' industrial one since the 1950s, makes it a distinctive setting for the study of issues in which 'environment' and 'development' interact. Conceptually it represents a dynamic 'bridge' between developing and developed countries. In the event of rapid industrialisation, any country exhibiting a similar pattern of land ownership characteristics, and other analogous circumstances, may be able to benefit from the Spanish findings. This does not mean that other countries exhibiting similar developmental patterns will follow the same development course as Spain, just as Spain did not follow the same path as other developed European countries. The use of the Spanish findings in this study, however, should be of value to by SWC planners or scientists operating in similar conditions elsewhere, providing they are adapted to the concrete situation of their particular country.

An important analogy between Spain and some developing countries is

[4] Helping in the installation of erosion measuring plots and other equipment, the collection of some field data, and asking some questions about the logic and objectives of particular experiments is not the same as being fully integrated and working in a project, in which an essential part of it is the elaboration and analysis of these questions. That physical scientists must ask about socioeconomic questions, and vice-versa that social scientists enquire about physical matters, can give important results but requires well planned and the full integration of both physical and socioeconomic in the same project. The difficulties of integrating physical data, as in this thesis, stem from these above.

that up to the late 1960s Spain displayed many of the usual social and economic conditions of a developing country. Similarities in the circumstances of developing countries and Spain in the 1960s make studies of burgeoning capitalist agrarian methods of production resulting in differentiation among land users, intensification of production, land degradation and migration to industrializing urban areas, highly pertinent. The differentiation process which gave rise to land abandonment and migration to cities in Spain and the myriad of land inheritors present a singular, yet comparable, set of conditions of social relations akin to developing countries.

Spanish farmers have now adopted European agricultural strategies which are based on directives worked out from planning offices with little consultation and still less participation of affected people. The way policies such as the 'set-aside' of land for reforestation are effected have an effect on the condition of the land. These policies, in the way they have been elaborated and implemented, are examined in conjunction with the study of the structure of the Spanish State in relation to the workings of its SWC planning bureaucracy.

Apart from land users and government planners in SWC, Spanish land owning urban dwellers are also able to make land use decisions or influence policy by adhering to or rejecting government's proposals. The non-compulsory character of reforestation of 'set-aside' land under the Common Agricultural Policy (CAP) gives landowners the power to reject or accept policy. Because the main objective of policy-making is to ensure that it is implemented, the degree of acceptance or rejection by land users is critical. Policy, either specifically designed to control LD, or to plan agrarian production (which also includes measures to avoid LD), must take into account the pattern of land ownership and people's perceptions of the need to protect land against degradation. Finding out the perceptions of the condition of land, is part of the examination of the processes of LD. In this thesis the perceived condition of land by people is, therefore, a research focus valuable for the explanation of LD processes and policy making alike.

Diverse agencies of the Spanish State (JCCLM, 1990: 14; ICONA, 1982), government officials (Camacho Lopez and de Aranda y Antón, 1993: 31;

del Palacio, 1993: 44; Lopez Cadenas, 1985: 54; Rojo Serrano, 1991: 1), and authors (Garcia Dori, 1994: 53; Lopez Bermudez, 1995; Sala, et al., 1991), see soil erosion and the conservation of water as the most serious environmental problems of the country. The two most important forms of erosion in the central area of Spain are gully and sheet erosion. The magnitude of soil erosion in Spain is often estimated through physical measurements, as those proposed by Camacho Lopez and de Aranda y Antón (Ibid), using the Universal Soil Loss Equation (USLE) for calculations. These authors often point to the 'desertification' processes taking place in areas of Spain, and to gully formation. However, other authors point out that loss of land through gully erosion, although visually impressive, is

> "...less likely to be the major component quantitatively... and it is ..loss of fertile soil through sheet erosion [which] is considered the main factor..." (Livingstone, 1991: 22-23).

Most of the policy and practice undertaken for the control of erosion through reforestation in Spain, successive Governments have been claiming, are for the protection of dams against sedimentation. The Spanish Government is under increasing pressure to augment the supply of water to the southern regions of Spain. Drought, the demographic movement towards the south, and the indiscriminate use of water for irrigation (Guardian 25-1-1993; Mundo Obrero, July 1993, N°.23-24, ;Financial Times, 27-7-1994 and 21-2-1995), require the Government to assess programmes of SWC carefully. These programmes will have a greater chance of success if SWC planning and project implementation is assisted by an improved understanding of the socioeconomic processes causing LD. One of the hopes of this thesis is to provide recommendations to assist in this endeavour.

The diversity of estimations and opinions about the seriousness of the drought and LD in Spain can be interpreted as reflecting the great uncertainty about amounts and rates of soil loss, and about the social, economic and political levels of acceptability of those rates and water shortages. Finding out what level of LD and water shortage is acceptable for a certain society is a complex task. Levels of acceptability imply how the problem and processes of erosion are perceived, a value judgement which is determined by social, economic, political, and ideological factors, as well as by rates of soil loss and conservation. These factors are generally not easy to quantify and therefore are often subject to qualitative interpretation. The examination of the perceptions of the socioeconomic processes of LD and the danger of erosion among planners and the affected population is therefore attempted in this thesis.

Providing an overall policy solution for standard cases of LD, even taking into account the results of an examination of perceptions, is difficult because the conservation cost of soil and water has a different value for the State, the poor or better off peasants, rural dwellers or farmers in the developed or underdeveloped world. For a government to use its economic resources in SWC in the most efficient manner, the physical and socioeconomic processes of LD have to be fully understood and integrated into the policy making process. Rural development policies affecting the possible loss or conservation of soil and water have an economic, social and physical cost which governments cannot afford to ignore. Ignoring the problem may have far reaching detrimental consequences which in the long run could prove to be extremely expensive and very difficult to correct.

A policy of total conservation cannot, because of its high cost, for most countries, be considered to be economically wise nor viable. Blaikie and Brookfield (Ibid) refer to "fundamentalist" approaches to soil conservation which contend that "since all life depends on soil, it is worth conserving at whatever cost" (p.84). The "fundamentalist" approach demonstrates lack of awareness of the physical, social and economic complexities involved in SWC. A course of action to tackle SWC 'at whatever cost' can be considered unrealistic and utopian. While acknowledging the desirability of soil conservation, these authors argue that because soil is in such plentiful supply, in economic terms it is not very valuable, and "Conserving soil and water, far from being worth whatever it costs, may not be worth its costs" (p.85). This is an important point to bear in mind in situations of management of tight budgets and decisions of allocation of scarce resources, as in many developing countries, if these are to be effected in the most efficient possible form.

The thesis proposes to provide an improved approach to explanation of the socioeconomic processes of LD and policy formulation, as much as through the methodologies and methods of study, as through its findings. The study for this thesis, while drawing on physical field data from the area, employs principally a multidisciplinary social scientific approach. Use is made of geographical, anthropological, historical and political economy methodologies. The use of these methodologies, especially political economy, will help to establish priorities in the decision making process of conservation.

Soil loss, and by default conservation, is affected by land users' perception of its importance, how it affects them economically and, above all, the measures they are able to take for its conservation. Soil loss and conservation in Spain are also affected by the Government's perception of the problem, its ability to elaborate a coherent and efficient SWC policy, and the economic and professional capability to implement it.

A condition which is often portrayed as crucial to make a SWC project work successfully is that governments and land users should be able to work together as partners, looking for and implementing solutions which are acceptable and beneficial to them both. Ostermeier and Yu emphasize that in "understanding how policy decisions are made, it is extremely useful... to discuss and analyze the roles and functions of policy participants, especially the Government role" (Ostermeier and Yu, 1991: 83).

The thesis considers that Governments should ensure that land users are involved in the planning and implementation of SWC projects. Initial consultation procedures should be directed at the involvement of land users in the planning process. Consultation provides important information about the socioeconomic processes of LD in the area of implementation and an opportunity to promote participation, which is of both scientific and political value. Successive Spanish Governments' disregard for the assessment of social and economic factors responsible for degradation, ignoring the need for participation and almost exclusively considering the physical factors involved, reflect the ideological nature of the State, its functional limitations, and/or the ideology behind the development strategy it pursues.

In its haste for 'modernization', the Spanish state has disregarded the value of traditional methods of agricultural production, land management knowledge, perceptions and priorities. This often results in overlooking the economic needs and other aspirations of land users as well as the circumstances determining their type of land management. The reasons why the reforestation agencies of the Spanish Government rigidly adhered to autarchic or 'modernization' strategies and used the full coercive force of the State to implement their SWC plans, are best understood by examining the structure and ideology of State power and social classes' access to it. This study will attempt to illustrate these through the examination of the case study of Guadalajara.

ii. Structure of the study

The thesis is divided into three Parts. The importance of LD, the disciplines used in the study, and the changing concerns for the condition of land, the solutions, and their effects in Spain are discussed in Part One. The physical and socioeconomic characteristics and past and present planning and implementation of SWC in the field area are examined in Part Two. Part Three uses methods of participatory data gathering which are an alternative to those normally used by SWC agencies. These methods of data gathering are specially designed, not only to provide explanations of land users' perceptions of the socioeconomic processes of LD, but also, to be valuable for the promotion of participation in planning for SWC. A considerable amount of the data for Part Two derives from field work primarily done for Part Three.

To provide scientific recommendations which is valuable to policy makers, the thesis sets four main objectives closely linked to those identified by Blaikie (1989). The first is to contribute to explanation of social, economic, political and scientific perceptions of LD processes. The study is set in context by examining some highly relevant social and economic concepts, viewpoints, and parameters for the understanding of LD in Chapter One. It is argued that land users' values and scientists' appraisals and recommendations to prevent LD are often affected by differing perceptions and ideology. Perceptions in turn are affected by the position of the individual or group in relation to the means of production and/or training and experience. Policy making is often affected by scientific findings, and the opinions of different social groups (such as land users, ecologists, people from the urban areas, or foresters), about the importance of LD and/or SWC measures. The last two Parts of the Chapter debate the suitability of multidisciplinary approaches and explain the choice of the methodologies used in the thesis.

Some of the important socioeconomic reasons for LD in Spain, the growing arguments for the protection of land, and the emergence of technocratic and autocratic approaches to SWC are examined in Chapter Two. The development of these approaches are identified as being in parallel with the rise and dominance of particular State ideologies and development strategies. The examination of the development of these approaches is done in an historical perspective. The Chapter shows how Spanish rural development policy affected the ownership and access to land in Guadalajara province and what the results of this policy are for the condition of land and SWC. Technocracy, autocracy and ideology constrained the operational capacity of the Spanish forestry agency and the organizational capabilities of rural communities. Technocracy and autocracy affect the possibilities of participation in planning and implementation of SWC.

The main actors in the decision making process for SWC policy are identified in Chapter Three. It examines how the collusion of interests of influential social classes in policy making, the use of scientific findings and their manipulation to validate policy reenforced the adoption of technocratic and autocratic approaches to SWC. The evolution of an influential social group in the decision making process outside Government, that of the ecologist pressure movement in Spain is examined in the Section ii of the Chapter.

Some of the most relevant European Union (EU) regulations to this study, especially those under the 'set-aside' programme involving reforestation of agricultural land abandoned under the 'set-aside' programme, are examined in the last section of this Chapter. In this section the extent to which the EU has a coherent policy - or even funding system to combat LD is discussed.

The first hypothesis of the study, that poor understanding of the socioeconomic processes and lingering technocratic and autocratic SWC planning and implementation in Spain are detrimental to efficient conservation measures, is tested in Part Two of the thesis. The background to the Spanish case covered in Chapters Two and Three complements the case study in Guadalajara in Chapters Four, Five, Seven and Eight. The importance of the study of Guadalajara experience is that it provides a detailed example of many national socioeconomic processes of LD. This broadly is because the socioeconomic processes of LD, to a large extent, are determined by the broad national economic and political circumstances affecting agrarian production. The case study of Guadalajara must be considered representative within this national political and economic framework.

A profile of the area of study and its physical and socioeconomic geographical characteristics is provided in Chapter Four. The exploration of the physical characteristics includes air photo interpretation and examines the results of erosion and degradation measurements carried out by the IBERLIM study. The socioeconomic characteristics of the area are examined in a historical perspective.

Autocratic and technocratic forms of planning and implementation of SWC are examined to elucidate the way these may have affected the control of the means of production, land, by the State. The political geographical characteristics of the area relevant to planning for SWC are examined. An important part of these characteristics is the organic professional structure of the Government office of agriculture in Guadalajara. This structure is examined in the last section of Chapter Four.

The rural development and reforestation projects in the area of study since 1939 (when technocratic and autocratic approaches started to be used) provide the empirical basis for the evaluation of the policy of SWC, are examined in detail in Chapter Five. The second section of the Chapter looks at the recent implementation of reforestation projects as part of the European Union 'set aside'. Evidence of continuing technocratic and autocratic approaches in the field area is also provided in this section. It uses evidence from three cases of reforestation and rural development to ascertain if Government officials' calls for participation are rhetoric or reality.

An alternative to Spanish SWC planning practices is needed if findings are to be useful to planners. The second hypothesis of the study tested in the Part Three of the thesis is that 'alternative' methodologies and methods of data gathering used in the thesis itself can both help explain the socioeconomic processes involved and encourage the participation of people affected by SWC projects. Besides gathering data for the explanation of processes of LD, the fieldwork is itself a trial exercise to guide the development of new SWC planning procedures based on the perceptions and participation of local communities.

Data gathering was based on open ended semi-structured interviews with a range of land users and soil/water professionals such as foresters. The evolutionary character of the qualitative data gathering process, based on rapid appraisal methods, was participatory from the construction of the questionnaire to the analysis of data and writing up some of the findings[5]. The methods used, as important as the data gathered, are explained in full in Part Three of the thesis. At this stage, however, it is important to reinforce the significance of the methods for the explanation of the socioeconomic processes of LD and the promotion of participation in planning. Devising these type of methods requires an evolving or innovative approach which is presented as valuable for planners and researchers attempting explanation and the promotion of participation of affected people in planning.

A review of the academic debates and opinions about data gathering for the study of socioeconomic processes of LD and planning for SWC is contained in Chapter Six[6]. Some of the ongoing debates on the desirability and usefulness of rapid rural appraisal are examined in the first section of the Chapter, and the second section examines those of participatory rural appraisal.

How these methodologies and methods of data gathering have been put

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[5] Some of these findings have been published by García Pérez, J. D., Charlton, C. and Martin Ruiz, P. (1995).

[6] The reason for including a review of theoretical issues related to methods of study in part three of the thesis and not integrated in Chapter One explanation of the disciplines used, is that these are best discussed when they are encountered. In this case this review is placed at the start of Part Two, before the field work data gathering and analysis in Chapters Seven and Eight.

into practice in field work for this thesis and the analysis of the data are explained in Chapter Seven. The field work provides empirical data on land users' perceptions of LD processes and helps to ascertain opportunities for their participation in planning. The participation of respondents in the construction of the list of questions and its use is explained. The analysis of the data also reveals some of the decision making processes in SWC by land users. This fulfils the third main objective of the thesis, to contribute to an explanation of decision making processes for SWC by land users.

The pursuit of further insights into perceptions of LD, erosion and SWC required the elaboration of an alternative/additional approach to ascertain visual perceptions of erosion danger using pair-wise photographs. The explanation of the method used and the analysis of the results is presented in Chapter Eight. This method provided an opportunity to expand data gathering to other three important social groups, technicians such as foresters, people from the urban areas, and members of environmental pressure groups. The selection of these social groups is based on their knowledge of the area and their potential to make or influence land use decisions. The method reveals their perceptions of danger of erosion, a basic expression of LD.

Soil and water conservation policy formulation, identified above as in need of exploration, is the fourth and last main objective of the thesis. By examining policy formulation two main clarifications are sought, one: to contribute to a fuller explanation the LD processes, and two; to explore the possibilities and constraints of working through the State in planning through participation. The institutional strengths and constraints of the Government's Office of Agriculture in Guadalajara are evaluated. This will provide the bases to formulate recommendations for the improvement of these government structures and professional capabilities to promote a participatory strategy in planning. Recommendations are evaluated and formulated in the Final Conclusions and Recommendations of the thesis.

Part One

Approaching the study of land degradation

The First Part of the thesis, comprising Chapters One to Three, places the study of socioeconomic processes of LD and planning for SWC in Spain into its theoretical and historical perspective. Chapter One discusses the importance of LD and the disciplines used in the study. The importance of LD is explored by looking at some definitions including those by various different social groups and academic disciplines. This shows that the construction of definitions is affected by the perceptions of social groups, by the choice of methodology, the way in which the data is analyzed, or the objective of the analysis, for scientific or agricultural production work. The choice of disciplines in this thesis is based on the result of this exploration.

The study of LD is then placed into its Spanish historical situation in Chapter Two, by the examination of the emerging concerns with LD in Spain and the ways in which the problem has been tackled. The factors affecting the decision making process for SWC in Spain have not only been influenced by the perceptions of the problem by various social groups or academic disciplines, but also by ideology. Chapter Three explores the ways in which vested interests in agrarian production are often able to influence and determine policy. Some of the most relevant policies of the Spanish State and the (EU) are then examined in the light of the forgone debate, setting the case study of Guadalajara Province in Parts Two and Three into the context of these first three Chapters.

Chapter One
Perceptions of land degradation processes and methodologies of the study

This Chapter reviews how land degradation has been defined and explained from a variety of standpoints. These have evolved from differing perceptions that are rooted in alternative academic disciplines, ideologies and positions in relation to the means of production. The existence of contrasting perspectives on the meaning, significance, ad measurement of LD has important implications for policy making in SWC.

The processes of LD, being highly conjunctural, are best studied through a multidisciplinary approach. The Chapter therefore also examines the advantages and disadvantages of multidisciplinary approaches to the study of LD, and considers the contributions made by a range of academic disciplines. Geography, anthropology and political economy, used in a historical perspective, are especially prominent. It can be argued that study of both the physical and social environments are essential and complementary in the study of LD. Perceptions of LD by non-academic groups is also examined in the thesis.

Definitions of LD to a great extent are a reflection of conditioning factors such as the scientific background and the ideological persuasion of the individual or group. Blaikie and Brookfield argue for a multidisciplinary approach to the study of LD, and the need to move away from single 'scientific' definitions and confront the reality of competing social definitions (1987: 16).

The section that follows reviews some of the more prominent alternative scientific perspectives on LD. This underlines the interrelated character of the socioeconomic and physical processes of LD and the ways in which they are studied and constructed.

i. Land degradation: definitions and meaning

The way the scientific community perceives the problem of LD, approaches its study and defends the validity of arguments, conclusions and definitions, has an impact upon the decision making process for SWC and the condition of land. Policy makers are most likely to reflect and respond to the standpoints, conclusions and recommendations of the scientific community, more so than those of land users. However, the meaning LD has for land users often differs from those who study it or who elaborate and implement policy. Land users' views reflect their concern about the productivity of land and their knowledge of its condition is gained through their working practice. They generally perceive LD in practical terms of production, traditionally taking a long term approach to ensure the steady fertility of land and their own survival.

There are competing and sometimes antagonistic views about LD among policy makers, land users and academics. Dumsday argues that "...no single definition of LD is likely to satisfy all those interested in the subject." (Chisholm & Dumsday, 1987: 316). Blaikie and Brookfield have argued that issues of LD and what it means to land users, are rooted in the severity of its effects in relation to the people using the land. They argue that "...the definition of degradation, and whether it is 'bad' or not are both related to the people who use land" (1987: 26). Barrow (1991) defines LD "...as the loss of utility or potential utility or the reduction, loss or change of features or organisms which cannot be replaced". But he stresses that "A precise definition is impossible, given the many factors which may be responsible." (p.1). Belshaw et al (1990) argues that competing views on what constitutes LD and how land should be used can be allowed to co-exist (p.68).

An important factor accounting for differences in views between land users and other social groups about the condition of land is that those of land users have been shaped by work on the land, observation and experience, which has been passed down through generations. In contrast, policy makers and scientists acquired their knowledge through conventional education or research, which often bears the imprint of the political and ideological make-up of the State. In this sense policy makers' perceptions are conditioned by education and the predominant State ideology. This does not mean, however, that land users are not influenced by political and ideological factors (they often see LD as a politically affected issue), but that they have their own 'vernacular definition' of LD. Land users have political views, take political sides, and effect decisions mainly according to land use policy affecting their economic wellbeing.

The meaning of LD and 'whether it is bad or not', according to land users' perceptions, is in clear contrast to scientists' and Government officials' definitions for one main reason - their position in relation to the means of production, land itself. Seemingly economically and politically detached from the land, scientists are supposedly more 'objective' in their analysis than land users or policy makers [1].

Economic interests in land exert a great influence on the way problems of LD are perceived and opinions are constructed. Land users' perception, related to production, affects the way the danger or extent of LD is qualified. Blaikie and Brookfield argue that land users' criteria for assessing degradation varies with their demands on land (1987: 95). But it can also be argued that the criteria of scientific studies vary according to the demands made by discipline, methodology, individual ideology, etc, as well as the funding body financing the research. Scientific methods and therefore findings are often influenced by the favoured scientific criteria required to obtain research funding. A danger for the understanding of LD processes is that research may follow political rather than scientific leads.

Studies of LD comprise multiple combinations determined by disciplinary and changing paradigms. Social scientists, such as Blaikie, adopt the definition provided by Hudson, who argues that:

> ...if soil erosion is defined in the widest possible terms, it includes any degradation of the soil which reduces its ability to grow crops (Hudson, 1971: 41 in Blaikie, 1985: 10).

This definition takes a broad perspective which would be understood/accepted by a range of different social groups (farmers, government planners, environmental pressure groups etc.), perceiving the effects of erosion as affecting the condition and productivity of land.

The following example shows some of the differences in the perception of social, economic and physical parameters used to assess the condition of land used by scientists, land users, and policy makers. In his case study of Kenya, Livingstone examines the carrying capacity of the range using livestock-to-people ratios, and compares

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[1] Although there may not be many cases in which the objectivity of scientists is obscured by their 'vested interests' in land, their difference of opinion about the importance of LD usually stems from their disciplinary and ideological approach. A discussion of these issues and the political persuasion of the researcher influencing the methodology used, and therefore the results of the analysis, is discussed in the section on ideology and methodology below.

it with Government's usage of livestock-to-land ratios. The livestock-to-land ratio is "...the maximum rate of stocking which can be sustained at an equilibrium without degradation of the range". He defines the degradation of the range "as a reduction in [its].. long-term productive capacity" (Livingstone, 1984: 30). He explains that:

> ...while the livestock-to-land ratio may be excessive (ie. the carrying capacity of the land is exceeded), the livestock-to-people is low; households on average have fewer livestock than would be desirable even for subsistence. (Livingstone, 1991: 81)

The two parameters used give different perspectives on the extent of degradation. Livingstone argues that the great resilience of the range is proved by its ability to recover under traditional pastoralist management. He defends the case of traditional pastoralist practices on social, economic and political grounds and emphasises that "...degradation can only be defined with reference to the range as a capital asset i.e. to its capacity to sustain livestock..." (Livingstone, ibid). Rather than de-stocking to reduce the pressure of animals on the land, he calls for greater research on the germination cycle of grasses to determine the potential of its recovery.

In contrast to Livingstone's views, the aims of the State in Kenya are the modernisation of pastoralism based on ranching techniques with the objective of obtaining greater productivity. Their rejection of traditional pastoralism is based on the hypothesis that:

> ...private ownership of animals and communal ownership of the range lead to a 'free rider' situation, with individuals maximizing their own use of the range by increasing individual holdings. (Livingstone, ibid: 80).

Although both policy makers, scientists (such as Livingstone above), and land users share similar concerns in their examination of the productive capacity of land, the perceived causes and extent of degradation diverge because of the different parameters used (ie. livestock-to-land and livestock-to-people ratios), and their position in relation to the means of production. The use of these different parameters is a reflection of different ideologies of State development strategies and scientific disciplines.

The way in which land use and erosion are perceived often results in conflicting land management strategies. This is more pronounced when governments perceive the cause of LD to be the result of irrational use of land or land users' ignorance. This has been the case in Spain where State programmes of SWC through reforestation normally have resulted in the struggle for the control and/or ownership of land between the State and land users. State control which ignores what LD means for land users and denies them proper access to the decision making process in planning cannot be considered the best way to secure a successful SWC policy.

Although there is a general consensus that what LD means for land users is coloured by how it affects them economically, relatively little is known about their decision making process for conservation. More studies of the processes of LD from a land user's perspective are therefore needed. This is emphasised by Millington et al who argue that:

> ...reliance on local knowledge is acutely needed because of the gaps between peasant farmers' and policy makers' ...the two different sectors have very different perceptions of the severity of environmental problems and consequently react in different ways. (1989: 287).

This is illustrated by Scoones in his study of range degradation in Zimbabwe, in which he explains that farmers:

> ...do not deny that a greater cattle population results in the removal of more grass ...but they do dispute that grazing results in major irreversible effects, except in particular instances. (Scoones, 1992: 57).

Land users' understanding of degradation is a pragmatic one which takes into account its importance in relation to production and their own survival, rather than purely for SWC. Scoones vindicates this pragmatism by farmers against Zimbabwean officials who blamed the damage done to the land on land users' irrationality and ignorance. He claims that apparently alarming erosion "...cannot be termed degradation", unless it affects present and future potential animal productivity (Scoones, 1992: 112). 'Present and future' issues are also discussed by Blaikie and Brookfield who explain that "...land degradation is judged in terms of the altered benefits and costs that accrue to people at the time and in the future" (1987: 26).

A similar perspective is adopted by Abel and Blaikie who argue against policies for reduction of cattle as a measure to reduce erosion because a small increase in vegetation cover and a minor decline in the amount of erosion would require a great reduction in stocking levels (Abel & Blaikie, 1989, in Scoones, ibid: 112). These views exhibit a sense of practicality when degradation is not irreversible: physical degradation that does not affect the present and future generations' ability to use land productively cannot be seen as degradation.

Proposals for SWC involving land use changes which fundamentally affect traditional practices must firstly ensure that this cannot be achieved in any other way but through drastic measures affecting the economic survival of land users and the capability of land to produce. Blaikie and Brookfield focus on cases where change of land use affects land capability. They explain that:

> ...degradation is defined as a reduction in the capability of land to satisfy a particular use. If land is transferred from one system of production or use to another ...a different set of its intrinsic qualities become relevant and provide the physical basis for capability. Land may be more or less capable in the new context. (1987: 6).

Secondly, if the way land is used must be changed, land users' views and opinions must be taken into account with the objective of understanding their predicament and involving them in policy making about new practices. For example change within the same broad type of land use, as for example by improving pasture for better livestock management and SWC, may be easier than a shift to a different land use such as reforestation. These changes need the evaluation of land users' perceptions of LD and their inclusion in the participatory process in planning.

Levels of soil loss which a government may feel are within acceptable 'safety limits', are also determined by perceptions and socioeconomic expectations. According to Cook, for decades soil loss tolerance has been defined as:

> ...the maximum rate of annual soil erosion that will permit a high level of crop productivity to be obtained economically and indefinitely. As a practical matter, one problem with the definition is that it strongly implies ...that there should be no loss in the long-term productive capacity of the soil. (Cook, 1982: 90),

Accepting this definition of soil loss tolerance would amount to, what in Blaikie's terms would be, a 'fundamentalist' approach to soil conservation.

Blaikie and Brookfield (1987), provide an equation of the main variables accounting for rates of LD. This helps to understand in what direction variables accounting for LD operate and the degree of importance in relation to each other. These authors explain that:

> ...net degradation = (natural degradation processes + human interference) - (natural reproduction + restorative management) (1987: 7).

'Safety limits' of soil loss are qualified by the way the problem is perceived according to academic discipline and social class ideology. Eyles (1988) stresses the difficulties caused by the class bias of researchers, because "virtually all researchers are... at least middle class" (p.4).

Two of the parameters used for the physical measurement of LD are its sensitivity and resilience. Blaikie and Brookfield define land sensitivity as referring to:

> ...the degree to which a given land system undergoes changes due to natural forces, following human interference...

and resilience to:

> ...the ability of land to reproduce its capability after interference ...a property of standing up to, or absorbing the effects of interference... (1987: 10).

The process of LD may be seen by land users as a consequence of their own production activities, but SWC is seldom seen as an end in itself. SWC is one of the integral parts of the production package. According to Blaikie, measurements of soil loss or LD by scientists are in themselves difficult and problematic and "...confirmation that there is, in fact, degradation taking place... is an immensely daunting task..." (Blaikie, 1989: 23). An examination of the methods available for the measurement of LD and issues of their accuracy and relevance to planning for SWC is therefore necessary.

ii. Measuring erosion

> *"It would be good to believe that science is fact and that measurement is right. Indeed, so tempting is the thought of the neutrality of science (and the objectivity of measurement) that many who should know better - scientists for example - believe it, and those not in a position to judge believe it too"* (Stocking, in Blaikie and Brookfield, 1987: 49)

This section debates issues of uncertainty, availability and usefulne_s of physical measurements of LD in planning for SWC. That rates of LD are not even considered by social scientists, is not only the result of the conjunctural character of LD processes or the different ways of explanation and substantiation (Dumsday, 1987), but also a reflection of the problems of accuracy and relevance faced by some forms of physical measurements. The method used to obtain measurements, is also "...preconditioned by the experiences, perceptions and prejudices of the observer (Stocking, in Blaikie and Brookfield, 1987: 63).

The training of Spanish foresters in the use of the Universal Soil Loss Equation (USLE) in the United States, influenced their predilection for the use of this form of measurement. The USLE "...was designed to predict soil loss from sheet and rill erosion (Wischmeier, 1976: 5). The equation "...splits the erosion process into six major factors, uses variables to express each of those factors, and provides tables and design equations to calculate appropriate numerical values for the variables" (Blaikie and Brookfield, 1987: 58). The ease with which the equation can be transposed and used in different field situations gave rise to its misuse. Wischmeier (1976), explains that the extension of the application of the USLE "...should not be categorically discouraged, but proper precautions are needed to avoid possible misuse or false conclusions" (p5). Roldan Soriano and Fernandez Yuste (1993), propose the use of the USLE as a reliable tool for planning reforestation but are aware of its limitations (p128). This shows that although the USLE is still considered an important tool for calculating rates of erosion by foresters in Spain, the readiness for its unconditional adoption has diminished. Abel and Stocking (1987) go further in their caution for the adoption of the USLE when they emphasise that "...the USLE is strictly valid only where the factor values for the equation have been experimentally determined, a situation that pertains only to cropland east of the Rocky Mountains in the United States" (p460).

Other methods of assessment of degradation can be devised to deal with limited technologies and scarce financial resources. Able and Stocking (1987), explain that one of the main problems with the use of the USLE is the difficulties encountered in evaluating the most important factor in the calculation, that of vegetation cover (p460).

These authors explain that the potential of remote sensing for the evaluation of vegetation cover and animal density, two principal agents of change in rangeland situations, is questionable. These authors describe an attempt to develop criteria for a soil loss model called SLEMSA (Soil Loss Estimation Model for Southern Africa) by developing countries, in this case Botswana. This encompassed obtaining air photographs for assessment of vegetation cover, to serve as data for statistical calculations and the construction of isoline vegetation maps. These calculations and other variables such as seasonal rainfall energy, soil erodibility, rainfall interception, slope steepness, canopy cover and topography, are part of the SLEMSA equation, which these authors emphasise, are a cheaper and more reliable form of assessment than the USLE would have been (p.462).

Because there are reasons behind the use and misuse of different measuring methods, Blaikie and Brookfield (1987) argue that it is ...necessary to examine critically the political, social and economic content of seemingly physical and 'apolitical' measures such as the Universal Soil Loss Equation, the 'T' factor and erodibility" (p.xix). The implications of basing a SWC policy solely on USLE calculations dependent on the value of the T factor [2] are that results may be inaccurate and wasteful. Cook (1982) examines the consequences and legal implications of lowering T values which have for a long time and extensively been used in the USA with a high degree of compulsion and expenditure. He argues that the legal implications would be enormous if farmers claimed compensation because they had in the past been advised to operate too high T values (giving too high rates of soil loss), making farmers incur greater expenditure in SWC than it was needed. He explains that the validity of T values, and the scientific method explaining how they were arrived at, would have been hard to justify in a court case because "the science behind T values is weak". Asking a farmer to reduce the degree of care in land in which he invested because T values had been too high, may give the impression that, after all, such investment, was not important (p90).

The construction of a theoretical explanation of LD has been proving

[2] The T factor is defined as "the maximum rate of annual soil erosion which would permit high level crop production to be maintained indefinitely" (Schertz, 1983 in Blaikie, 1985: 17)

extremely difficult not only because of the large number of variables involved, but also because of insufficiencies in these studies. These insufficiencies may lie in the limitations of studies of processes through physical measurements, socioeconomic studies of processes, or in the inadequate integration of these two. A problem related to the limitations of physical measurements, as seen by Blaikie (1985), is that although the necessary equipment exists and reliable estimates can be obtained, this and the manpower needed to operate this equipment is not available to most developing countries. For these operational reasons accurate measurements of LD are scarce and most data of physical measurements available in those countries are of a qualitative character (Blaikie, 1985: 15). This was also the case in Spain during the 1950s and 1960s, when experimentation with the USLE gave rise to the 'demonstration' and claims by Government officials of excessive soil loss. Although claims were made of scientific authenticity, such techniques were rarely used effectively at the level of individual projects[3].

The availability of the USLE did not ensure its use because of the operational difficulties encountered in the professional capabilities among teams of Government officials. Only a few Government technicians trained in the USA knew or had the time or inclination to operate the techniques comprised in the USLE. Camacho Lopez, one of the technicians trained in the use of the USLE in the USA, during informal interviews for this thesis, explains that such techniques were unnecessary in project elaboration, since a simple visual assessment could tell nearly as much of the degree of erosion as these physical measurements. This technician, however, defends the accuracy and usefulness of the USLE, as the best equipped method to obtain the measurement of soil loss in a large and widespread geographical setting (personal communications). Project elaboration and approval for the protection of land through reforestation in Guadalajara did not make use of the USLE, presumably because of the lack in training in its utilisation by existing staff in Spain at the time.

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[3] The absence of scientifically based tests on the state of the soil or its hydrological condition, in planning for reforestation in the area of study, are issues examined further in section 'i' of chapter five.

Another problem is that available measurements of LD often are unrelated to other important socioeconomic causes or contributing factors such as agricultural or pastoral land use and methods of SWC. Chambers explains about the "special reverence reserved for quantification", and he argues that:

> ...much more is known about 'first' subjects than 'last' ones. Compare knowledge of space rocket technology with the ignorance of how female headed households in remote rural areas contrive to survive tropical wet seasons... More is known about computers than goat droppings; a large imported computer scores straight 'first', a local goat's droppings straight 'last'" (Chambers, 1983: 175).

Greater knowledge about goats' droppings would certainly be useful to the study of LD in Guadalajara, where pastoralism is an important economic activity and a contributing factor to the stability and productive capacity of the soil. Contrary to the beneficial effects of pastoralism a large herd of goats can also be the cause of soil erosion by the action of their hooves on the ground.

Chambers' statement on the "reverence reserved for quantification" and his wish that what he calls "the tyranny of quantification" should be kept in check (Chambers, ibid: 200), implies that the importance accorded to quantified data is greater than that of qualitative data. However, physical data unrelated to the social, economic and political contexts involved is of limited value to researchers and policy makers. Assertions that, "...more than 30 tonnes of soil per hectare are washed away every year causing severe sedimentation of water courses" in Spain (CEPA, 1992: 95), or that expressed in a FAO report which argues that "...unless conservation is introduced, 544 million hectares of rainfed cropland... could be lost by the end of the century" are according to Bojo (1991), of little use to decision makers (p.75). The problem sometimes also lies in the difficulty of interpretation of data, for example which measures the rate of top soil loss per square kilometre, yet is unrelated to land use changes (Blaikie, 1985: 17). The task of predicting the causal links between soil loss and land use accurately is only one part of control programme administration (Chisholm & Dumsday, 1987: 323). The demonstration of high soil loss by physical measures, by itself does not provide an explanation of processes nor does it establish the need for conservation. The argument for the need for SWC, to justify its expense, has to be established in conjunction with the evaluation of the value of land, its productivity and production potential, and/or the sociological and economic benefits such expense would render to land users or other affected population.

The imperfection of studies of processes of LD derives from deficiencies of integration between the quantifiable, generally physical aspects of LD, and the less quantifiable, generally the social, political and economic aspects. It is often the case that there is a fair amount of knowledge about micro levels of erosion in particular places, but not much is known about its economic effects (Bojo, 1991: 76). For instance, the effects of sediment deposition on flooded agricultural land are difficult to measure and evaluate in economic terms. The difficulties of measuring the effects of deposition are coupled with deficiencies in the methodologies used for socioeconomic studies of processes of LD.

It is not only important that data is available and presented to decision makers in a concise and amenable form , but that it is useful and reliable. Data is useful when it fulfils the purpose for which it has been collected. A methodological approach designed for collecting rates of erosion data does not explain the socioeconomic processes of LD and should not be, on its own, considered as a reliable informative instrument to determine policy. However, Pile claims that while:

> ...qualitative methods raise the problem of interpretation, they are directed to problematising common sense rather than accepting the test at face value... qualitative information can - and must - be linked to the general and the theoretical, rather than simply describing the specific... (Pile, 1992: 136,138).

Multidisciplinary studies of causes and effects of LD is an improvement which to a certain extent compensates for deficiencies in measurement and explanation by single discipline studies . Even in cases when causes can be narrowed down to "excessive exploitation and faulty agricultural practices", as proposed by le Houerou (1990) for southern European countries (p.104), the situation still is that there are "...practical difficulties in making precise technological and agronomic estimates.." (Livingstone, 1986: 6), in studies of LD.

Given the level of uncertainty in 'exact' measurements of LD, a study of the working context of land can help in the explanation of land degradation processes. For whom LD is 'important' and how this importance is measured, are issues best examined within the working context and land use practices. Issues of importance examined in the following section relate to consequences and concerns about LD as perceived by different social and interest groups and not to rates of soil loss or degrees of physical degradation. Some implications of the sole use of measured and quantified data of LD in the decision making process are explained below.

The following section examines issues of 'importance', which helps to build up the framework for the study of the way social, political and economic forces accounting for LD work in the Guadalajara province of Spain.

iii. Significance of erosion

Land degradation and soil loss do not affect all sections of the population equally. Land users or the industrial sector attach a degree of importance to LD which corresponds to the way it affects their assets. Blaikie, explaining that soil erosion can contribute to food shortages, drought, floods, landslides etc., points out that the degradation of soils does not affect all land users equally. He argues that, for example, in East Anglia, where land users have access to inputs such as fertilizers, LD has less social impact as in another place where they may lack access to these inputs (Blaikie, 1985: 16).

An assumption running through this study is that there is greater concern about soil loss and LD when its consequences threaten economic or social interests. LD is especially seen as important by Governments when it threatens the interests of the dominant social classes. Blaikie contends that little will be done about soil erosion until the process of economic accumulation of the dominant social classes is threatened, as for example, by siltation of reservoirs endangering the generation of electric power for the industrial bourgeoisie (Blaikie, 1985: 44-45). It is only then that LD becomes a serious 'public hazard' of varying political concern. The construction of the Vado and Beleña dams, providing drinking and irrigation water for Madrid and Guadalajara city and for irrigation in its surrounding agricultural area (see map 2, page 31), prompted the reforestation for the protection of large water catchment areas, and at the same time for wood production. The provision of drinking

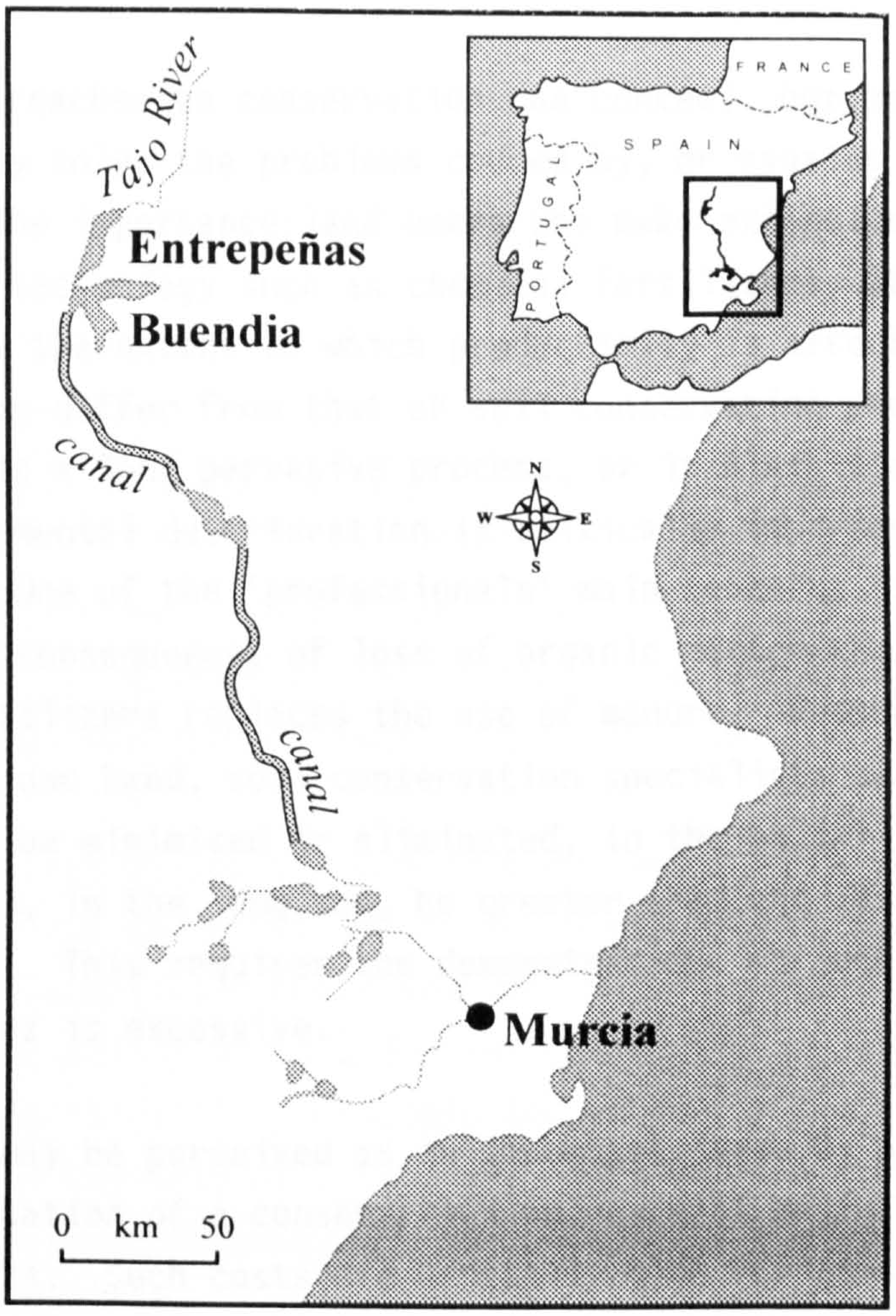

Figure 2: Water transfer system from Guadalajara Province to the South East of Spain

water has primarily benefited people living in Madrid and the industries located there, and reforestation mostly benefited the wood pulp industry. Soil erosion became important when its reduction meant greater economic and social benefits for the urban population and the wood pulp industries of Spain.

Technical approaches to conservation can conceal, but not completely or permanently solve the problems caused by, or causing erosion and soil loss. The importance land users who make extensive use of new agricultural technology such as chemical fertilizers, attach to LD is influenced by the extent to which productivity is affected. Their evaluation may differ from that of soil conservation professionals, for whom LD is a long pervasive process, or in Blaikie's words, for whom 'environmental deterioration is critically important and extensive'. One of the 'professionals' main concerns is, for example, the consequences of loss of organic matter when the use of chemical fertilizers replaces the use of manure. Dumsday points out that, on the one hand, soil conservation specialists see soil loss as something to be minimised or eliminated, in the belief that social benefits will, in the long run, be greater than the costs of conservation. This requires the demonstration, through measurement, that soil loss is excessive.

Although LD may be perceived as an important issue by policy makers, the implementation of a conservation policy will be influenced by economic costs. Such costs are generally high for governments and land users alike. Governments may also have to justify the high expenditure of a conservation policy to the electorate, (an issue which politicians are often highly sensitive about). Those governments with an inadequate conservation policy may have to face the criticism and organised campaign by environmental pressure groups. A conservation policy which, as in the Spanish example, is based on indiscriminate reforestation with conifers, creating social, economic and sometimes other soil and ecological problems, tempts the criticism of environmental pressure groups.

It can be said that the level of rejection of conservation measures by farmers is directly proportional to its cost. This cost may be directly financial, in disruption to their land use practices and productivity, or in labour costs, having to use more labour or number or hours worked reducing leisure time. If farmers reject Government's conservation measures, because they may be perceived as costly and unnecessary, compulsion may be used. Millington differs from Rickson about the 'necessary level of governmental compulsion' and, by implication, the implementation strategy of a soil conservation policy. Citing the way that American maize farmers have rarely benefited financially from conservation measures, Millington rejects Rickson's assumption that conservation ...is economically beneficial to the farmer (in Millington, 1989: 283).

Turner (1988) argues that:

> ...the economic advantages of soil conservation are no incentive to Lesotho farmers when monthly wage levels at South African mines exceed the value of the annual crop production from individual farms. (in Millington, ibid).

However important the conservation issue is for farmers, it is the economic cost of implementation, or their time and effort, in relation to the resulting financial benefits, which usually prevails.

While the Spanish policy of reforestation may have been important to protect dams from sedimentation it may worsen small farmers' economic conditions. Excessive concern and zeal about conservation, implementing a policy which addresses the physical problem in isolation from its social, economic and political factors, as will be shown below is the case of Spain, may in the end augment the complexity it aimed to simplify, that of achieving better SWC. Blaikie explains that "...remedies are not found simply in compelling or persuading the immediate land managers to mend their ways" (Blaikie & Brookfield, 1987: XIX), nor by emphasizing the importance of soil protection to land users. Remedies may be found in understanding how important soil is for land users and how they perceive the processes of LD and to involve them in planning for SWC.

Rather than a 'fundamentalist' approach (meaning a comprehensive soil conservation policy, implemented at whatever cost, as explained p.10 above) or a 'do nothing approach' to conservation, it can be discerned that "the relevant question is how much soil can we afford to lose" before productive capacity is lost (Cook, 1982: 92), and as in the case of Spain, before dams fill with sediment. A 'fundamentalist' approach is extremely costly but Governments may try to use it as an argument for other purposes. The need for the conservation of soil 'at whatever cost' may hide other objectives, such as the 'modernisation' of agrarian production. The need for the protection of soil against the devastating actions of peasants was an argument often invoked by Spanish Government officials to justify and promote the development of the incipient wood pulp industries in the early 1950s.

Even when it put in jeopardy the fragile economy of the many subsistence producers, the interests of the wood pulp industry were promoted, disguised as or in parallel to concerns for the degraded condition of land. The promotion of these interests in Spain is parallel to the demonstration of the need for land protection. This demonstration was achieved by the simplification of the explanation of LD presented to decision makers. Reports presented to decision makers by the agencies of Government often contain extremely simplified information about soil conditions and the causes of LD, when in reality processes are highly complex and vary greatly in time and with changing land uses. In the case of Spain one of the simplifications has been the 'fact', visually manifested in existing gullies and other features showing erosion, of the damage caused by the inadequate working practices of peasants. The presentation of this simplified data as 'user friendly' statistics or 'facts' to Government decision makers with 'little time' or inclination to analyze the more intricate social, economic or political components of LD processes, suited the hidden objective of reforestation by the State, wood production, and justified its actions.

The examination of the data gathered by planners for the projects of reforestation in the area of study shows lack of detail and depth[4]. The data of these projects presented to decision makers for approval, was not supported by any previous measurements of the physical conditions LD, and only very superficial assessment of the socioeconomic ones. No consultation with land users, of the most convenient way to proceed with reforestation, took place except to inform them that if they did not effect the directives of the particular project affecting their land, the Government would do it. There was no alternative to reforestation with conifers, but two ways of effecting it, through a consortium with the Government or by the

[4] This data is examined in greater detail in Chapter Five.

Government on its own, through expropriation of their land. Neither of these two ways provided any scope for changes in what had been determined at Government office level regarding the species to be planted.

The argument that decision makers respond better to 'concrete' simplified, often quantitatively based explanations, than to intricate ones involving social and political forces, may be an excuse for the unremitting use of the former. This indicates time or professional limitations on the part of Government officials producing the reports and/or that of decision makers considering them, rather than the superiority of purely quantitative explanations. Officials' professional limitations for report elaboration, comprising socioeconomic and physical studies to facilitate interpretation for decision makers, may be found in the difficulty of integration of these two highly different forms of substantiation and explanation. These professional limitations become 'insurmountable' when socioeconomic studies of the processes of LD may demonstrate the approach to SWC favoured by the State to be socially, ecologically or economically inappropriate for those whose very presence are portrayed to be the cause of LD and the obstacle to SWC, land users.

Another reason for the unremitting use of 'data-friendly' reports presented to decision makers is that they are often compiled by government officials trained in the physical sciences rather than in the social sciences. Explanations carry greater weight when measured or quantified data is presented to decision makers by physical scientists enjoying greater status and clout. This is an attribute associated with physical scientists described by Stocking as "...the white-coat syndrome..." (in Blaikie and Brookfield, 1997: 49). Bridging the gap between quantitative-qualitative data, or between physical-socioeconomic studies, is necessary to improve understanding of the processes of LD affected by policy. Integrated multidisciplinary studies provide a way forward in bridging this gap.

iv. The value of a multidisciplinary approach

Different academic disciplines explain land degradation according to their prevailing paradigms. Thomas Kuhn used the term paradigm to refer to a cluster of general notions which constituted a "way of seeing the world" (Kuhn, 1962). Paradigms or theoretical frameworks, by suggesting, selecting and prioritising relevant questions of study, provide an organised framework to analyze problems which would otherwise appear chaotic, unrelated and difficult to comprehend.

In this thesis the term 'methodology' refers to the philosophical and epistemological basis of the study [5]. While philosophy has been concerned with making sense of general consciousness and reason, epistemology deals with the nature and validity of knowledge. Methodologies "orient the user by providing a framework for selecting the means to find out about, analyze, order, and exchange information about a particular issue" (Cornwall et al, 1993: 2). On the other hand 'method' refers to the form in which the theoretical principles and philosophical basis of the disciplines used are put into practice in the field. The choice of methodologies affects the character of the research and analysis of the data.

Blaikie and Brookfield's theoretical framework for the study of land degradation is one using "approaches which share an historical and a dynamic approach to human-environmental relations", arising "from the conjunction of physical and social processes" (1987: 23-24). The theoretical framework they suggest, helping to select and prioritise the relevant questions of study, affect the various methods of collecting data and these in turn often affect conclusions. Seddon also argues that:

> ...whatever methods and techniques are used to collect, process and analyze the data, the terms in which the data are identified and classified ultimately depends on the way in which social data in general is conceptualised; and this depends upon the theoretical perspective and epistemology of the social science adopted (Seddon et al, 1979: 12).

The prioritisation of relevant data in surveys conducted by officials for the elaboration of SWC projects in the area of study was confined to data gathering preceding project elaboration and disregarded the nature and validity of land users' knowledge. Government officials' view of land users is often one of an ineffective and backward system responsible for degradation. This view has been set by the conditioning effect of their ideology, educational, political and

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[5] The term 'method' in this thesis is that referring to the way in which the methodologies are put into practice in field work.

economic position in society and the structure of the State.

One important reason for the predominance of such convictions is that the control exercised by the dominant political forces of the State tend to sanction conformity of views and actions and discriminate against dissent. According to this, Spanish government's policies based on data collected by policy makers' preconditioned views, generated 'top- down' actions which sanction the dominant ideology of the State. These may be either of a repressive or persuasive nature, but with little attention being paid to land users' views or knowledge.

The policy of basing reforestation decisions on scientific demonstration, devoid of any ideological content, has been deceptive for two main reasons: first, because little assessment of physical and socioeconomic conditions was carried out to support the suitability of reforestation methods and secondly, because 'facts' alone could not justify the reforestation decision. Miller (1985) exploring "...the extent to which ideology and not 'facts', influences our judgement on environmental matters" concludes that:

> It is particularly difficult for some individuals to accept this, especially those who profess objectivity and reliance on 'factual' information. The idea that all data are interpreted through the lens of ideology is very upsetting to them. (p.21)

Forestry practitioners' views of rural areas are also conditioned by their urban biases and access to promotion opportunities. The Spanish State has been particularly efficient in the selection and supervision of foresters work. These are civil servants directly under the control of the Spanish State. As practitioners, however, foresters are generally regarded as being more positive than academics, who tend to take a more critical approach. As Chambers puts it "Academics look for what has gone wrong, practitioners for what might go right". He, however, recognises the dangers of "positive optimism" by practitioners or the pressures of getting things done regardless of the social and economic consequences (Chambers, 1983: 33-35). The 'positive optimism' of Spanish foresters was based on the misconceived idea that land users were irrational and ignorant (a point to be discussed below), that the best and only way to solve the problem of erosion was through a technocratic solution, and that the ones best qualified to put right what land users did wrong were foresters. Their 'positive optimism' and State tight control on planning for SWC eventually led to the limitation of their own professional abilities with detrimental results for SWC planning.

A particularly damaging constraint on the scientific understanding of LD is the contempt and lack of understanding that sometimes divides social and physical disciplines (Chambers, 1983: 30; Blaikie, 1985: 97; Blaikie and Brookfield 1987: 34). Both Blaikie and Brookfield, and Chambers reject the partiality or narrowness of single disciplines, which is exacerbated by misunderstanding and distrust. Chambers (1983: 44) urges "political economists to ask about material conditions... and physical ecologists to ask about social relations", a plea for constructive plurality "...based on doubt, puzzlement, and agnostic openness to evidence and argument" and which "...see(s) error less in what people say than in their condemnation of what others say (Chambers, 1983: 44). However, there are real difficulties in scientists 'crossing over to each other's camps and there is still great uncertainty about how disciplines should combine their expertise in order to improve the study of LD.

Reflecting on the difficulties of interdisciplinary understanding, Blaikie concludes that:

> The point at issue is that both sets of disciplines [physical and social] tend to have different conceptions about the domain and status of proof in the pursuit of knowledge. Whether they should share a common epistemology is a debate which it is possible to avoid head-on in this context. ...while the activities of physical sciences, too, are amenable to a social explanation, there are *de facto* different modes of explanation and substantiation. Some of these can be attributed to the subject matter itself ('the objects of study are so utterly different that they require fundamentally different methods and forms of explanation and understanding') (Banton 1977: 12). This is perhaps believed by practitioners rather than being a view that holds up to epistemological scrutiny (Blaikie, 1985: 97).

In a practical sense, however, it is positive that physical and social scientists or 'professionals' cross over into each other's camps because even if issues are not fully understood, an open minded willingness to learn from 'other' discipline helps to dispel misunderstanding and antagonism. Academia, however, suffers from pressures to conform that are similar to those facing policy makers in that their views and actions are conditioned by their own position within the education establishment and the structure of the State. Chambers argues that:

> ...education and training encourage independent thought, disagreement with lecturers, and the choice of unconventional subjects for study and research. But usually the pressure is to conform... The Ph.D. with subservience to supervisor and slavery to method, can stunt and deform intellectual development (Chambers, 1983: 171).

In his quest to correct the deficiencies of narrow professionalism, Chambers prefers a multidisciplinary approach because "...all relevant aspects [of research] will be well covered if enough of the available disciplines are mustered", and he sees that in this sense "political economy is more a set of questions than a discipline" (Chambers, 1983: 179-185).

Decisions about the methodologies and methods to be used to confront LD require "a flexible approach to theorising which is capable of employing different methods and techniques, and of moving from one theory... to another, according to circumstance" (Pinder, 1994: 5). A particular problem of multidisciplinary approaches is how to deal with the complexity of integration of the contributing disciplines. One of the aims of this case study is to show that disciplines which may appear to have little in common, can be applied simultaneously by making use of paradigms with a similar philosophical 'thread'. Development Studies, portrayed by Chambers as 'a set of questions', is well suited to the study of the socioeconomic processes of LD because of the extent it integrates other disciplines. These include political economy, geographical sciences, anthropology, and environmental sciences. Contemporary geography is itself a notably diverse science, incorporating themes such as agricultural policy and systems, industrial and environmental aspects of development, political and gender issues, historical studies, etc. (Lawler and Walker, 1991) [6].

Scientific disciplines experience theoretical and epistemological evolution. Depending on their influence on current thinking and explanation, specific theoretical proposals may 'grow' to become a

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[6] The 1991 Research Register of the "Institute of British Geographers" reveals the large number of topics currently covered by the geographical sciences.

significant paradigm shift. The emergence of major theoretical movements in particular disciplines are related to the changes occurring in society itself. The growing power and sophistication of science and technology underpinned the emergence of modernization as the dominant development paradigm in the 1950s. Although modernization theory is no longer regarded as the panacea for development problems, its ideological influence has been considerable. As modernization became the keystone of Spanish policy in the mid 20th century, agrarian producers' 'backward mental outlook' was presented as an explanation for both the country's economic stagnation and the degradation of its land resources. This outlook has had great ideological repercussions in the way rural producers are still regarded.

The choice of methodologies that are most appropriate to the case study in question is in part related to the ideological persuasion of the author. According to Cornwall (1993) "The choice of a methodology, is... not determined solely by fit to the kind of information which is sought", but is also a political and personal decision (p.2). As emphasised by Blaikie (1985), soil erosion, being a political-economic issue, is not neutral and "...even a position of so-called neutrality rests upon partisan assumptions" (p.1). Given that the reason for the choice of particular disciplinary perspectives and methodologies is a personal one, it is therefore paramount to understand that the conclusions should be contemplated according to the methodologies and methods used. Some of the methodological principles of the disciplines used - geography, political economy, anthropology and history are discussed in the following section.

v. Disciplines used in the study

The geographical approach adopted for the case study is that of examining the way in which people change the world, via building and remodelling their milieu, putting in motion environmental transformations which may be detrimental to nature. This is closely related to the effects of land use. This approach will help to provide an explanation of the struggle between different social classes in relation to their geographical location and use of nature.

The case study looks at how the established national pattern of productive forces and social relations of production affected local producers and are perceived by them in relation to their interaction with nature. One of the effects of the productive forces on local producers, was the process of rural desertion and land abandonment. European Union policy which is intended to check economic decline and rural desertion, as well as to ensure the conservation of nature (Gomez Benito, 1987), is examined in terms of how this is perceived and the form of its implementation. These policies are also examined in relation to the social and economic growth and decay of the area and its physical characteristics.

Geographical differences in natural conditions are taken into account in the examination of intensification of production and the processes of LD. Differences in the natural conditions of the geographical areas of study are regarded as responsible for contributing to disparities in the accumulation of energy, and consequently in the productivity of labour. For instance, the valley of Henares, due to its climatic conditions and fertility of the soil, can provide more advantageous natural conditions, increasing the productivity of labour, than Palancares which comprises land with higher gradient and harsher climate. Pérez Yruela (1995), explains that the marked differences in climate, especially rainfall and temperatures, with the Cantabric Coast averaging 1000 mm of rain per year and the South East between 200 and 300 mm, accounts for differences in agricultural productivity between Spanish regions (p276-277). Taking into account that agrarian production in Spain was localised, much of it consumed locally even as late as in the early 1960s (Etxezarreta and Viladomiu, 1989), studies of the socioeconomic processes of LD must bear in mind these differences. In this study it is acknowledged that although reforestation, or agrarian policy generally, was the same for all areas in which it was effected, differences in climate and other natural resources such as land, influencing the productivity of labour, must be taking into account in the analysis.

The study of the socioeconomic processes of LD in this thesis will help to counterbalance the tendency of geography, according to Johnston (1993), to return to the empiricist-positivist model of prediction (p.152) when using greater quantities of marketable 'hard' spatial science (as for example GIS), with or without understanding (p.159) the broader socioeconomic implications. In this thesis the study of socioeconomic processes of LD, making use of and in conjunction with the study of IBERLIM, presents a fuller explanation of these processes than if results were provided unconnected. This can help to redress the tendency, referred to by Johnston above, and assist geographers in trying to bridge the gap between emancipatory theory and political praxis, so they can influence policy.

The essential anthropological concepts used in this thesis are those of socio-economic formation and social relations. The case study examines how the "law of order" of social relations, as proposed by Godelier (in Bottomore, 1983: 24), change in social structures as the relations of production between subsistence and emerging capitalist productive systems are transformed.

The anthropological methodology of participant observation adopted for data gathering is well suited for the study of perceptions of socioeconomic processes. Fyfe argues for the "debunking" of assumptions such as Evans', that characterise human observation as 'idiosyncratic, not sufficiently objective and unscientific', by:

> ...emphasising the methodological rigour demanded by skilled observation... [and] its epistemological value in providing access to knowledge about social life inaccessible to those equipped with the techniques of spatial science... (1992: 128)

The failure of many development projects has often been due to misinterpretations of indigenous economies and social values. Omitting land users' perceptions from case studies, such as those preceding reforestation projects for SWC in the areas of study, can result in failure to understand the processes of LD with detrimental results for SWC. A crucial element in the "economic ethnography" approach adopted by Gregory and Altman (1989), is to "identify the economically significant elements of the environment" and the economic consequences of their input-output relationships (p.69). Accordingly, the economic forces affecting the study area are examined, from both a present day and historical perspective. Gregory and Altman emphasize that "economic history is the closest neighbour of economic ethnography; furthermore, abstract theory,... will only ever make sense if approached from the historical perspective" (ibid, p.11). Finding out the history behind each type of land use, agricultural technology and knowledge, farmers' consumption and trade needs in association with their social relations, is an essential part of the ethnographic approach adopted in this study. Such information has been derived by asking land users themselves and by observation.

One of the advantages of the anthropological approach is, according to Pottier (1993), "finding unique social configurations in even the most ordinary places" (p.19). Part of the examination of the workings of State bureaucracy and their social configurations is obtained through this anthropological approach to the study. Rew (1985) recommends anthropologists to focus on the entire ethnography of projects, looking "at the complete range of actors and ideologies involved in development work and policy making", rather than just on the local populations (Rew, in Pottier, 1993: 31). In this study, the examination of perceptions of LD processes by land users, government officials, people from the urban areas, and ecologist pressure groups, covers (if not a complete), a 'wide range of actors and ideologies' that influence the process of planning for SWC.

Apart from providing an explanation of the socioeconomic processes of LD, anthropology is an especially well equipped discipline to assess the possibilities of greater participation of the rural population in planning and decision making. Pottier hopes anthropologists can act as 'facilitators' in providing an "understanding of the participatory process..." (p.25). Gabriel (1991) presents a valuable discussion of two of the different existing paradigms in anthropology: monitorists, scrutinising development activities, or activists, "helping to transform the *status quo*" (p.45).

This study will assess the feasibility of people's participation, as envisaged by Oakley and Marsden (1984), either through mobilisation, i.e. "implementing activities generally decided by outsiders" or through empowerment, "the voluntary, spontaneous growth of organised group activity... characterised by active involvement of members and by self-reliance" (p.vi). To ascertain the feasibility of these two options, the case study uses principles of "applied anthropology", explained by Gabriel (1991), as that "engaged in advising and monitoring... what exists at present", as well as that of "development anthropology", concerned with "...what ought to exist in future..." (p.37). Issues regarding applied or development anthropology will be considered in further depth in Chapter Six when examining the application of Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA) methods.

The principles of political economy, as a study of the social, economic, and environmental effects of resource allocation as part of aggregate economic activity, used in the first part of the thesis, will continue to be applied to the analysis of the case studies. Political economy "is increasingly being recognized as necessary for any realistic examination of development problems" (Todaro, 1985: 601). The case study will especially follow the aim of other writers to examine issues of distribution and accumulation, and "the efficacy or otherwise of political arrangements to promote accumulation" (Desai, 1983: 375) as explanations of the reasons of erosion processes.

An explanation, rather than a theory, of the socioeconomic processes of LD as well as empirical evidence of the operation of decision making in SWC by land users is attempted from a political economy perspective. This is done by examining the economic strategies of land users, their relationships with other producers and the Spanish State, their access to the means of production and the extraction of surplus value, in terms of the effects these have on the condition of the land. Chamber's concerns (1983), about the use of political economy by "negative social scientists" (p.185), is taken into consideration in the case study because of the need to explore LD processes to propose changes in policy. Proposing policy changes in this case must be seen as 'constructive' because, as the historical perspective implies, it presupposes learning from the mistakes of the past to improve the future. Chambers' concerns, about political economy questions being mostly asked by 'negative' social scientists, but much less by "positive physical and biological scientists" (p.185), is perhaps a reflection of the *a posteriori* character of social scientists' involvement in research work. Social scientists, often anthropologists, are often called in to decipher what has gone wrong with particular projects. *A priori* involvement of social scientists in data collection and planning for reforestation and SWC, it is argued, would put them on the same footing as physical scientists - making 'positive' recommendations - since their work would be participatory and 'constructive' rather than simply critical.

The study draws understanding from written history (in Chapter Two) and oral history, in field work. MacLennan (1981) describes oral history as "a technique or a kind of source". The source involves the transmission of the historical experiences from people to the historian. One of the techniques is the ability " to listen to people, and to note down their authentic experience..." (p.117-118). Approaches such as participatory action research draw on oral history not only as a source of information to be used as an experience for the present and the future, but also as a process of collective confidence building (Cornwall, 1993: 25-29) between researcher and respondents.

The utilization of history to examine LD processes is, however, not without controversy. The history of land ownership and land use is studied in defence of Blaikie and Brookfield's (1987) postulate that "damage to the land and damage to certain classes in society are interrelated" (p, 19). Blaikie and Brookfield's approach 'sharing a historical and dynamic approach to human-environmental relations', is questioned by Napier, who is unconvinced by their attempt to link historical events in societies with LD. He argues that relevant historical records are so limited because the phenomena were not perceived as important by contemporary observers, so that "the use of recorded history to gain an understanding of factors affecting current environmental problems is extremely risky" (Napier, 1988: 124). Thus recorded history will be inadequate if an exact account of degrees of LD or erosion is what is sought. However, if what is to be explored are the socioeconomic and political processes leading to degradation, written or oral history can provide valuable insights. In his study of perceptions of nature and environmental degradation in Cochabamba, Bolivia, Zimmerer (1993:314) shows that his construction of the erosion problem, "within a regional spatial scale and a historical time frame", provided an understanding of the social, economic and political processes involved. Cross and Baker (1991) also confirm the ability of oral history, as a source of information, to provide an explanation of the processes of LD, the loss of soil fertility, soil erosion, and changing landscapes through the use of trees, pastoralism and agriculture.

This thesis will confirm how the use of written and oral history can contribute to an explanation of LD. Written and oral historical records and accounts show that LD may be implicitly recorded in peasants' demands for more land and the expansion of their agricultural practices into more marginal areas. The exploration of land users' knowledge and perceptions of processes of LD also provide important oral explanations. The case studies (in Chapters Seven and eight), utilizing RRA and PRA methods make use of historical accounts by rural people.

Conclusion

The multidisciplinary approach to data collection used to develop an historical perspective can also help promote land users' participation in SWC planning and action. Pretty and Scoones (1991) argue that "...local involvement and multidisciplinary analysis are vital ingredients in planning" (p.8). Following this exploration of the value of multidisciplinary approaches and justification of the contributing disciplines and methodologies, the review of the methods chosen for use in the study is done in Chapter Six. These methods are also advocated as part of a participatory approach in SWC practice.

So far it can be discerned that there are ideological and academic differences between land users, policy makers and academics. These differences, reflected in the way definitions are constructed and meanings are manifested, indicate that the decision making process of SWC by land users and Governments are often conflicting.

For land users, LD means decreasing land productivity and the threat to their own survival, for scientists it may be the object of research, and for policy makers it may mean concern about environmental effecting policy making. What LD means for these groups is affected by their perceptions, which is in turn a function of their position in relation to the means of production, academic discipline or ideology.

Perceptions expressed in the form of meaning, for land users, or definitions, for politicians and scientists, have an effect on the policy making process for SWC. The examples of pastoralism in Kenya by Livingstone (1991) and of Zimbabwe by Scoones (1992), discussed above, and preliminary assessment of the Spanish case show how their relation to the means of production determines land users' perception of the problem and their actions. Their land use practices contradict those proposed by government officials whose ideology conditions them to propose land use changes based on 'modernization' tenets, as for example the reduction of stocking levels or reforestation. The influence of such scientific findings varies according to the ideology of policy makers and their subservience to social groups benefiting from either accepting or rejecting these findings. The perceptions and opinions of land users are, however, seldom taken into account by policy makers and scientists concerned with LD policy.

Policy makers' justification for enforcing changes in land use practices (which might be resisted by land users) requires them to demonstrate that LD exists and that it is advisable to control it. Simplistic explanations have often highlighted apparently 'irrational' land use as a causal factor, without an attempt to investigate its underlying reasons. This may be because of scientific or economic limitations on the part of planning authorities and/or the ideological persuasion of the State. The State may disregard consideration of the socioeconomic processes of LD in favour of more 'scientific' quantitative physical measurements of soil loss. Therefore an analysis of the structure of the State and the workings of its bureaucracy in the study of the decision making processes of SWC is crucial. The aim of such an analysis, to provide a scientific explanation and guidance for planners to promote greater participation of land users in SWC planning, requires the examination of past policy examples.

It has been established that the way data is collected, conceptualized and presented is a reflection of the methodologies and methods used. The choice of paradigms, methodologies and methods determine the findings and this will in turn influence policy making. Reforestation planning based on details of conditions assessed from a narrow disciplinary perspective, such as that applied by foresters in Spain, based on climate, visual assessment of erosion and suitability of species, are incomplete[7]. Not assessing other physical factors, such as overland flow or rates of erosion, nor any of the socioeconomic conditions crucial for successful planning, are

[7] Chapter Five explores in detail these deficiencies in planning for reforestation in Guadalajara.

indications that the influence these assessments could have in changing policy was minimal, and not expected, because of the predetermined and rigid objectives of the State - these of reforestation with conifers.

The need for identification of particular factors of LD processes determines the choice of disciplines, methodologies and methods for research, and this in turn is determined by specialism and the political persuasion of the researcher. The choice of paradigms and philosophies within anthropology, geography, political economy and history for the case study are made under the assumption that they provide the best way for research to be carried out. The common thread making the operation of these disciplines possible in a multidisciplinary form, is the philosophical binding agent viewing class struggle as the explanation of socioeconomic processes of LD. This comprises problematizing land user's perceptions of processes in relation to their working practice and its environmental effects as well as an examination of the relations of power between them, the Spanish State and other social classes. The next Chapter examines some of these issues in a historical perspective.

Chapter Two
The changing concerns for the condition of land in Spain - an historical evaluation

Local processes contributing to LD cannot be understood without examining the reasons behind land use changes and land ownership patterns, their detrimental effects and the attempts made to solve them. To understand the local structure of land ownership or changes in use, the national policy must be explored in historical perspective. It was Spanish national policy which determined local patterns of land ownership and use in Guadalajara and most other provinces, which in turn has affected the condition of land. This Chapter examines the workings of the Spanish State bureaucracy in planning for reforestation, and the links between autocratic and technocratic strategies in planning and implementation of SWC plans.

The Chapter examines the way scientific findings and economic interests in Spain have been used to authenticate and gain support for policy to enforce SWC projects requiring reforestation against existing land use methods or other options. The first section examines the reasons for changes in State policy towards land ownership and use and the consequent implications for the condition of land. The second section looks at the evolving concerns with levels of LD and the forces behind the arguments made to reverse them. The arguments, underpinned by reforestation sciences, are closely related to the emergence of technocratic strategies of SWC[1]. The third section questions the effectiveness of the technocratic approach to SWC.

i. Land ownership and condition: State policy

This section explores those past policies and social conditions which account for LD in Spain. Study of the history of land use policy is relevant to contemporary circumstances because of its long lasting socioeconomic and ecological effects. Land policy resulted in the establishment of working and economic arrangements at local level which were parallel to those of the State, widely used until the 1970s and indeed, still surviving today. The underlying central conceptual notion used in the analysis of this policy is one taking

[1] The results of reforestation techniques on the condition of land are explored in subsequent sections of chapters four and five.

class struggle for the control of land ownership and land use, as the principal reason for actions by the State and land users.

From medieval times into the modern period, extensive pastoralism was the fundamental economic activity of Castilla (the autonomous region to which Guadalajara belongs), although land was also used for agriculture and forestry. The political and economic structure was based on a form of feudalism called *señorio*. The *señores* were agents of the Crown in village councils with powers for effecting justice, appointing local authorities and receiving land rent. Villages gained considerable economic and political autonomy in exchange for their support in the war against the Moors. As far back as the tenth century village councils, with the *señores* as heads of organization, leased land from the Crown and rented it to village users and transhumants. Much of the land colonised during the expulsion of the Moors, awarded by the monarchy to the *señores* was, according to Cuadrado Iglesias (1980), again assigned by these to colonists' communities, and only in the minority of cases to individuals (p.92). The land, however, remained the property of the State, embodied in the Monarch. A small Spanish population and large number of cattle and sheep, in need of more pasture, resulted in a great amount of land remaining uncultivated.

In the fourteenth century, population growth and the increase of village cattle gave rise to social pressure demanding more land for agriculture. These demands, usually by landless peasants, were fiercely resisted by the *Mesta* and *Carretería* [2], especially in the mountainous areas. In the fifteenth century, the fate of common land depended on the outcome of the struggle between the corporate privileges of the transhumant organisations, others defending local agrarian and pastoral interests, and the antagonism of these two groups against agriculturalists (Mangas Navas, 1981: 147). The renting out of land for agriculture by the Council of Guadalajara

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[2] The *Mesta* were initially organized groups of transhumant pastoralists minding large flocks, of usually sheep, goats or cows, owned by various village households. The Church and the Military did later control the workings of the *Mesta*, excluding smaller village animal owners. The *Carretería* main economic activity was the haulage of goods but, apart from their draught animals, they also owned flocks.

city [3] encountered less opposition from the *Mesta* and *Carretería* than land rented out in the three nearby but more mountainous villages of Brihuega, Hita and Jadraque (Ibid, 1981: 139-140) around the 1,000 metre contour (see figure 3, page 52). The more mountainous areas of these villages were more used for pastoralism than land near Guadalajara city, situated in the Valley of Henares, which was more used for agriculture. Impinging on the traditional access to land of the *Mesta* prompted the defence of their interests. The argument made by the *Mesta* in defence of their interest, was often supported by pointing out the destructive effect of agriculture in terms of soil depletion. These accounts of the effects agriculture had on the land, according to Gonzalez Bernaldez (1990: 440), constitute some of the earliest descriptions of erosion.

At the end of the eighteenth century, incipient liberal political ideas led to proposals to sell Crown land to private and institutional buyers, such as councils. There were ideological and economic reasons for this State policy. According to Cuadrado Iglesias (1980) there were two economic reasons; one to revive the national economy, and two, to raise revenue to pay for the heavy national deficit. Liberals argued that pastoral activities in enclosed private land would be more productive than through traditional extensive pastoralism. This view was reinforced by the disturbances experienced in revolutionary France and the necessity to defuse social and economic tensions building up in Spain. These were created by the greater demand for agricultural products to feed the increasing population, a decline in yields, and demand for land by landless peasants. Many landless peasants in Spain left the villages and established their house and production arrangements in the more remote areas of virgin Crown land - so avoiding rent payments.

The power struggle for the control of land by the *Mesta* and *Carretería*, village councils, and agriculturalists, was until the late eighteen century generally tilted in favour of the transhumance organisations. One of the main reasons was that the monarchy, the church, the military, and the *señores*, the four main pillars of the structure of the Spanish State, had interests in the *Mesta*. Nieto (1986), explains that although technically and legally the

[3] Guadalajara is the name of the capital city of Guadalajara province.

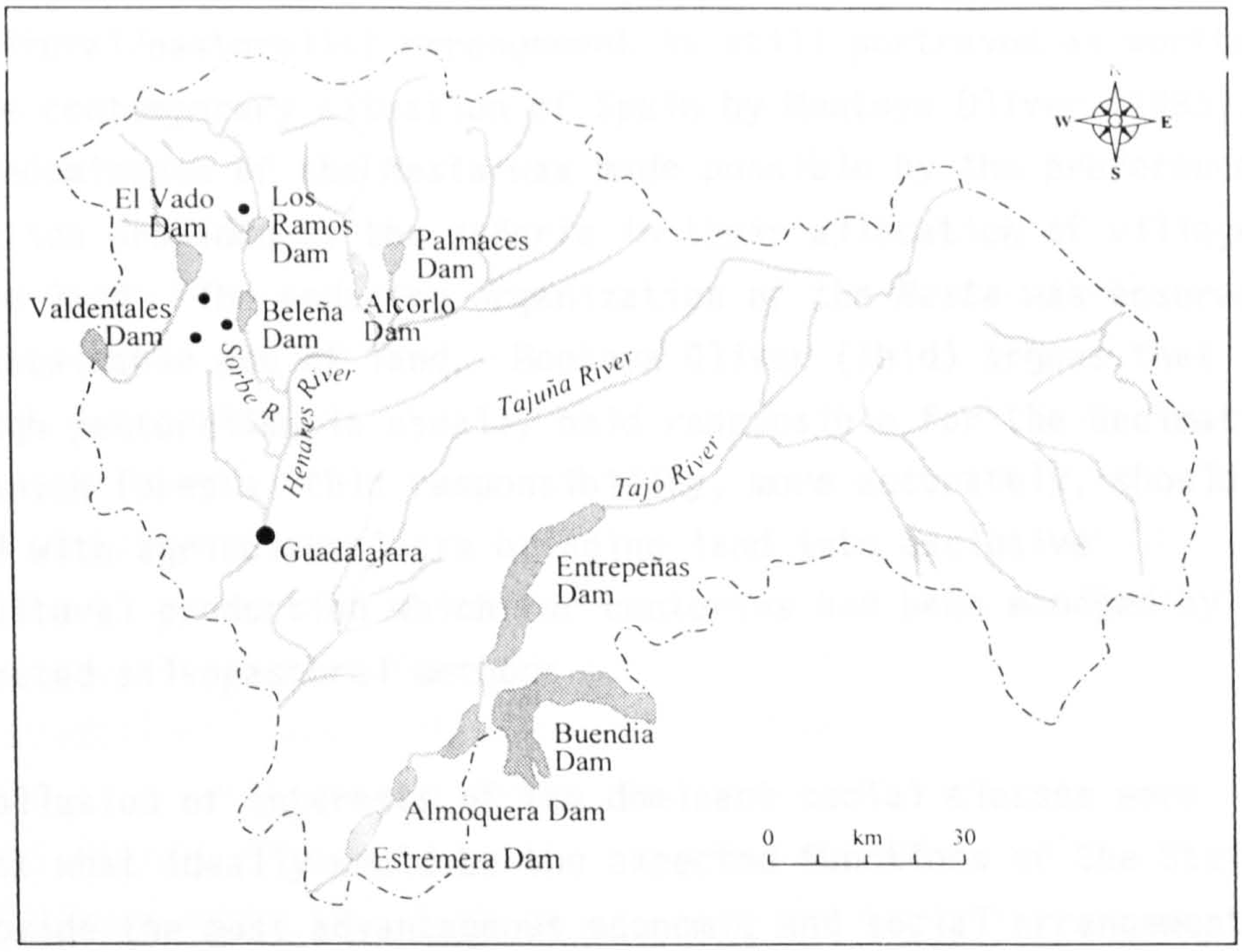

Figure 3: Hydrography of Guadalajara Province

agricultural/pastoral arrangement was seen as the most suitable to ensure the economic wellbeing of the people, the *Mesta* insisted in its superiority in providing for a more prosperous society (p.86,90). The economic and ecological advantages of an integrated agricultural/pastoralist arrangement is still portrayed as worthwhile for the contemporary situation of Spain by Montoya Oliver (1983). The predominance of the *Mesta* was made possible by the preference and protection provided by the *señorio* in their allocation of village pasture land. The enduring organization of the *Mesta* was ensured by the sustainable use of land. Montoya Oliver (Ibid) argues that although pastoralism is usually held responsible for the decimation of Spanish forests, this responsibility, more accurately, should be shared with agriculturalists bringing land into exclusive agricultural production which for centuries had been managed by integrated silvopastoral methods.

The collusion of interests of the dominant social classes were against what ideally would be the expected functions of the State - to provide the most advantageous economic and social arrangement for its people. The reason was the access and control over the decision making process by influential individuals and groups to defend their own interests. These were medium and large landowners working against the interests of small producers.

It was not until the late eighteenth century and the turn of the nineteenth century, that the balance of power changed in favour of the many small scale pastoralists and agriculturalists. Mangas Navas (Ibid) explains that in 1784 and 1788 the Spanish crown regulated the use of village common land in favour of village pastoral users. With more land put under cultivation, village agriculture became an important economic activity. With more fallow land available for pasture, flocks multiplied to such an extent that they outstripped that of the transhumants four times over (p.228). However, Spanish agriculture at the end of the eighteenth century and turn of the nineteenth still remained largely underdeveloped mainly due to the scarcity of land and the high cost of renting it.

In the mid 19th. century a policy of converting State land to private ownership resulted in grave consequences for the condition of land. Raising revenue for the indebted State was achieved through the liberal policy of *desamortizacion* (disentailment), firstly by selling Crown land administered by the Church, and at a later stage by selling that administered by the military and village councils. It was often the case that villages bought the land they had been using for centuries from the State. However, the liberal policy of transferring more land to private ownership did not achieve its main aim fully - that of appeasing the social discontent of the poorer social sectors, the landless peasants. Cuadrado Iglesias (1980) points out that while the French Revolution managed to create millions of new land owners, the Spanish disentailment policy of 1820 only created around four thousand of them (p.106). Much of the land from disentailment was not purchased by the people who most needed it, the landless peasants, but by urban investors, wealthy individual villagers or groups of villagers, and village councils. Many local people managed to raise money to buy this land collectively for the local council and land continued to be managed as it had traditionally been done for centuries. The controversies surrounding communal village land were revived in 1931 and 1939 by the policy of disentailment reversal, which accompanied the expropriation of land for reforestation.

The liberal drive against the privileges of the *Mesta* and the Church, and falling prices in the international merino wool markets (Garcia Sanz, 1986: 419), meant that these two groups could neither afford to acquire nor rent sufficient land to continue with their transhumant pastoral activities. The progressive decline in profits of transhumant pastoralism during the mid eighteenth century put the organization of the *Mesta* under strain resulting in its gradual and eventual demise as a legal institution in 1836 (Garcia Sanz, Ibid: 422). Urban land buyers, interested in the rate of return to their investment, charged high rents resulting in intensification of agricultural production, differentiation and the eviction of many landless peasants. Bringing marginal land, such as that on the slopes of the hills in the area of study, into agricultural production and the intensification of its productive capacity suggest a potential for greater LD. The constant complaints made by the *Mesta* about the deleterious results of agriculture, notably the loss of rich soil on traditional pasture land are a clear indication of this.

Not only pastoralists' and agriculturalists' interests were conflictive, but also those of forest users. Forest exploitation was well regulated by village councils for the extraction of household wood fuel and pasture until the end of the eighteenth century. In the eighteenth century transhumant pastoralists' attempts to obtain the lease of forests and pasture encountered the opposition of villagers, who traditionally had free access to wood, as well as the antagonism of charcoal makers. Charcoal making became highly profitable with the growth of smelting capacity in the industrialising areas of Spain. According to Harrison (1978), the use of charcoal for smelting in the Basque region and in Malaga was only being gradually phased out in the early eighteenth century. Charcoal was replaced by Welsh imported coke in these areas. However, the use of charcoal continued until 1865 in Vizcaya (Northern Spain). While in parts of the Basque region and Malaga the use of charcoal was being abandoned, in more backward areas of Vizcaya new smelting capacity using charcoal started as late as 1849 and continued until 1865 (p.56). The use of charcoal in the Basque region was the main reason for the depletion of its forests at the end of the eighteenth century (p.15). During field work in the Guadalajara Province, respondents were aware of past charcoal making activity in the area, which was sold for use in the smelting industry.

Some areas such as those in the vicinity of Madrid had suffered the consequences of deforestation even since the seventeenth century. The town council of Madrid proposed the reforestation of some of its land in order to counteract the devastating effects of deforestation on the condition of land and, in the long term, the shortage of charcoal (Mangas Navas, Ibid: 193). The international fall in demand for wool, falling prices, and the need to provide cheap agricultural products for a burgeoning population (of approximately 40 to 50 percent increase in the nineteenth century) were responsible for the change from pastoralism to agriculture. The consequences of this considerable demographic increase were greater demand for basic food products. The rise in population, Garcia Sanz (Ibid) argues, resulted in a large increase in the price of wheat in comparison with the small increases in the prices of other products such as wine, meat or wool. This had implications for the relations of production, social organization, and detrimental effects for the condition of land.

Bringing more marginal land under cultivation increased the supply of agricultural products, but still could not meet demand, causing prices to rise. The prices of renting land increased more than the rise in prices of wheat, making the conversion of pasture land to wheat production commercially attractive (García Sanz, Ibid: 423). Pasture land on gradients and *dehesas* [4], was not ecologically suitable for cereal cultivation. Cultivating this type of land point to circumstances which are well known to increase erosion. Gonzalez Bernaldez (1990), the same as Montoya Oliver cited above, suggest agricultural practices were responsible for LD processes in Spain. Gonzalez Bernaldez (ibid) defends the sylvopastoral conservation management of the *Mesta* against the false accusations made of the detrimental effects of their animals on trees.

The debate on the effects of goats on trees is a long drawn-out one. Serrano Vicens (1954) accuses the goat of being responsible for deforestation and the demise of fruit trees, and dismisses concerns about the importance that these animals had in the economy of the poorest sections of the population. The development plan for Guadalajara Province (CESP, 1959), justifies the need to eradicate goats, more because they are representative of extreme poverty than because of the damage they cause. In the CESP (*Consejo Economico Sindical Provincial*) document (Ibid) it is argued that in societies where the standard of living is higher and work is more dignified, goats disappear. The official view was that these animals should be restricted to unproductive stony areas, releasing other land they use to reforestation (p.144). Montoya Oliver (1983), traces the vilification of the goat and pastoralism as a historical event rooted in the struggle between pastoralists and agriculturalists for the control over land use. This vilification intensified during the nineteenth Century and still survives in the discriminatory Spanish legislation today (p.36).

The damage these animals may inflict on trees is more to do with

[4] *Dehesas* are silvopastoral land (forestry put to pastoral use) generally of *Quercus ilex* and *Quercus suber* (at low density of between 20 and 50 trees per Ha.) and pasture, which for many centuries managed by the *Mesta*, constituted an stable ecosystem (Campos Palacín and Martín Bellido, 1986).

their deficient management than with their voracious or 'instinctive' destructive nature. If properly managed, goats keep *matorral* undergrowth short, reducing the danger of forest fires. This positive contribution made by goats, according to Ruiz Abad and Colmenarejo (1984?), has only recently been recognized by foresters (p.73). Gonzalez Bernaldez (1987) links the negative evaluation of goats actions to their increase in numbers because of instability in the land use systems. What this author means by 'instability in the land use systems' is not clear but it seems to refer to differentiation[5] and intensification, which in this case it can explain that these processes would increase the number of landless peasants and/or goat herders.

Differentiation processes are marked by an increase in the number of marginalized land users and goats resulting in greater pressure on pasture resources. Goats' ability to feed on Quercus ilex *ramón* [6] or on the young shoots of Cistus *matorral* constitute a form of natural resource that no other animal is able to exploit. These often communal land resources were the only available ones to poor land users. Pastoralists' appreciation of trees, especially by goat herders, persist today. Ruiz and Ruiz (1987), in a study of landscape perceptions among pastoralists, concludes that goat herders, in comparison with sheep or cow herders, are the ones with the greatest regard for forested landscapes. This coincides with the appreciation and sustainable management of forested areas by the *Mesta* for centuries. This implies that goat herders actually conserve the resource that is so valuable to them.

Social and economic instability in the system of land use acts as a detrimental influence on the condition of soil. The effects of the disentailment policy was brandished by political factions opposed to the Liberals during last century as an example of land mismanagement

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[5] Social differentiation, or proletarianization, in agrarian production is a process by which the weakest producers are pushed out of production, often through indebtedness to stronger producers, losing access to the means of production, land, tools or other crucial implements.

[6] Careful pruning of trees, especially in the *dehesa*, was an important and beneficial part of tree management which at the same time provided food for goats. At times of drought and pasture shortage the *ramón* (the pruned branches of trees) provided an important alternative feed for goats and sheep.

by private owners. They argued for the reversal of disentailment and the control over the use and ownership of land by the State. A policy of disentailment reversal was formulated at the turn of the century, revised in 1931, but only put into practice in the 1940s. Influential forestry engineers, such as Codorniu (1915), who were greatly concerned about the deteriorating condition of land, argued in defense of forests, and put the blame on land users and their alleged blind irrational hate of trees (p.50).

Although Codorniu placed an unjustified and inaccurate blame on land users, he envisaged the need to gain the assistance of rural people for reforestation[7]. Codorniu proposed to do this through education in schools, distributing seeds and plants among children, the propagation of birds, the encouragement for the creation of forestry societies, tax reductions for slow growing natural forests, and using State forests as examples of good management. These can be regarded as examples of innovative proposals to promote the participation of rural people in conservation.

The justification for the protection of land is closely linked to the perception of the danger it appears to face. Perceptions of the importance of LD by pastoralists, agriculturalists, charcoal makers, and foresters are strongly determined by their economic needs and interests. The next section explores how arguments made by foresters for the protection of soil gained greater relevance and influence in policy making.

ii. Reforestation - the emergent technocracy

This section examines how forestry sciences and the arguments made by foresters seeking to control erosion, were supported by political and ideological arguments based on technocratic strategies. Apart from the physical techniques involved, technocratic strategies also encompass political measures, for example to reverse patterns of land ownership as a means of preventing LD. The following examination of forestry policy in Spain makes special references to the situation in Guadalajara.

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[7] This way of involving people in what has already been designed outside their control or without their participation is regarded by Chambers, R. (explored in Chapter Six) as 'participation' through co-option practices.

The effects of last century's policy of disentailment, selling church and Crown Spanish land to private and institutional buyers, is often portrayed by authors such as Tamames (1976) as an example of a misguided policy being responsible for deforestation (p.307). Foresters often argued for the reversal of the disentailment policy to protect forests against the actions of private owners (Anonymous, 1961). The rise in exploitation and demand for forest products such as wood for boat building, the consumption of charcoal in urban areas for household and industrial metallurgy purposes, and mining were also causes of deforestation (Groome, 1990: 32).

The increasing value of forestry products such as charcoal at the beginning of the nineteenth century gave rise to the recognition that governmental regulation for a more rational exploitation of forests was needed. From the turn of the century demand for charcoal, firewood and other forest products declined and consumption of coal and oil increased. However, there was greater production of cheap wood for the paper and composite wood industries in response to increasing market demands for these products after the Second World War in Spain. The military regime after the Civil War ending in 1939 in Spain, was subject to trade restrictions by the allies. This prompted shortages of materials and reinforced the ideological State inclination of autarky in Spain.

Forestry regulation and policy evolved gradually in Spain. The emergence of a forestry science was the foundation for regulatory legislation. In 1883 the government created the *Direccion General de Montes* (Directorate General of Mountains) and decreed the *Ordenanzas Generales de Montes* (General Decree of Mountains). The Directorate had administrative powers in some public mountain areas. Private and village owned mountain forest areas, however, were outside regulatory control and remained under the free management of their owners. The *Escuela Especial de Ingenieros de Montes* (Forestry School) was created in 1848 with the purpose of finding a scientific or technical solution to the problem of deforestation and erosion. This School was formed after two natural sciences lecturers were sent to Germany to study forestry sciences.

Natural Mediterranean vegetation and land use techniques are well adapted to withstand the high summer temperatures and unpredictable rain conditions. These are very different to those experienced in Northern European countries such as Germany. Yet forestry techniques based on northern European circumstances were taught and unsuitably applied to Mediterranean conditions in Spain. The dry climate of Spain, and other Southern European countries, does not provide for the fast tree growing conditions for wood production that countries in the north of Europe can achieve. According to Groome (1990), Denmark achieves rates of wood productivity of around 5.8 cubic meters/Ha./anum, while Spain and Greece achieve 0.9 and 0.5 Has. respectively (Ibid: 266).

The technocratic approach to reforestation which emerged as a result of the use of 'imported' forestry techniques, disregarded the SWC functions of ecologically well-adapted natural vegetation and the valuable local knowledge of land users, in favour of fast growing tree species and 'scientific' fixes. Groome (1987a), explains that since the creation of the Forest School, Spanish forest policy has evolved around four main topics: forestry ownership; multiple and integrated land use versus its segregated use; the type of tree species which should be promoted; and the wood manufacturing industry. The main arguments by foresters about private or public ownership of forest land were in connection with their protective and productive functions. Forests were classified by Government as 'protective' or 'productive'. Prevention against floods and protection against erosion were seen as beneficial for society as a whole. The liberal ideology advocating the private ownership and free management of forests resulted in forest owners disregarding the protective function in their pursuit of the productive function - the maximum return to their investment. Foresters were becoming concerned about forests in private hands which, although classified as 'protectors', were exploited for maximum profit. Private buyers of forests, classified as 'productive', paid for them in instalments, and these were raised by cutting and selling existing trees. In order to prevent deforestation, Groome (1987a) explains that, in 1877 the forestry administration prohibited the cutting down of trees before all the instalments were paid. These concerns and the new legislative powers conferred to foresters secured the exclusion of a considerable amount of land from disentailment, averting deforestation.

The classification of some forest areas as *montes de utilidad publica* (mountains of public utility, or 'protectors') in 1931 with the intention of stimulating protective management and reforestation was another achievement of foresters in changing legislation and protecting forests. The social importance of forests was greatly emphasized by the Nationalization and Reforestation Project (*Proyecto de Ley de Nacionalizacion y de Repoblacion Forestal*) of 1931. The nationalization project was a reversal of the liberal disentailment project, with the State regaining ownership of forests or deforested areas and assigning them for replanting. This legislation compelled private owners of land classified as 'of public utility', to sustain its permanent production and fertility. This, as recommended by foresters, often entailed reforestation to be carried out by private land owners. Failure to do so gave the Government the automatic right to expropriation. The 1931 law was, however, rarely put into effect before 1940. The high cost of expropriation, lack of political will, and the economic, social and political repercussions of a reduction in the amount of land available to marginal land users, would have made expropriation unattainable.

The policy of the Spanish State after the Civil War changed from attempting to regain ownership of land, to the control over the management of forest trees. The State put great emphasis on the development of consortia and giving plantation subsidies to private land owners. Its main objective was to provide the politically influential and burgeoning wood manufacturing and pulp industries with cheap raw material. According to Groome (1990), profit was put before sound ecological considerations. Castroviejo Bolibar et al (1985), explains that, until the 1980s, 78 percent of the plantations were executed through consortia (p.15). Under consortium arrangements the forestry Government agency, *Patrimonio Forestal del Estado* (PFE) or at a later stage the *Instituto para la Conservacion de la Naturaleza* (ICONA), created and made responsible for reforestation in 1972, were in charge of the technical and administrative aspects of the project.

Although the objective of the plantation of conifers has been portrayed as mainly for protection, the argument about how much is for the protection of water catchment areas against erosion or for wood production is a tenuous one. As an example of the dual character of the two objectives, Sagasta Azpeitia, a prominent Spanish forester, expected reforested areas classified as predominantly for protection, when managed by ICONA, to provide 35 percent of the national wood supply (Sagasta Azpeitia, 1979: 179). As a result the need for the protection of soil in water catchment areas sanctions dubious reforestation projects for wood production, and this is an ongoing strategy. The species selected in reforestation have not varied a great deal between those of the period 1940-1982 and those of 1983-1987 (García Dori, 1994: 34). It is important to notice, however, that the plantation of fast growing conifers increased from 84% to 88% and that eucalyptus decreased from 13.6 to 3.8%, for these two periods. The selection of fast growing species indicates that the objective can be speedy protection of the land, especially in extremely degraded areas where 'only' conifers are able to grow, or for the production of cheap wood. However, because extremely degraded areas have been recolonized and protected by *matorral* for some years, it can be assumed that the need for speedy protection no longer arises and that wood production is the real by 'hidden' objective.

Reforestation through consortium was free of charge for land owners. Twenty to forty per cent of the value of wood during the first stages of commercial exploitation was for land owners and the rest for the Government agency to recover plantation expenses. When these expenses are recovered the full amount pertains to the owner of the land, be it private or a village council. Many of the consortia were established with village councils on land which *de jure* belonged to it, but that *de facto* had been bought collectively by villagers own funds through disentailment. Castroviejo Bolibar et al (1985), explains that land users were the real losers in the consortium arrangement because they had to give up land communally owned and traditionally used by them, while village councils, after 1939, did not always share the income from selling the wood equitably. Groome (1990), claims that the main beneficiaries were a few individuals and wood manufacturing and pulp industrial interests. She explains the relative high number of consortia (2,510 between 1940 and 1983) as being due to the threat of expropriation if land owners refused to cooperate with Government reforestation orders (p.68,72), rather than to economic advantages.

Changes in strategies for SWC through reforestation can be observed from the last century. Groome (1987a), explains the changes in reforestation strategies and policy from the multiple and integrated use of land to its segregated use in three main stages. Firstly, that starting in 1877 envisaged reforestation as an instrument of soil restoration. The second stage after 1926, changed to segregation between the conservation and production functions of forests, and thirdly there was the ending of segregation in favour of an exclusively productivist strategy after the Civil War. Successive governments after 1939 implemented a reforestation policy which disregarded some foresters' proposals for restoration of existing vegetation, such as those made by Ceballos and Ximenez in 1939. The implementation of a policy for massive plantation with conifers, which previous governments did not attempt, was possible because it was based on the ruthless disregard for the social and economic effects that it would have on local populations. Gonzalez Bernaldez (1990: 442) explains that excessive abuses and authoritarian rule during the Franco period (1939-1976) created great resentment in rural areas which still persist today.

A minority of foresters were in favour of improved management of existing forests and the agrosilvopastoral (agricultural, forest and pastoral) integrated exploitation of land and products such as timber, fuelwood and pasture. Ceballos and Ximénez (1939), in contrast to the standard State approach, emphasized three main components in the reforestation plan they proposed. Firstly, the multiple character of forest management, not only should include plantation but also restoration and conservation, such as pruning and cleaning existing forests. Secondly, the harmonization of agrarian, pastoral and forestry uses; they regarded plans proposing the eradication of traditional pastoral practices as untenable and simplistic because this would create a climate of resentment in the rural population making reforestation plans fail. Thirdly, they advised the plantation of indigenous tree species; for the Sistema Central (see figure 3, page 52) they proposed to regain the natural forest climax composed of Ash, Chestnut, *Quercus*, Juniper, *Pinus* trees, etc. They regarded the use of natural pine species and *matorral* as forms of successional vegetation progression of great importance in the protection and formation of soil.

The debate around the productive and protective functions of forests and whether they should be used in an integrated or segregated way show some political and ideological controversies. Although at the turn of the century most foresters favoured the official productivist and segregated strategy of wood production, some dissented. The example of the forester Garcia Maceira, who in 1915 criticised the Government's adoption of Adam Smith's liberal doctrine applied to forests, can be contrasted with that of Martinez Hermosilla and Foyo Panaleon after the Civil War. Garcia Maceira argued that pursuing individual interests converted forests into a means of production for the market, which neglected their protective functions (Groome, 1985: 83). Representative of the Government's ideology were Martinez Hermosilla who, according to Groome (1990), promoted the consortium arrangement of reforestation, and Foyo Panaleon who, adopting the fascist concept of the 'social function' of property, had a less tolerant attitude towards land users' duty to reforest their land for the benefit of the Nation (p.62).

The majority of foresters, as a reflection of the political climate after 1939, however, favoured the plantation of fast growing species for wood production. From 1939, the government of the Franco dictatorship was isolated from international trading, and was also bankrupt. This precluded it from purchasing wood in international markets, and in response a policy of economic autarky emerged, as described by Tamames (1976, Vol.II: 22). Groome (1981), asserts that the forestry administration after 1940, following economic-industrial criteria as well as a concern by foresters trying to achieve 'spectacular' reforestation results for job promotion within the administration, opted for massive reforestation (p.31) with single species of conifers. Prieto Rodríguez (1995), explains that the choice of single species of fast growing conifers for reforestation was the result of lack of technical knowledge in the management of mixed plantations, and the pressure exercised by powerful groups interested in the production of wood (pp.17,20). The policy of achieving the maximum possible rent from reforestation was openly defended by many foresters, such as Abreu y Pidal (1963), as a principal objective.

Debates regarding the type of tree species which should be promoted were reflected in foresters' concerns about the effects of the introduction of exotic species such as *Eucalyptus sp.* and *Pinus insignis*. Legislation calling for caution in the use of these and other fast growing species was introduced in the nineteenth century, but was changed during the present century to allow the promotion of fast growing trees to provide the wood manufacturing industry with the necessary raw material.

What started as a concern for the loss of forest, other vegetation cover, and the worsening condition of land, developed into measures to stimulate reforestation for industry using fast-growing tree species. To achieve this, the Spanish State fostered the kind of forestry expertise which suited the policy of tree production. Alternatives proposed by other foresters who dissented from the official view of reforestation techniques and objectives were ignored and discarded. The technocratic strategy, backed by the hegemonic forces of the wood pulp and composite industries, became especially dominant with the advent of the military dictatorship in 1939. The validity of this strategy and the collusion of interests for reforestation with conifers must be examined to explain socioeconomic processes of LD and SWC adequately. The next section evaluates the validity of technocratic methods as solutions to LD problems.

iii. Technocracy - a solution to LD problems?

Because the processes of LD are physical and socioeconomic, solutions require not only technical approaches but also socioeconomic ones which take a broad perspective of alternatives, including those advocated by land users. Planning for reforestation, to control LD or for wood production is not purely a technical matter but one of economic development. In the short term plantations require the exclusion of pastoral and agricultural activities, so reducing the amount of land available to land users. Apart from the initial exclusion period needed to protect young trees, monocrop plantations often result in long term land use segregation. Species such as pine can have inhibiting effects on the growth of grasses or other vegetation which may be valuable to local economies[8]. In the light of this, this section discusses the technical solution for the

[8] The inhibiting effect of pine on other species was clearly evident in the area of study. Very little vegetation growth takes place under the forty year old pine plantations of Puebla de Valles. The techniques and socioeconomic 'arrangements' for this plantation are more closely examined in chapter five.

control of erosion through reforestation effected by the Spanish State.

The technocratic approach, with its origins outside Mediterranean conditions, rebuffed the use of traditional land use arrangements, land users' knowledge of natural vegetation and micro conditions, and their cooperation. Referring to Africa Bara Guéye (1995), explains that many natural resource management projects "...have not been very effective, because of their essentially technological bias" (p83). After the transfer of modern methods from the German school, a second wave of 'modernization' saw Spanish foresters being sent to the USA to learn what was perceived to be 'highly' scientific soil management and reforestation techniques.

The use of methods based on quantifiable measurement, such as the USLE [9] or terracing using heavy machinery, gave foresters greater scientific standing and credibility - and disregarded land users' knowledge even further. Montoya Oliver (1983), refers to the short sighted vision of Spanish foresters who, blinded by modernization tenets, snubbed integrated agropastoral methods and knowledge of land users (p.34). Such scientific methods gave respectability to political decisions for reforestation. Hijacking scientific findings "...to disguise the political nature of planning decisions by making them appear scientifically or technically inevitable" (Richards, 1981: 8), is a common occurrence which enhances the validity of reforestation policy in Spain.

Since the turn of the century in Spain, and in the late 1930s in the US, technicians believed that bad practices damaging the soil could be rectified through technical measures. The scale of the problem made "The Head of the US Soil Conservation Service (SCS), Hugh Bennett, [to portray] environmental catastrophe large..." (Pretty and Shah, 1994: 4). To rectify damaging practices the SCS demonstrated SWC measures to farmers in the US. The application of technical measures, such as terracing, tried in Navajo Indian reservations, and technicians' disregard for "...locally adapted and appropriate

[9] See argument made by Cook, Able and Stocking, and Blaikie and Brookfield in page 26 about the doubtful scientific validity of T values, as an important variable in the USLE formulae to calculate soil loss.

technologies ...provoked an intense negative reaction, not only to SWC but also to all government programmes" (Pretty and Shah, Ibid: 5).

This type of technology and approach was 'exported' to Spain via visits of influential people such as Bennett and the training of Spanish technicians in the US. Terracing for forestry plantation, part of the trend of modernization, was portrayed as a technically 'superior' approach to that of manual plantation with hand dug holes and minimal disturbance to the existing vegetation. The technocratic approach, Baker (1984) warns, sees the problem as a physical one... amenable to a technical solution." rather than as "...symptomatic of a social and political crisis..." (p.53). It can be argued that in the Spanish case the 'superiority' of the technocratic approach, which still persists among many foresters, has been underpinned by the 'demonstration' of peasant's irrationality and ignorance.

The technocratic approach has prompted reactions similar to those in the US among rural populations in Spain, and equally cannot be considered as a satisfactory solution to land degradation problems. The view foresters have of land users has great negative implications for the feasibility of promotion of participation in reforestation planning. This and the 'superior' status attributed to technological methods (and by default foresters' capabilities), has constrained their ability to consider participation as a form of improving forestry and SWC practices, which in turn has antagonized rural populations.

Classification of land in terms of its 'vocational' (a term widely used by foresters in Spain) physical characteristics, as best fit for forestry, pastoralism, agriculture, etc., and ignoring land users circumstances, knowledge and perceptions, amounts to exclusively technocratic reasoning. An example of this reasoning and of the type of Spanish-USA cooperation was that provided by Bennett in 1956. During a three month research visit to Spain on behalf of the International Cooperation Administration of the USA, Bennett studied the problems of erosion and admired the erosion control achieved by Spanish foresters. Commenting on landowners' reticence to give up their land to reforestation, he concludes that, although understandable, in the long term they would be better off by paying more attention to SWC in gentler sloping land than wasting their "time and energy on land obviously unfit for farming" (Bennett, 1956?: 72). In response to this opinion, land users' view may have been that land is unfit for farming only if it cannot provide them with a sustained livelihood. Baker (1984) argues that the persistence of the technocratic approach

> "...even in the face of its self evident ineffectiveness..." is because of its ability "...to shift the blame for its own failure onto its victims... [and] tighten the screws on the marginalised poor" (p.53)

The type of advice provided by Bennett to land users does not explore the reasons why SWC measures are not implemented. It implies land users' ignorance, and proposes as a solution greater conservation work by land users assuming this would yield a profitable return to their investment (financial and labour time) in SWC.

Although the drive for afforestation was based on the need for wood production, the argument for the protective function of forests was not abandoned. Representative of the views of the majority of forest officials, is Lopez Cadenas (1985a), who argues that productive forests are also protective (p.55). The implication is that there is no longer need for purely protective, slow growing mixed natural species for agrosilvopastoral integrated use, because single species of fast growing trees could perform the same protective function and provide raw materials for the artificial wood manufacturing industry. Castroviejo Bolibar et al (1985), illustrates the absurdity of the 1939 Reforestation Plan to plant 6 million Has. with pine and eucalyptus (in 100 years), by comparing it with the fictitious, and equally absurd proposal of planting the entire agricultural land of Spain (6 million Has.) with potatoes (p.13). In practice only 3.5 million Has. were reforested and 270,000 Has. of pasture planted (Groome and Llorca: 1988: 83,85). The technocratic approach to land degradation problems through massive reforestation cannot be considered a feasible solution. The sheer scale of the reforestation task which was proposed, as well as the unsuitable character of its ecological balance, made the project unattainable.

The grandiose ideologies typical of fascist Spain were reflected in the PFE plans of 1952 to plant between 100.000 and 150.000 Has. annually. This mentality has, to a certain extent, endured changing economic strategies and ecological concerns. Mono-crop plantations of single species of conifers and eucalyptus, have been the routine practice. The technocratic approach to SWC also still lingers on as a solution to LD problems. Measures of reforestation devised by technicians are portrayed as the solution without considering those which may be conceived by land users. Lingering technocratic measures continue to be devised for production. According to Groome (1990), in 1976 Martinez Hermosilla (an influential forester with financial interests in the wood pulp industry, Rico Boquete, 1995: 84), proposed the reforestation of 2 million Has. in 10 years, and in 1986 there were proposals for the urgent reforestation of 5.5 million Has. (p.115).

Plans for reforestation continue today. The EU contemplates the reforestation of one million Has. of agricultural land in Spain under the 'set-aside' programme, from 1993 to 2012, (Prieto Rodriguez, 1995: 19). As a result of this the region of Castilla-La-Mancha expects to reforest 132.000 Has. between 1993 and 1998 and double its reforested area (1.9 million Has.) in 60 years (Lopez Carrasco, 1994: 51,57). Proposals for the form of reforestation vary from the continuation with the use of mainly conifers to those of mixed plantations, accounting for some change in perspectives. Araujo (1994), calls for a carefully planned reforestation, using techniques which are least disturbing to the existing vegetation, at a rate of 500,000 Has. per year for 25 years (p.60). Plans to reforest with mixed species of trees indicate changes in policy, however, the ambitious pace of reforestation, akin to past grandiose expectations, is not easily attainable.

One of the main arguments of Spanish foresters for the choice of fast growing and frugal species, such as *Pinus nigra* and *Pinus pinaster*, has been that they are able to succeed in highly degraded soils. Although this is a valid reason for these type of conditions, plantations with these species have been employed indiscriminately even in areas where soils are not too degraded. The plantation with different species of trees according to soil type and conditions, and the small but important climatic differences corresponding to the situation of relatively small areas of land, would require meticulous planning and a higher budget. The *Quercus* species *lusitanica* and *pyrenaica*, need more fertile soil conditions and protection from direct sunlight in the early stages of growth than conifers. The identification of more fertile and shaded areas would require greater care in planning in conjunction with land users. Land users' knowledge of local conditions for a rapid identification of these areas was not taken into account in the indiscriminate reforestation with conifers or presently for the reforestation of agricultural land under 'set-aside'. Reforestation with mixed species would be more expensive than that solely with conifers, but the reward could also be higher. Making use of place-based local knowledge of micro conditions to reduce the cost of reforestation, involve the local population in planning, and creating employment in the rural areas, are examples of these rewards.

The three main official arguments for reforestation with fast growing trees after 1931 have been the need to reduce the Spanish wood deficit, the need for rapid protection of water catchment areas and their ability to advance the seral evolution of vegetation to a climax condition. Although the ecological disadvantages of plantations solely with conifers have been known to Spanish foresters, these were disregarded in practice. Earlier recommendations from the 'German school', by foresters such as Burgers (1949) writing in the main Spanish forestry journal 'Montes', were ignored. Burgers' warnings were based on findings of the acidification effects of the soil by fast growing conifer species experienced in Holland and Germany. The advice he gave to Spanish foresters, to use mixed species for quality wood production and soil protection (p.505), was ignored.

Apart from the ecological argument against conifer plantations the policy of reforestation with indigenous trees was also defended and justified on its economic advantage by some foresters. Groome and Llorca (1988), explain that a minority of foresters, envisaging the long term and plausible revitalization in demand of products such as sawdust, charcoal, cork etc., advocated a policy of conservation, regeneration and plantation of natural trees for quality wood production. The cutting of many *Quercus suber* (cork oak) to make way for wheat production in the 1950s, is an example of a thoughtless policy with long term detrimental ecological and economic effects. The recent increase in demand for cork and the unsuitability, and consequent degradation, of the land where these trees stood for wheat production, indicate that slow growing species were seen as economically unimportant and not promoted.

The most influential foresters, such as Martinez Hermosilla, conceived the future of forests, not as providers of wood for sawmills, but as providers for the cellulose and manufacturing industries of boards, such as chipboard and plywood. Groome (1989) highlights the conflict of interests between these two industries and supports the pleas of the sawmill industry and furniture makers for the Government to change from cheap conifer wood production to the plantation of broad leaf trees for wood production for quality furniture. The long term beneficial ecological, economic and social effects of conservation, regeneration and plantation of natural trees is rejected in favour of fast growing tree plantations. Garcia Dori et al (1984) considers the progressive qualitative destruction of Spanish natural forests, which he regards as samples of the most ecologically and genetically varied forests in Europe, to be the result of forestry policy since the Civil War.

The technocratic approach still exists, not due to lack of knowledge of other solutions to LD problems but, due to the preference given to the promotion of fast growing species for economic reasons. Although the use of *matorral* for soil protection was debated and well understood by foresters before 1939[10], the productivist objectives of the administration in the 1940s discounted its use for soil protection. In 1939, Ximenez and Ceballos emphasized the importance of *matorral* in extreme cases of degradation as the only solution for erosion control (Groome, 1981)[11]. Blanco (1994), however, notes the limitations of *Cistus* as a slow agent for soil formation but emphasizes its protective capacity (p.26).

However, the protective functions of natural herbaceous pasture and *matorral*, as a plausible solution to LD problems, not only received

[10] The earlier reforestation projects in the area of study, examined in Chapter Five, show foresters at that time considering the plantation of *matorral* as a form of erosion control. This practice was soon after abandoned in favour of the sole plantation with conifers.

[11] As shown in Chapter Five, the first projects for reforestation of La Mierla in 1943, 1944 and 1950 (as shown in table 13a, page 160), considered the use of *matorral* as a form of SWC.

little attention by government officials, but were also the object of their contempt. Blanco attributes officials' lack of knowledge of natural herbaceous pasture and *matorral* as a reason for their disinterest in its promotion for protection. A main reason for officials' lack of interest and knowledge of the protective possibilities of *matorral*, Gonzalez Bernaldez explains, is the small fraction dedicated to research on *matorral* species in comparison with the great financial expenditure in fuel and machinery for reforestation (1990: 440).

Although the protective effects and management of *matorral* are largely under-researched, foresters in favour of reforestation argue that its use is conductive to a vegetation para-climax condition. According to these, *matorral*, especially where *Cistus ladaniferous* is predominant, cannot provide the natural conditions for evolution into a climax condition, that attained by a balanced ecosystem, but remains in a para-climax fragile state. To avoid this para-climax situation and advance the seral evolution of *matorral* vegetation, some foresters advocate the introduction of conifers. For example, del Palacio (1993), proposes the introduction of species, "normally conifers", which are well adapted to specific requirements of soil and climatic conditions and provide the most advanced possible inception in the seral stages of vegetation evolution. Similarly, Serrada Hierro (Prensa Alcarreña, 11-x-84), following the official productivist line, argues that the protection and restoration of soil by vegetation is best achieved by constructing terraces and planting trees. Tree plantations are seen as speeding up the evolution of vegetation towards a climax condition, which is conceived as the ideal. Serrada Hierro (1990), promotes the removal of *matorral* vegetation when its evolution is slow or static, and proposes its replacement with plantations of conifers. He considers the use of fire, as a form of *matorral* management to encourage the growth of grasses stemming from past pastoral activities, to be irrelevant for the improvement and protection of soil (p.456).

In contrast with these views, the traditional management of vegetation is defended by some environmental scientists. Gonzalez Bernaldez (1990), points to the traditional use of controlled fires for land management which was able to maintain a stable ecosystem in Spain for many centuries. He calls for the documentation of still existing (but rapidly disappearing) knowledge of fire management and extensive pastoralism. He concludes that the conservation and regeneration of natural Mediterranean vegetation, avoiding past mistakes and excesses, would best be achieved by making use of this knowledge and fire management (p.441). Studies carried out in Portugal also suggest the need for better fire management. Rego (1986, in Coelho, et al., 1994: 16), points out the Portuguese practise of burning to encourage the growth of grasses for pastoral use also reducing the danger of "...devastating fire." Rego et al. (1990) also explains further that Portuguese "Legislation in the 1940s preventing grazing and burning led to a build-up of highly combustible fuel on forest floors resulting in enhanced fire hazard" (in Coelho, et al., Ibid).

An indication of the insignificant regard the forestry administration had for *matorral* is its imprecise classification. *Matorral* is perceived by Spanish foresters as the problem to reforestation rather as a possible solution to SWC problems. The official classification of *matorral* (*monte leñoso*) does not differentiate between its conditions or stage in the seral succession. *Matorral* is described as the mixture of vegetation covering more than 20 percent of the land, composed by dwarf trees, such as *Quercus ilex*, *q. pirenaica*, or *q. lusitanica*, originating from stumps or roots, mixed with *Cistus*, gorse, heather, bearberry, broom, etc. The importance of *matorral*, covering about 9 million Has., or 18 percent of land in Spain, according to Garcia Dori (1994), should be estimated according to its ecological and economic values.

In comparison with the official classification, Gonzalez Bernaldez (1988), classifies *matorral* into two main groups: that of climax in areas which, because of conditions of climate, soil, altitude, etc., will not evolve towards a forest; and that originating from degraded or deforested areas. For the latter class, García Dori (1994), recommends that its progression should be controlled and conducted towards a forest climax, its transformation for extensive pastoral use should be considered, or it should be left undisturbed (p.6-7).

One of the few recent studies of *matorral* in Spain emphasizes its protective[12] and economic value. This study carried out in Granada and Almeria Provinces concludes that the results of *matorral* improvement (*Dittrichia viscosa, Salvia lavandulifolia, Oxyodon satureja obovata, Thymus serpylloides and Lavandula lanata*) were an increase in soil infiltration and a reduction in surface runoff. The study, carried out with the participation of the local population, making use of their knowledge and taking account of their aspirations, set the basis for the production of honey and valuable aromatic oils (Martinez Raya, et al, 1993).

The resources assigned for research and/or the improvement of *matorral* in Spain, nevertheless, is small. In 1979 the Government established a *matorral* research station to investigate silvopastoral systems. As a result of this in 1980 some subsidies were offered for the installation of mixed forest-pasture systems. However, subsidies were directed towards fast growing tree species and artificial pasture, disregarding the interesting examples of traditional use of *matorral* areas for pastoralism (Groome, 1987a: iv).

This diversion of subsidies can be understood as a continuation of the forest policy laid out in the legislation of 1957 for the uplands areas (*Ley de Montes de 1957*), when in practice it was giving preference to tree plantations and actively discriminating against the integrated use of forests, *matorral* and pastoralism. Extensive pastoralism for the production of animals to be fattened under more intensive conditions elsewhere, is given a lower priority than crop production. Successive Spanish Governments ignored the 1966 World Bank/FAO recommendation to dedicate most of its agrarian activity to animal production (Llorca and Groome, 1987). Technocratic solutions based on a policy of exclusion from reforested areas, which are traditionally used for pastoralism, created resentment among rural communities and gave rise to many forest fires (Llorca and Groome, 1987; Groome and Llorca, 1988; Pou, 1984; García Dori, 1994).

The policy of conifer plantations to protect the soil against erosion, dams against sedimentation, the reduction of shortages of wood in Spain, and the seral advance of vegetation, has had, paradoxically, the opposite effect when forest fires occur - land

[12] This coincides with the findings by IBERLIM.

degrada*ion. The colonizing strategies of many conifers, using fire to stimulate the germination of its seeds, result in a para-climax condition, rather than helping to advance the seral evolution. Gonzalez Bernaldez (1978) explains that the high burning temperature of conifer forest fires suppresses the recovery potential of other species, damages what little humus may have been created, and exterminates many of the micro organisms living in the soil, resulting in reduced infiltration. He explains further that, infiltration conditions, determined by the level of micro organism activity in the soil, are lower in conifer and eucalyptus plantations than in natural forest and *matorral*. For these reasons the technocratic approach of reforestation with conifers cannot be regarded as satisfactory.

Research in Portugal showed that evapotranspiration in pine and eucalyptus regrowth on areas burnt two years before is greater than the evapotranspiration from areas in long unburnt catchments (Coelho et al., 1994: 16). This higher evapotranspiration in mature forests and undergrowth, added to the risk of 'enhanced fire hazard' (as in Rego et al., 1990, above) suggests the need for careful forest management research to device policy measures for the control of undergrowth so fire risk is reduced, the retention and eventual yield of underground water is maximized, and sediment yield minimized. Land use prohibition, rather than the improvement of well tried land management forms, such as controlled burning, so the damaging effects of high temperature burning could be avoided and undergrowth could be kept under control, was the form of 'modern' land management methods of plantation promoted by technocrats.

These plantations for protection in Spain may have repercussions contrary to the results expected. Conifer plantations for the protection of reservoirs from sedimentation, according to Wilkinson (in Whitby, 1992: 181) lead to a reduction in the amount and quality of water available and, at times, increase sedimentation. According to Wilkinson (Ibid), lysimeter interception studies show that afforestation of water catchment areas can result in as much as 20% loss in the water supply yield. Other effects are that conifers collect pollutants from the atmosphere which, in conditions of the low buffering capacity of the soil, are then carried down to the reservoir, and may result in the acidification of surface water.

The utilisation of bulldozers for the construction of terraces in the area of study is an example of the growing popularity of mechanical/technical methods of plantation starting in the late 1960s and early 1970s in Spain. The construction of terraces, explained by Coelho et al., (1994: 3-4), involves the creation of a new slope following contour lines with machines of more than 100 CV of power, with power shovels, angledozer or tilldozer, and rippers for subsoiling. The angledozer pushes the soil down the slope which will be the next bench terrace constructed by the machine[13].

Depending on specific conditions, low infiltration under conifers may result in greater surface runoff and high sediment yield (causing the sedimentation of reservoirs), or greater surface runoff and low sediment yield (ensuing the replenishment of reservoirs), or greater evapotranspiration and low surface runoff and sediment yield (resulting in a diminished amount of water and sediment reaching reservoirs). The last condition corresponds to the case of reforestation in Guadalajara[14]. Greater infiltration under natural forest conditions are emphasized by Lopez Cadenas (1985a) who also notes the higher interception of total precipitation under conifers (35%), than under deciduous natural forests (17%) (p.56).

Technical measures such as using heavy machinery for the construction of terraces for reforestation, cannot be considered successful in the control of erosion. Sedimentation increases with soil disturbance, at times of tree planting and wood extraction. The indiscriminate use of heavy machinery and inadequate application of plantation techniques which destroy the existing vegetation and till the soil to encourage the rooting of newly planted trees, account for an immediate increase in soil erosion. In the case of the construction of terraces for tree plantation the consequences may be disastrous and long term. In many cases the construction of terraces, involving the use of heavy machinery destroys or inverts horizons with devastating effects for the recovery of soil fertility.

[13] The effects of this practice on the soil are discussed in greater detail in chapters four and five.

[14] An important finding of the IBERLIM study is in the measuring of sediment yield under diverse conditions of pine forest and *matorral*. A close examination of these findings is carried out in chapters four and five.

The need for the construction of new dams to reduce the existing water 'deficit' in Spain, requires further protection of water catchment areas which, according to the official view, is best done with conifer plantations. However, many of the natural springs that were well known to local people in the field area, according to them, dried up shortly after conifers were planted (field work data), indicating greater evapotranspiration. The recent resumption of water transfer from the Tajo river to Murcia Province (see figure 2, page 31), the planned enlargement of *Los Ramos* dam (figure 3, page 52) and the construction of the *Matallana* dam, in the Jarama river North of El Vado dam (figure 4, page 77) indicate a continuation of the policy of great engineering works and reforestation for protection-production characteristic of the orthodox modernization strategy. Suspicions are growing that water shortages in Spain are used as an excuse to press for great engineering works to 'pump-prime' the stagnating economy (Guardian, 25-1-1993).

A great problem in need of reassessment in SWC policy in Spain is the high consumption of water. Technocratic solutions such as the construction of more dams and interregional water transfers require political decisions - as does trying to reduce the amount of water used. 'Cynics' in Spain point out that the Government is forced to provide work for construction companies in order to compensate them for the still unpaid road building work carried out in the recent past. According to Mestre Marcotegui, the consumption of water, 1174 cubic metres per capita/annum is high, in comparison with a world average of 660 in the world and 726 in Europe. Farmers pay for water use according to the area irrigated and not for the amount of water used, resulting in a great squandering of resources. Eighty three percent of water goes on irrigation in Spain in comparison with 57 percent in the EC as a whole (Mundo Obrero, No.23-24, July 1993). Lopez Pardo (1995) and Tió Saralegui (1995) put the consumption of water for irrigation as high as 90 percent.

The reason for the high consumption of water in Spain, which is suffering its longest dry cycle this century (Financial Times, 21-2-1995), is the indiscriminate and unregulated use of water by intensive agriculture for crop irrigation and the high consumption by the tourism sector, especially for golf course irrigation. The possibilities for the regulation of water consumption by the Spanish

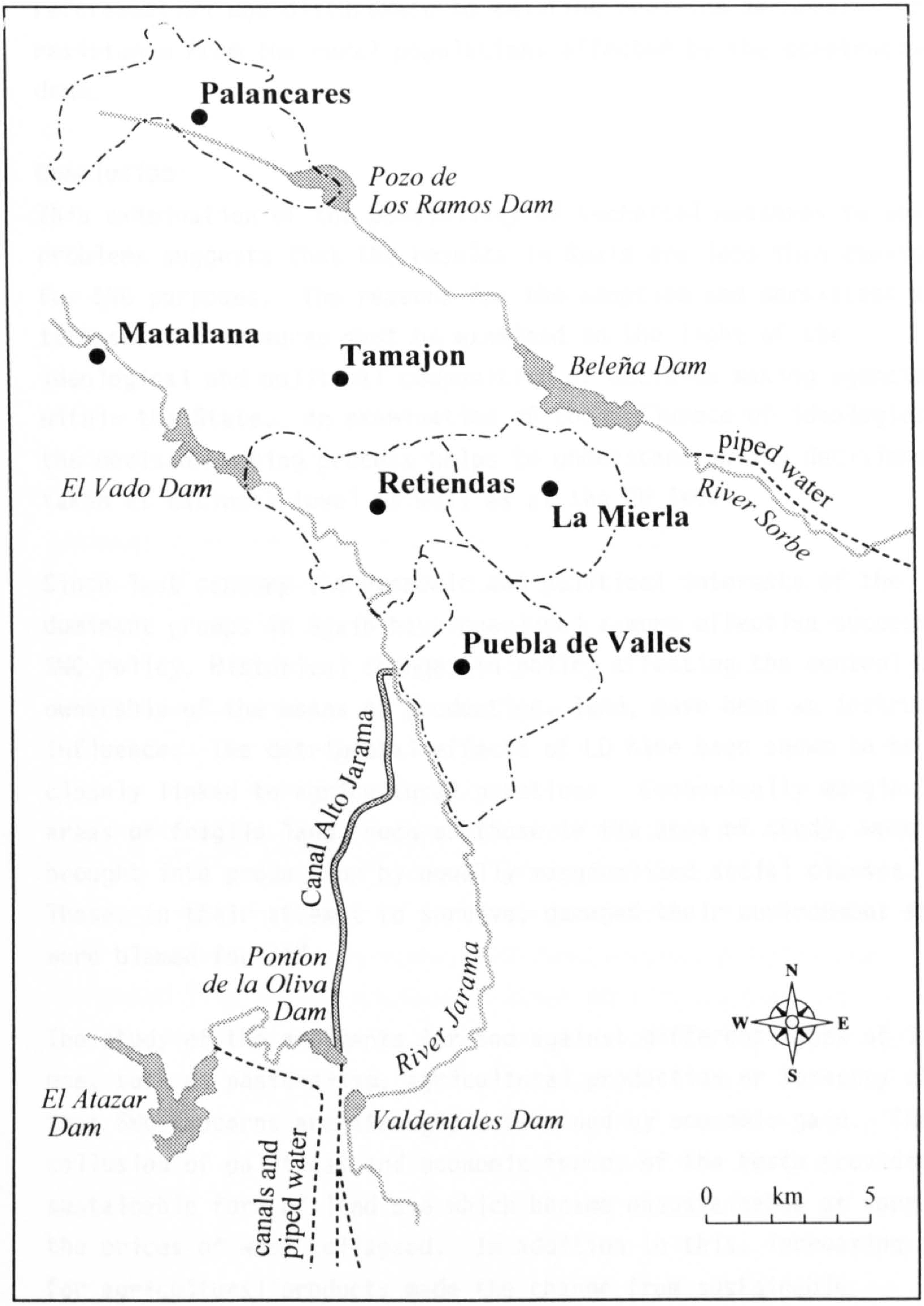

Figure 4: Village areas of study, water catchment and distribution system

Government are complex. Strong political lobbies on the part of both the construction industry and irrigation farming put the Government under pressure. The difference, however, could have been that the second option could provide better ecological balance, less reforestation and disturbance to existing evolving *matorral*. and less resistance from the rural populations affected by the construction of dams.

Conclusion

This examination of the possibility of technical measures to solve LD problems suggests that the results in Spain are less than convincing for SWC purposes. The reasons for the adoption and persistent use of technocratic measures must be examined in the light of the ideological and political composition of decision making agencies within the State. An examination of the influence of ideologies in the decision making process helps to understand policy decisions taken at national level as well as at the EU level.

Since last century the economic and political interests of the dominant groups in Spain have precluded a more effective successful SWC policy. Historical changes in policy affecting the control and ownership of the means of production, land, have been an instrumental influence. The detrimental effects of LD have been shown to be closely linked to agricultural practices. Economically marginal areas of fragile land, such as those in the area of study, were brought into production by equally marginalized social classes. These, in their attempt to survive, damaged their environment and were blamed for it[15].

The study of the arguments for and against different types of land use, such as pastoralism, agricultural production or forestry shows that SWC concerns are strongly determined by economic gain. The collusion of political and economic forces of the *Mesta* provided a sustainable form of land use which became unsustainable as soon as the prices of wool collapsed. In addition to this, increasing demand for agricultural products made the change from sustainable pastoralism to less sustainable agricultural production, which in the case of Guadalajara Province was discovered to cause extensive LD.

[15] Evidence and extent of damage caused by LD and erosion is covered in chapter.

Emergent forestry science was used by the opponents to the disentailment policy as proof of the need to reverse the environmentally damaging effects of private land ownership. What these opponents did not question, however, was the existing deficiencies in the State's ability to regulate the use of common land, nor the economic reasons of agriculturalists for their land use practices. Explanations of irrationality, such as that by Codorniu, hide rather than explain the socioeconomic reasons for land use and degradation, as well as precluding an objective explanation of socioeconomic processes. Rather than being irrational, in times of hardship the rural household production unit tends to intensify production by extending the area of work to more marginal land, with the attendant danger of increasing degradation and erosion levels, as well as "their own self exploitation" (Harriss, 1982), usually by working harder to be able to survive.

Although some foresters tried to find a solution based on existing social and economic agrarian production structures which would not harm the interests of land users, a new economic interest, that of the industrializing composite wood materials and pulp production sector, gained greater influence with foresters in influential decision making and political positions. The strong technocratic process established in policy making and implementation became well entrenched after 1939, becoming the rule rather than the exception in dealing with problems of LD and SWC, to the extent of becoming an ideology. The hegemony of the dominant forces, those of the wood pulp and composite industries, the construction industry and irrigated farming continues with their ability to make use EU funds for subsidised production. This, it is argued, can be considered as part of the lingering technocratic strategy in Spain and the EU. The next Chapter examines the rationale and arguments made for planning in the light of ideology, and how these have been sustained by EU regulations of agricultural markets and the adaptations of directives by the Spanish State. The next Chapter examines the effects of ideology in development plans and its effects on the condition of soil.

Chapter Three
Ideology and planning in Spain and the European Union

While last Chapter examined the unfolding concerns for the degrading conditions of land and the consequent utilization of technical methods to limit the damage, this Chapter looks at the ideological forces underpinning such reforestation methods. The professional, political and ideological structure of the Spanish forestry agency was part of the political system responsible for the promotion of autarky and attendant grandiose plans for wood production after the Civil War. The ideological persuasion of the State fostered autocratic, technocratic and 'top-down' reforestation strategies for SWC and wood production.

The first section of this Chapter looks at the power of dominant ideologies in swaying policy making for SWC in favour of reforestation and against other options and interests in Spain. An important part of the socioeconomic processes of LD is that of the policy decision making for SWC. The agricultural land which has been 'set-aside' under EU policy needs to be protected from degradation and erosion especially in the early stages, that is between land abandonment and the time when encroaching *matorral* starts colonizing it and providing protection cover against the erosive action of rain. The policy of protection of 'set-aside' land through reforestation, rather than through the eventual colonization of *matorral*, is managed mainly by the leverage of subsidies, those given to farmers in compensation for their relinquished production. These are solutions based on recommendations which gained access to the decision making process for SWC at EU and Spanish Government levels. Other alternatives have recently been proposed by emergent ecologist pressure groups who also seek to influence the decision making process. The history, ideological underpinning and strength of these pressure groups is also examined in section ii.

Section iii shows that the effect of the continuation of subsidies is detrimental to the promotion of participation to stimulate reforestation[1]. European Union regulations, such as the Common

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[1] The theoretical and empirical testing of participatory approaches in planning are presented in chapter six. The reason for the separation of this from the main theoretical examination undertaken in chapters one

Agricultural Policy (CAP), are supported by significant subsidies. Each country in the EU, according to the ideological inclination of the Government and development strategies, chooses the best way to comply with EU Directives for the administration of subsidies, in this case for investment in the protection of the set-aside of agricultural land. The set-aside of land was introduced in 1988 to reduce surpluses of certain products, mainly cereals (MAPA, 1988). Farmers qualifying for this programme receive compensation in exchange for taking at least one fifth of their land out of production for five years (MAPA, 1991). In Spain, due to the predominant ideology and professional structure of the forestry agency, the reforestation of agricultural land has been approached in the similar technocratic way as in the past. Signs of change, however, are detectable in that past autocratic approaches used by the previous undemocratic administration that governed the country from 1939 to 1976 have been decreasing. There has also been a natural phasing out through retirement of technocrats with decision making powers in reforestation[2] who were ideologically akin to the previous political regime, and the influence of the emergent ecologist pressure groups in Spain.

The EU makes important financial contributions to reforestation and prescribes the conditions for their use, leaving the technical details of project planning and implementation to each country. Although Spanish officials recognise the need for participation, lack of action suggests, at this stage, rhetoric rather than action. The regulations of the Common Agricultural Policy, examined in section iv, do not make any provisions for the promotion of participation in planning for SWC either. It is argued that regarding participation, both the Spanish Government and the EU policy makers show lack of awareness or commitment in their planning strategies, and similar ideologies based on the management of subsidies.

i. Ideology and the control of natural resources

It is crucial to understand that the continuation of technocratic

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to three, is that participatory postulates when examined before their empirical testing provide greater relevance to the issues examined.

[2] An examination of the organizational structure of the administration regarding reforestation is presented in section iv of Chapter four.

solutions in SWC is a reflection of the ideological tendencies present in the workings of the State and its bureaucracy. Strategies for SWC claimed to be for environmental reasons are also contemplated for their economic return, especially when reforestation for wood production is one of the objectives. The reforestation of water catchment areas in Guadalajara, as claimed by the Spanish forestry agency, is for the protection of reservoirs such as El Vado and Beleña (shown in figure 3, page 52, and figure 4, page 77). These provide drinking and irrigation water for industrial, urban areas, and intensive modern agriculture. Ostermeier and Yu (1991) assert that "...policy development and implementation is dependent on the culture of the system that produces it." (p.83). It could be added that the 'culture' of a political system, being the reflection of its ideological and hegemonic construction, is determined by the interests of dominant social classes. In the case of Spain the political system after 1939 was a reflection of the ideological construction of the dominant classes, among these those with financial interests in the wood pulp and wood composite industries (chip board and plywood).

The ideological hegemony of the dominant classes inspired courses of action to promote the reforestation of large areas of Spain with conifers. The results of the workings of ideology in policy making often remain hidden under explanations of the inevitability and common sense of the policy decisions made. Often the workings of ideology are denied and 'common sense' explanations of courses of action are advanced. Denying the most general and simplest meaning of ideology as a "system of ideas, as for instance when people refer to liberal or conservative or socialist ideology" (Simon, 1982: 58), is an attempt by neo-liberal politicians and thinkers to divest their politics of any ideological connotation. Ideology as referred to by Gramsci is seen as the cause which binds a bloc of social elements together and acts as cement or as an agent of social unification. It is also argued that bodies such as "industry, financial institutions, commercial companies and the State apparatus, [respectively owned and/or controlled by the dominant social class], play an important part in elaborating, sustaining and spreading ideologies and have ideological effects" (Simon, 1982: 60). Ideology in this case must be understood as "more than a system of ideas; [but] ...also has to do with a capacity to inspire concrete attitudes and provide orientations for action" (Bottomore, 1983: 222). The tight control over the appointment of civil servants, such as foresters, exercised by the Minister of Agriculture, at the top of the political ladder of the system in power from 1939 until its disappearance in 1975, resulted in an homogeneous politically 'safe' bureaucracy for that regime. The direct involvement of the Minister in the appointment of technicians and administrators meant they could be vetoed on political grounds, producing an ideology which was 'dominant' in the Spanish Civil Service. Many of those which gained access to the administrative or technical sections of the forestry service are close to retirement age but still in service. Their proposals and actions regarding reforestation often prompt calls for their early retirement by ecologist pressure groups (Varillas, 1987: 7).

The confrontation between two opposing ideologies which gave rise to the Spanish Civil War (1936-1939) ended in nearly forty years of dictatorship and the imposition of a particular ideology and accompanying development strategies. The examination of the ability of the dominant social class to spread their ideology and inspire courses of economic, social and political action in Spain are the basis for this study of SWC policy.

The choice of a particular development strategy is often influenced by the control over policy-making exerted by dominant social classes, whose interests tend to prevail over those subsumed. Bryant (1991), argues that:

> Government and business elites deriving power from processes (e.g. industry, dam construction) often contributing to ecological degradation, are typically ill-disposed toward any changes that may threaten their power ...such elites when pressured by international or national forces (e.g. World Bank, NGOs, media) only tinker at reform cloaking such efforts in environmentalist rhetoric (p.164).

Reforestation and water transfer works in Spain, whether under free market ideology are calculated to benefit certain economic sectors or not, are to the advantage of the wood pulp, construction industries, and irrigated farming interests. In forwarding these interests the Spanish Government relegates to second place the option of an alternative SWC strategy which could, with the careful management of existing vegetation, yield greater runoff flow to keep the existing reservoirs fuller.

The wood pulp public and private industries, such as National Society of Applied Cellulose Industries (SNIACE), Cellulose of Galicia (CEGA), Papelera Española C.A., and construction industrial interests, such as the National Association of Construction Firms (SEOPAN) are able to influence policy and spread their ideology affecting other economic sectors. Rico Boquete (1995), identifies ideological links between the Spanish (under Franco) and Italian fascist political systems, such as the involvement of the State in economic matters of little interest to private capital or in those strategically important for the nation. These political ideologies declared their trust in the role of private initiative while regulating and controlling its activities tightly. Spanish capital with interests in the cellulose industry, although under the tight control by the State, benefited from its partnership with the National Institute of Industry (INI) and the PFE, because of the protection against financial risk these offered. The PFE and the INI were determined that the State should have a share in the profits of cellulose production (calculated at 7 percent) because of the State reforestation effort. Rico Boquete explains further, that the independent initiatives of private capital to establish cellulose plants and benefit from the efforts made by the State in reforestation, while trying to exclude the PFE and INI as partners, were aborted by the PFE and the INI. The condition for the establishment of a cellulose plant by CEGA in 1947 (as an example of the same case for other cellulose industries in Spain) was that the PFE and INI should hold at least 51% of the shares in the company. Demands for State financial assistance by CEGA resulted in a lengthy bargaining dispute. CEGA was eventually allowed to be built and operate in the 1960s (pp.150-153).

The links between the State and the cellulose industry were made possible not only because of the ideology of the State and the security against risk sought by private capital, but also because of the possibility of private gain among influential and wealthy officials with financial interests in this industry. The involvement of PFE and INI as majority partners ensured cellulose companies access to cheap primary materials, wood, and financial security. Rico Boquete follows the unravelling of SNIACE's application for eucalyptus plantations in Galicia (in the North West of Spain) and in Santander (in the Cantabric coast). Two influential officials, Alberto Martin Artajo (Minister of Foreign affairs, 1945-47) and the forestry engineer Paulino Martinez Hermosilla (in a position of authority in the PFE) were executives in SNIACE. According to Groome (1990), Martinez Hermosilla was also president (chair) of two other important wood composite manufacturing industries, TAGLOSA and CUBERG (p.324). Rico Boquete explains further that the insistent demands made by SNIACE for its direct involvement in the plantation of eucalyptus and its participation in consortiums, was granted by the Government due to the political pressure and influence of these two officials. SNIACE's reason for the insistence on their participation in the consortiums was to be able to attain the legal and coercive force needed to ensure the supply of wood (pp.84-87).

State plans to plant large areas with single species of trees for wood production and SWC have social and ecological repercussions affecting the economy of farmers and the condition of soil. In comparison with influential financial and social sectors, small farmers in marginal areas or ecologist pressure groups lack the power to implement their ideas and set in motion a policy of SWC.

The recent development of technology-intensive agriculture and horticulture in Spain requires a rethink in land use planning, with the emphasis on water and soil conservation. This requires reversing the prevailing arguments made by the wood pulp industry for the production of cheap wood and the protection of reservoirs. The ecologist movement is at the forefront of the struggle for the reversal of the reforestation policy. This movement questions the economic and ecological desirability of conifer plantations.

Land users, social groups dependent on the water level of reservoirs, such as the Entrepeñas and Buendia dams (see figure 3, page 52) for the tourist trade, or those using water for irrigation in Murcia (see figure 2, page 31), have also been challenging the hegemony of these industries with limited success. The symptoms of the struggle to influence SWC policy are firstly, the social strains developing between areas sending and receiving water (demonstrating against each other to influence Government decision in their favour), and secondly, the doubtful economic returns of reforestation with fast growing species for wood production. To find a solution to the conflict of land and water use requires action by the Government that accommodate the diversity of interests, together with a 'listening' approach instead of imposed technocratic solutions.

Three main social groups have engaged in the current conflict over water resources in Spain; one, those in the areas providing and using water (near the Entrepeñas and Buendia dams), two, these receiving and using water (horticulturalists in Murcia), and three, less conspicuous but so far politically more powerful, the industry using wood as its main production material. This struggle has ended in a belligerent dispute between provider-users and users of water. During the summer of 1994 an acrimonious debate broke out between people living in the immediate area of *Buendia* and *Entrepeñas* reservoirs in Guadalajara, and those in Murcia and Alicante who were seeking transfer of additional water from the reservoirs to overcome their growing water supply crisis (see figure 2, page 31). This issue has created tensions between different regions of Spain - the heads of the regional governments of Castilla-la-Mancha and Murcia encouraged their people to demonstrate in Madrid in the summer of 1994 (Financial Times, 27-7-1994), demanding greater amounts of, and control over water supplies. In August 1995, as a result of the decision by the national government to send 55[3] Hectometres of water to the south eastern regions, tensions rose again. Deputies of the regional Government of Castilla-la-Mancha passed a motion to challenge the legality of the ruling and farmers from this region demonstrated in Madrid against the decision (Diario 16, 12-8-95; Guadalajara 2000, 8-9-95, 11-9-95).

Guadalajara Province is affected by shortages of drinking and irrigation water and a marked decline in tourist trade, especially in areas nearby the virtually empty reservoirs. Those in Murcia and Alicante invoke "solidarity and justice" in their argument for the 'obligation' of those in Guadalajara to share water with the most needy regions in Spain. Tensions are understandably high when the availability of water may make or break the viability of intensive farming in the receiving areas, or threaten the economic survival of local businesses dependent on tourism around *Buendia* and *Entrepeñas* (see figure 2, page 31) reservoirs, which are nearly empty. The economic losses caused by drought nationally in 1994, according to the Agrarian Young Farmers' Association (ASAJA), were £1.5bn, although Greenpeace have claimed a level twice that amount (Financial

Times, 21-2-1995).

The policy for the management of irrigation water exemplifies how investment is directed to obtain maximum returns in the form of agrarian production. Recently the National Congress of Deputies ordered MAPA to draft a National Plan of Irrigation (PNR). Although Tió Saralegui (1995), describes the kind of solidarity farmers from the South invoked as 'solidarity of the poor with the needs of the rich', he supports the water transfers to the South in economic terms. He explains that the two basic questions relating to the irrigation plan are how much the Spanish Government can afford to invest and how to evaluate priorities for action (p.6). This Government official argues that the most productive areas of Spain, the South East, and more recently also the South West (El Pais, 13-3-1994: 22-23), should be given preference and that water transfers from the North to the South East are necessary. Failing this, 300,000 Has. of irrigated land would have to be abandoned. Conversely, he considers that spreading the investment among other less productive regions, as for example the areas around the Entrepeñas and Buendia dams in Castilla-la-Mancha, would not be such a sound investment.

Although drought has economic costs affecting the viability of both provider-users and users of water, neither of these two groups put into question the desirability of reforestation and the prevailing interests of the wood industry. Neither politicians from Castilla-la-Mancha nor leaders of ASAJA representing farmers' interests question the correctness of the policy of reforestation in the national or provincial press of Guadalajara at the height of the dispute (Guadalajara 2000 8-8-95, 11-8-95; Diario 16, 12-8-95; El Pais, 12-8-95). Demonstrations by provider-users and users of water in conjunction with each other rather than against each other for the control and use of water, questioning Government policy which favours reforestation for the benefit of wood industrial interests, the construction industry and irrigated farming, could be more forceful to affect policy making.

Since the type and distribution of species in a plantation affects the amount of water reaching reservoirs and the provision of water has been at the top of Spanish development needs' agendas, it would make sense to explore ways of vegetation (*matorral*) improvement and management to increase water supply, and if successful integrate these into policy.

The construction of reservoirs, road and rail transport and coastal infrastructure works, is a form of 'pump-priming' of the economy via the building industry. SEOPAN, visualizes the Master Plan for Infrastructure (PDI) in Spain, as providing an remunerative opportunity for the construction industry and the creation of jobs, if supported by a suitable Governmental financing mechanism (El Pais, 13-3-1994: 24). The construction of reservoirs and distribution of irrigation water, would satisfy the demand for more water as well as the demands made by the construction industry for greater infrastructure.

Policy decisions are often made on the basis of the greater capital accumulation potential of particular economic activities. The preference given to water transfers to the South by Tió Saralegui (1995) is an example of the argument supporting alternatives for the highest return to investment. Although *Quercus* species, because of their root systems, contribute more to the replenishment of underground water tables than conifers (Ayanz, 1985), and broad leaf trees are needed for furniture making (Groome, 1989), the choice of conifers responds to an investment preference which, the Government and the wood pulp and composite industries contend, should generate more rapid economic returns.

The second symptom of the struggle to influence SWC policy is the challenge presented to the hegemony of the wood pulp and composite industries by furniture makers and ecologist pressure groups. The validity of the argument of the superior economic returns of reforestation from fast growing timber species are contested by these two groups and financial analysts. Although in 1953 the furniture (small scale) industry in Galicia was employing 17,000 people, and was working at 50% of its capacity because of the scarcity and high price of wood (its price had increased 20 times since 1936), the project to establish a new cellulose industrial complex by Papelera Española, which would employ just 500 people, was treated as preferential and in the national interest by the Government. According to financial analysts, the economic return on coniferous plantations for low quality soft wood production has been and will continue to be unpredictable and disappointing. The great fluctuations of wood pulp markets (Financial Times, 18-1-1995 and 2-2-1995), based on the production and supply of low quality soft wood are not easy to manage given the long-term character of forestry planning. Although all prices for wood pulp increased in 1996, those showing the greatest upward trend are for good quality paper rather than for lower quality pulp from conifers (Financial Times, 25-5-96).

Following an autarkic production strategy in the 1940s and 1950s, Spain assumed a greater role in the provision of low quality conifer wood for Europe. Although the continuation with this type of plantation is no longer related to past justifications, the need for reforestation of land which was under cultivation to stop erosion and the sedimentation of reservoirs, it endures because of the strength of powerful economic groups. These justifications could be re-examined by policy makers and technicians to assess the validity of a policy stemming from misconceived expectations of autarky. Spanish dry climate, soil, and ecological conditions are not as propitious for fast growing conifers as in Northern European countries. Spanish conifer production cannot compete in price with production from countries such as Finland, Austria, or Sweden. The entry of these countries into the European Community, doubles the woodland area of Europe and raises its self-sufficiency in timber from 40 percent to 75 percent and to 90 percent in paper and paperboard (Financial Times, 26-1-1995). If coniferous wood production in Spain continues to be supported, it would increasingly be seen as a policy subsidizing the wood pulp and wood products industries. This would put into question the effectiveness and real intentions of the water conservation policy because of two main points, one, the higher evotranspiration of conifers than broad leaf trees, and two the water yielding capacity of *matorral* to replenish reservoirs being as high as that of conifer plantations.

The preference given to the wood pulp and composite industry has limited the ability of land users to devise less damaging land use alternatives or to continue farming the land rather than migrating to the cities. Spanish SWC policy was based on the compulsory reforestation of land by land users or by the State through expropriation. Devising less damaging land use alternatives in conjunction with peasants was not part of a strategy inbuilt in

Government planning, and the reforestation of land was too expensive for an impoverished peasantry. Expropriation and the reduction of productive land available resulted in greater pressure on the remaining land, worsening land users' economic situation, and finally making migration imperative.

Apart from wages for work in the plantations, Spanish rural communities have not benefited from the reforestation. Other forms of land management to complementary to reforestation, such as pasture improvement to compensate for income losses resulting from exclusion from former grazing areas which were reforested, were rarely put into practice in any part of Spain. Plantation of grasses and use of pasture especially adapted for soil protection, which after a few years are eventually replaced by native varieties, is a form of erosion control recommended by FAO (Gil, 1986: 87). The plantation of such grasses could have also helped to raise incomes for farmers by increasing the area of pasture available to them and therefore the number of animals per household. However, the implementation of pasture improvement was only a fraction of the already small amount planned, and also small in comparison with the areas reforested. Between 1958 and 1971 the areas of new and improved pasture in Spain were only 10 percent of tree plantation areas (Llorca and Groome, 1987: 7) and severe fines were imposed on those caught with their animals in the reforested areas. ICONA admitted past policies which discriminated against extensive pastoralism and hindered animal production were a mistake (Castroviejo Bolivar, 1985: 25).

Decisions to persevere with the plantation of conifers was detrimental to extensive forms of livestock production, and in favour of intensive production. The switch from extensive pastoralism that used renewable natural resources, to one based on animal feed imports had great repercussions for small-scale animal producers in marginal areas. They could not compete with the price of animals produced under intensive conditions. The increase in meat production, from 324.000 metric tons in 1950 to 2.6 metric tons in 1981, although increasing supply and reducing prices, created new demands for imported animal feed, , paid for in foreign currency and to the detriment of the Spanish economy (Castroviejo Bolivar, 1985: 30). According to Montoya Oliver (1983) imports of corn and soy based animal feed increased dramatically since 1965 (p.94-96)

The policy of support for intensive animal production is based on ideological development tenets associated with modernization theory applied in Spain in the 1950s and early 1960s. Montoya Oliver (Ibid), apart from the effects of the modernization of agrarian practices, identifies two other main causes responsible for the decline of pastoral activities in Spain. These are, firstly, the social disparagement against pastoralists in Spain, explaining the absence of a school of pastoralism, and secondly the (also disparaging) attitude of agrarian technicians in their battle against '[pastoral] routines', and in favour of 'progress', 'modern production techniques', and the 'entrepreneurial spirit' (p.34). Successive Spanish Governments did not regard the existing pastoral subsistence production arrangement as the basis upon which to improve land use practices and the wellbeing of land users, but as a system to be eradicated. The wider development trend based on modernization tenets, followed by successive Spanish Governments, neglected the potential of improving existing social and economic structures in favour of modern trends[3]. The argument by some foresters against pastoralism, especially goats, and the 'backward style' of rural life was used to justify the promotion of tree plantations. Whereas before 1936 the opposition of pastoralists to reforestation was explained by foresters as the result of 'individualist greed', after the Civil War goats and sheep were portrayed by technicians as the great enemies of forests (Groome, 1990: 126).

Segregation between forest and pastoralism emerged as the orthodox policy - based essentially on a continuation of the arguments which held the Mesta flocks responsible for deforestation during the last century. Groome (Ibid) explains that from 1942 to 1985 foresters' attitude towards pastoralists, especially goat herders, has been of open hostility. These foresters, during the Franco dictatorship period, considered the migration of entire communities to be necessary for the good of the national economy. The fascist ideology of the Government of the time, using Gramsci's words, 'inspired concrete attitudes and provided orientations' for rural development action, based on modernisation tenets. The fascist Government saw

[3] Section one in chapter five provides some examples of these trends, such as purchasing an excessive number of tractors and other machinery and their eventual under-utilisation, as examples of the quest for modernization pursued by the Government.

rural desertion in a positive light, ignored protests against reforestation, and did not take account of the cultural, or physical, direct or indirect effects of the process (p.131-132).

The State is not ideologically free; ideology is part and parcel of policy making and implementation. There is ideological endorsement for development strategies in organised societies, 'inspired by attitudes and orientations', through the political system and the machinery of the modern State. Supra-national decisions, such as those of the EU through the CAP, to reduce production as in the case of agricultural surpluses and the resulting 'set-aside' policy are established on particular strategies of development, are ideologically based, and have great implications for the condition of soil and the viability of rural life in marginal areas. The way in which the Spanish State, at its level of policy making and implementation, interprets the EU set-aside policy by allocating funds for the reforestation of agricultural land bears the clear ideological mark of its bureaucracy. The conspicuous absence of a participatory approach to SWC planning and the absence of a 'spirit' of learning from past experiences in Spain, is the result of the workings of an entrenched conservative bureaucracy and ideology.

The type of development strategy implemented, to a great extent, determines the level of impact on natural resources and their use and degree of abuse. Napier's claim that the main determining factor accounting for land degradation "...is when societies decide to increase production of material goods and services [economic growth], degradation of natural resources occurs regardless of who receives the benefits of the output or who controls the means of production" (Napier, 1988: 124) does not explain socioeconomic processes of LD. Although in most instances land abandonment results in LD, at least until the area is recolonised and protected by vegetation, it is also generally evident that intensification of production can give rise to LD and/or erosion.

To understand the reasons for "societies' decision to increase production", and provide an explanation of the socioeconomic processes of LD, requires an examination of who receives the benefits and control the means of production. These are the basic causes of social differentiation responsible for intensification of production which may be causing LD. Market led demand for some products, such as the demand for wheat during the increase in population in Spain last Century, are responsible for intensification of production and changes in agrarian practices, in turn responsible for LD. However, the greatest degradation occurs in these marginal places (Blaikie and Brookfield, 1987) which find it difficult to compete with others, in the case of Spain, supplying the wheat market.

The conflicts of interest between actors in the decision making process, including the State, land users and ecologist pressure groups, are also relevant to the study of socioeconomic processes of LD. Napier's argument that economic growth is one of the main causes responsible for the depletion of many natural resources is a well explored one. What is crucial to an understanding of LD processes in Guadalajara is that land users' decision to increase [cereal or animal] production was of no avail to them when the Spanish Government decided to promote the plantation of trees in their land. As a result of the plantation of trees land users had to intensify production. As another example, the efforts of water providers in Guadalajara and users in Murcia, for the control of the means of production, water, may be of no avail if the machinery of the State, and its lingering modernisation ideology based on the selection criterion for investment to obtain the greatest financial return (such as that proposed by Tió Saralegui in page 89 above), decides that sending water to the south for horticultural production is the most profitable course of action. The strength of the State machinery is rooted in its ability to administer subsidies for the regulation of production of certain products. This has been strengthened by the subsidies made available through the EU.

Modernisation in this thesis is visualised not as a possitive nor negative ideology, but as a development strategy which is promoted, among other things, through the dominant ideology of the owners of the most profitable, and therefore influencial, means of production - in this case the owners of irrigated land in Murcia and the wood pulp industry.

In this struggle and conflict of interest between actors, emergent Spanish ecologist pressure groups, also seek to gain access to the decision making process, either by directly influencing Government or public opinion. In order to ascertain the possible outcomes of these conflicts, the history, ideological underpinning and strength of ecologist pressure groups is examined in the next section and the arguments and form of management of funds for the environmental protection of land made by the Spanish Government and the EU are explored in sections iii and iv.

ii. Ecologist pressure groups and decisions on conservation

The environmental movement in Spain started in the late 1960s, and through a series of organisational transformations continues today. These transformations have taken place in relation to the changing political climate in Spain affecting their objectives and strategies. The objectives and organisation of these groups initially disguised within the political aspect of conservation and the protection of nature but worked together under one main umbrella. In 1976 the movement experienced a realignment of their forces into those openly opposed to the economic and political system causing environmental degradation, and those less concerned with the causes but prepared to protect nature in a practical form.

The first epoch, as identified by Varillas Suarez (1987), is that starting with the foundation of the Association for the Defense of Nature (ADENA), which is the Spanish section of the World Wildlife (WWF) in 1968, until the end of the Franco regime in 1975. In this period ADENA saw the involvement of distinguished personalities, such as the then Prince of Asturias (now king of Spain) as its patron, and others with important financial and political positions in the country. The thousands of young people who joined ADENA were well regarded by the more liberal echelons of the regime lead by Fraga Iribarne, a minister of the Government, but scrutinised with suspicion by the more conservative sections. These more conservative sections were distrustful of any organization in fear of the possible reorganization of political parties in Spain. Varillas Suarez explains that these fears were not unfounded because behind many of the main organizations of cultural character were political parties. The Communist Party of Spain was behind some of the main organizations in Asturias (in the North West of Spain) such as, 'Pumarin', 'Jijonesa', 'Natahoyo', 'Ovetense', 'De Mieres' or 'Langreo', and also was the Socialist Party (PSOE).

Many of the activists in the fight against the political regime saw potential in these ecologist movements in two ways: firstly, the possibility of criticising the destruction of the environment in clear opposition to the policies of the regime, such as the plantation of conifers and eucalyptus, the immoderate urbanization of the coastal areas, the construction of nuclear power stations, the draining of wetland for agricultural production, or the construction of reservoirs. The second was that the regime did not harass these organizations for protesting about the damage done to nature as much as they did to those protesting about the lack of political liberties. The first convention of Spanish Associations of Friends of Nature celebrated in 1974 brought together most of the groups representing a wide spectrum of objectives, ideologies and strategies, such as those like ADENA or ANA (with great involvement of people from the Communist party), or SEO (the Spanish Society of Ornithology). Varillas Suarez explains that these associations were not united by their opposition to the regime as much as by being born in the same epoch and with the same recent objectives, which had not allowed time for the development of ideological, criterion and strategic differences on how best to defend the natural environment.

The second epoch, the end of Franco's regime and the start of the transition to democratic practices in 1975, represents a change in the conservation movement. Many of those with political ties dedicated themselves fully to the legalisation and organization of their political parties, leaving aside other associations. All this contributed to the demise of the conservationist movement. The third convention of the Associations of Friends of Nature to be celebrated in Madrid in 1976, had to be cancelled because the association in charge of its organization was dissolved. The success of the French ecologist movement gave some of the remaining active groups and the newly created ones the strength to organise the convention in 1977. The convention was considered to be a failure because of the poor attendance of groups, but the conference organized immediately after by the newly created AEPDEN (Association for the Study and Defence of Nature) was considered to be a success resulting in the creation of the Federation of the Ecologist Movement. The change in the Federation at this time was characterised by the estrangement of those who were accused of complicity with the former regime and the final abandonment by those who previously combined their political militancy with that of the conservation movement. Those left to carry the torch were mainly ornithologists deeply aware of the need to fight in defense of nature.

This purely conservationist composition did not last long. After the first free elections since 1932 in Spain in 1977, some political parties such as *Liga Comunista*, *Organizacion Revolucionaria de Trabajadores*, or the *Communist Movement* failed to gain hardly any support from the electorate. Members of these parties turned back to the ecologist movement as a point of entry in their fight against the capitalist system. These substituted the former members of the Communist Party (PC) or the Socialist Party (PSOE), who were previously active in the conservation movement.

These 'politicised' new members, although clearly defending the natural environment against continuous abuses (including those of reforestation with single species of conifers), clashed with the ornithologists who purely wanted to defend nature leaving aside political aspects. As a result the Federation of the Ecologist Movement became un-operational and was dissolved two years after. The 'politicised' section started to adopt the term 'ecologist', and those exclusively dedicated to the study and defence of nature adopted the term 'environmentalist'. Varillas Suarez explains that the division between these two sections became more apparent with the victory of the Socialist Party in the elections of 1982. The environmental movement was divided between those willing to cooperate with the newly elected Government in order to modify policy, and those whose strategy is to create a green party and try to repeat the success of their German colleagues in the political arena. This third and last epoch, as identified by the author above, has firstly been marked by the financial and political backing given by the Government to these associations which mainly cooperated with them. To a great extent the Government succeeded in attracting these into its political ranks (Sosa, 1993: 106; Varillas Suarez, ibid: 44).

This co-opting strategy of the Government, however, failed to appease public opinion because of the successes ecologists were having in publicising and persuading people of the validity of their argument. The former subdirector of the PFE and director of ICONA, Ortuño Medina (1983), argues that the ability of the ecologists to attract 'ordinary people', (assuming it means from diverse social and political backgrounds), onto its ranks is dangerous. The formation of Greenpeace in Spain in 1983, using a publicity strategy to gain public support (Precioso, 1987) and the strategy used by ecologists in denouncing the complicity of scientific conservationists integrated in the Administration, Ortuño Medina argues, is dangerous because of the success these groups have in changing public opinion and recruiting new members. Ortuño Medina also criticises the silence of the Government in not defending the work of these conservationists.

Secondly, this third epoch is characterised by the localisation and regionalisation of environmentalist groups. Local groups in towns or villages are organised in the Provinces and often coordinated at the level of the Autonomous Region. Varillas Suarez explains that in this epoch the movement is divided into three main sectors: one, those who are organized in political ecologist groups, two; those who have been integrated in and working with the administration, and three; those who still persevere with the old strategy of defence of nature regardless who or where it is attacked.

This last sector, although criticised by the 'ecologist' sector for their lack of political analysis, in the view of Varillas Suarez, are obtaining best results; their organisations are prospering while the others are dwindling. Varillas Suarez, however, proposes that the creation of a Green Party, could be used to channel all the disinterested energies of those fighting against attacks on nature, into a constructive rather than defensive form. Sosa equally illustrates the need for greater understanding between political and the environmentalist movement, with the example of trade unions defending jobs even when these are damaging the environment, and the environmentalist movement defending nature at the cost of jobs (ibid: 111). Sosa esteems the work done by the older generation in the ecologist movement, in their ability to provide a wider perspective to the problems caused by environmental degradation, by coordinating and integrating the efforts of other important social groups, such as feminists, pacifists, or consumers (ibid: 112).

Sosa also argues that when evaluating the results and strengths of environmentalists and ecologists there is a tendency to assess them in national terms, often forgetting or even devaluing local experiences. These experiences which may be the result of the protracted opposition to a particular project which would cause some damage to the environment, are regarded by Sosa as important because the organization required for such action may create a new social consciousness, participation in decision making, and new perspectives and analysis about life itself among local people (ibid: 117). He uses this argument against the assessments of Recio (1992, in Sosa, ibid: 117) who argues that the climax of the environmental movement peaked in the mid 1980s, after the Chernobil disaster, or against the idea of separation between 'ecologists' and 'conservationists'. He points to the existence of CODA (Coordinator of Organizations for the Defense of the Environment), Greenpeace or ADENEX (Association for the Defense of Nature in Extremadura) as proof of the reality of integration of these two previously divided sections of the movement, ecologists and conservationists. He attributes the lack of political perspective of the younger local groups, when they reject technical modernization without referring to its whole political, social and economic dimension, to be a romantic characteristic of the present generation rooted in pre-modern ideas. Sosa concludes that the social change experienced in the movement, that of the reappropriation of the political sphere from those who monopolized it, constitutes a new political and socio-ecological culture of participation and redefinition of progress and wellbeing, in relation to an ecological vision in the modernizing process.

In their struggle for access to the decision making process, the movement has to contend with the other main players. An assessment of these, in relation to the movement as well as in the general context of the importance of ideology in the planning process, follows below.

iii. The Spanish argument for agrarian subsidies

This section examines the arguments made in Spain in favour of subsidies for the reforestation of agricultural land [4]. This is

[4] A detailed examination of the types of subsidies used for reforestation through the formation of consortiums between village councils and individual land owners, and the State, is given in chapter five. The reason for this is that the financial conditions of each consortium varied. Their social and economic effects of these conditions on the local population are best understood if

done in relation to the lack of Spanish and EU measures for involving land users in the formulation and implementation of forestry projects and programmes. Land users' participation, a main argument made in this thesis, would facilitate attaining two of the main objectives of the 'set-aside' policy, soil protection and the retention of a resident rural population.

The form in which the EU 'set-aside' programme has been implemented shows that some of the autocratic practices followed in Spain in the past have been abandoned. There is no threat of expropriation nor Governmental or EU compulsion for land owners to subscribe to the plan of reforestation of their agricultural land under the 'set-aside' programme. The removal of the threat of expropriation has been replaced by financial incentives for the 'set-aside' of land and its reforestation. The set-aside policy, basing reforestation solely on subsidies, faces the ostracism and scepticism of some forestry officials contesting its rationale, and the impotence of those foresters promoting it. A way of improving its promotion would have been the involvement of land users in planning and implementation. The Spanish administration sole emphasis on financial incentives precludes the promotion of participation.

The examination of these two ideological trends among forestry officials, those contesting and those promoting the set-aside policy, is based on individual informal interviews and their writings. These interviews with foresters were carried out at the outset of field work in the area of study. Foresters in key decision making positions were informally interviewed first. The reason for that is a practical one stemming from the need to obtain permission to carry out such interviews in Governmental offices. Permission has to be obtained from the highest official, the *Delegado de Agricultura*, in charge of the agricultural office in the Province of Guadalajara (*Delegación*), leading to the introduction to the next lower ranking officials in charge of other departments, such as forestry and agrarian extension.

Most foresters interviewed, whether sceptical or promoters of the reforestation of agricultural land, view the voluntary character of

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examined with the rest of each reforestation project set of circumstances, as presented in section one of Chapter Five.

the plan as an improvement on past autocratic approaches. Informal interviews with both foresters in decision making positions as well as practitioners, such as lower ranking foresters and forestry guards, revealed that they regard compulsion as potentially leading to forest fires. There is a general consensus and recognition among these interviewed that compulsion and resentment lead to revenge in the form of forest fires[5]. When asked "what do you see as major constraints for reforestation today", some forest officials in key decision making positions in Guadalajara responded that it is their inability to choose the land that needs reforesting most. These comments denote a rejection of what has been agreed at EU level - the reforestation of 'set-aside' agricultural land, which in their view is often not in the greatest need of reforestation for protection - and some frustration with the decline of past intensive reforestation campaigns.

This view was explicitly voiced by a few foresters in key decision making positions in Guadalajara, who blamed politicians (especially socialists in Government) for dwindling budgets for reforestation work. This frustration did sometimes verge in longing for past autocratic approaches, which on the one hand 'facilitated' their reforestation task (as an example of the ideological remnants of a technocratic view), while on the other restricted it, because of cuts in budgets and the concerns of a more environmentally aware society today.

Other foresters, who perhaps represent the viewpoint at a higher planning level, although also agreeing that the reforestation campaign should be expanded, see the reforestation of abandoned land as necessary for soil protection. This group of foresters/planners, as for example de Aranda y Anton (1990), argue for a strategic forestry plan based on a national survey to determine the amount of land which has been abandoned, the type of property, and the forestry techniques to be used. What is meant by 'abandoned land' in this

[5] This is a highly sensitive issue, the veracity of which is difficult to ascertain. The case that the majority of fires are occurring for revenge is emphasized by those seeking to prove the futility of compulsion in reforestation. The case that the majority of fires are occurring for a variety of reasons, but revenge, is promoted by many of those defending past reforestation policy.

context is not clear: he does not specifically refer to land recently abandoned due to 'set-aside', which would be extremely easy to determine by examining compensation claims by land users, but simply abandoned land. This is an extremely important issue to bear in mind when exploring what kind of abandoned land has been put forward for reforestation in Guadalajara.

Foresters' rejection of compulsion, however, cannot be interpreted as an endorsement for land users' participation. It is *their* interpretation of the best option, rather than that which land users would propose, that they promote and support. The great majority of foresters interviewed do not recognize that interaction with land users could help establish how the problems of SWC are perceived, and thus overcome lack of enthusiasm for the reforestation of their agricultural land. Foresters experience of interaction with land users has been mostly negative and frustrating, reinforcing their belief in 'peasant irrationality and conservatism'. These views are also representative of the higher level of ICONA's hierarchy.

The use of funds as incentives for reforestation under the "set-aside' programme of the EU is the main instrument for action of the Spanish forestry agency today. This can be regarded as a continuation of the technocratic policies of former directors of ICONA, but now supported by funds from the EU. Gonzalez Hernandez (1984), as director of ICONA in 1982, advocated 'peoples participation' by giving financial help to rural areas with a forest based economy. In much the same way Barbero Martin (1985), director of ICONA in 1984, proposes the use of subsidies for forestry plantations and sees the strained relationship between ICONA and both urban and rural sectors as a weakness in forestry management. Barbero Martin argues that the urban Spanish population are increasingly critical of ICONA's forestry management practices, and the rural population show great disinterest and distrust.

The implementation of forestry policy and plans, elaborated in the offices of Central Government, the Autonomous Government of Castilla-la-Mancha, or the EU, are made possible by the provision of subsidies. However, the incentives of an economic return at the end of the twenty year plantation period will not encourage land users interest in SWC. As well as the prospect of an economic return, to raise their interest in a successful SWC programme requires that they understand the need for it and that they are involved in its planning from the beginning. Giving greater subsidies may make them complacent and even as opportunist as any investor, but not genuinely committed to SWC. Barbero's proposals lack credibility and effectiveness because they imply the continuation of top-down approaches, not so much through coercion as during Franco's successive former Governments, but by gaining legislative power so reforestation programmes can be implemented (Barbero Martin, 1985: 9-10), it can be assumed even when this is against the will of land users .

A policy geared to encourage land users to participate as partners in which plans are developed for both their benefit and that of the nation, rather than as mere 'consultative targets', needs substantial changes in Government approach and organisation. The promotion of subsidies may be a relatively easy approach to 'participation' in the absence of effective operational capabilities in the field, but it is not the best way to achieve a sound economic and social structure that discourages rural desertion.

The continuation of subsidies as the main form of promoting reforestation in Spain, strongly suggests that although autocratic approaches have been abandoned, technocratic ones endure. Some of the difficulties of changing well established practices are that the adaptation by Governmental administrative and technical structures is slow. Their own bureaucratic inertia stops or retards adjustment to new policies (Prats Lauradó, 1991: 237; Pardo 1991: 100). The Spanish forestry agency in Guadalajara (*Servicio de Montes y Medio Ambiente*), and most agencies throughout Spain, are not capable of working other than through the allocation of funds based on applications, verification that the area complies with the criteria for reforestation funding, and assignment for payment[6].

Gonzalez Hernandez's call for 'people's participation' has a different meaning to that of the participatory approach proposed by

[6] This will be demonstrated in the study of the way the implementation of reforestation of 'set-aside' land in sections ii and iii of chapter five.

RRA or PRA methods[7] and their overtly political implications. Gonzalez Hernandez strongly condemns what he sees as the 'politicisation of environmental issues' in Spain, as responsible for the negative effects this has on forestry policy (Ibid, p.201), (by which he means reforestation with conifers). What Gonzalez Hernandez means by 'people's participation' is unclear but a participatory approach in which issues are necessarily politicised would presumably not be welcomed.

Marraco Solana, also a former director of ICONA, takes a technocratic and productivist approach to reforestation and SWC. He sees forestry planning as a necessary instrument to evaluate conservation needs and wood production (Marraco Solana, 1991: 23), with no mention of land users' participation. Gomez Jover (Subdirector of Rent Subsidies in MAPA) also proposes a policy of wood production backed up by European and Spanish Central Government subsidies, to compensate land users for the income loss a reforestation programme would entail. He recognizes that erosion problems should be taken into account (1993: 42), but does not propose any provisions to find out what the processes are or how to counteract their effects through land users' participation. Judging by the absence of specific examples of participatory arrangements, and the 'strained relationships between ICONA and urban and rural sectors', participation in Spain suggests rhetoric rather than action.

An efficient way of tackling distrust and disinterest and establishing the preferences of land users and other social sectors involved or interested in conservation would be, as Pardo proposes, no longer to regard land users as problems but as legitimate partners worthy of working relationships similar to those traditionally operated between the Government and forestry economic interests (Pardo, 1991: 104). On how to start to build such partnerships, Chambers advises that:

> At the community level, foresters need to be willing to listen to people as experts in their own right and to consider the information they get even if it means throwing out some project parameters and goals and

[7] RRA and PRA methods, used in field work data gathering, explored in Chapter Six, are proposed as reliable forms of data gathering to explain processes of LD and erosion and to promote participation in planning for SWC.

starting all over again (Chambers, V. 1991: 474).

The reforestation of agricultural land under the 'set-aside' programme is intended to avert LD and stop rural desertion. In Spain, as well as these two purposes, the programme anticipates the production of more wood as a solution for the reduction of the European deficit and import costs (Novas Garcia, 1989: 143, Barbero Martin, 1993: 52). This underlines the 'protection-production' duality of reforestation, with the second being predominant. The use of funds for forestry production, however, will not succeed in providing employment for a resident rural population in Guadalajara nor in most of the rural areas of Spain. An examination of the content of the proposals to deal with the 'set-aside' of land, and the way it has been adapted by the Spanish Government, helps to assess the suitability of the EU policy without participation.

iv. The regulations of the Common Agricultural Policy

An important dimension of the EU's CAP over the past decade is its set-aside programme. This programme comprises the reconversion and extensification of production. This section examines the most relevant parts of the 'set-aside' programme which are intended to avert LD and stop rural desertion. Decisions discussed in the European Council and approved by the ministers of agriculture of each country are far removed from everyday rural life. The process of participation of land users in the decision making at EU or Spanish national level would be a complex one because it would ideally require a system of consultation with land users. These decisions and measures for rural development, however, could be better understood and accepted by land users if, at least, they were involved in planning at project level. This section will examine the most relevant parts of the CAP's policies to the area of study with an special emphasis on the set-aside programme.

The first important revision of the CAP regulations in 1985 was needed to limit surpluses of agricultural products, bringing demand and supply for these into balance. It gave priority to full-time and young farmers to improve production structures, reducing the number of people working in agriculture and encouraging the establishment of larger and more efficient production units. The main financial instrument to deal with these requirements of the CAP measures is the European Agricultural Guidance and Guarantee Fund (EAGGF). The

European Regional Development Fund (ERDF) also contributes towards rural development under Objective 5b. An important recent development in the ERDF is the creation of the Committee of the Regions to encourage the establishment of direct links between regional and local authorities and the Commission (Bainbridge and Teasdale, Ibid: 223). This could result in greater participation of people affected by plans and projects supported by the EU.

Disadvantaged uplands areas can be excluded from the set-aside measures if they are at risk of depopulation or unemployment. The 1985 CAP regulations requires the setting-aside of 20 percent or a minimum of 1 Ha. of land per holding, under herbaceous crop production for at least 5 years. This set-aside land must be left fallow, used for afforestation, or non-agrarian purposes, excluding urban or industrial use. The use of land for production of brown fallow, green manure, or pasture for extensive grazing, or the cultivation of legumes such as lentils, chickpea or *Vicia* species is permitted. The reforms of 1985-1989 caused agrarian production to slow down considerably, although the supply and demand for beef meat, butter, powder milk, sheep meat, tobacco, wine, sugar and cereals remained unbalanced. The Spanish Government adopted a firm stance in not allowing subsidies for the production of cereals in fallow dry land in order to avoid CAP financial penalization for exceeding the maximum area allocated for its production (Barreiro Seoane, 1994: 11). One of the main reasons for the limited success of the 1985-1989 reforms in stabilizing supply and demand of these products (according to Mata Porras, 1993: 41), only 2 percent of cereal production land in Spain was set-aside, and these were in areas of low yield), was that subsidies were proportional to production, promoting intensification.

Apart from the LEADER programme encouraging the participation of people in planning and implementation, there are no other EU provisions specifically geared to make policy making more participatory. According to Gomez Benito et al. (1987), because of the particularly mountainous character of the country, however, the Spanish State enacted special legislation to encourage the participation in planning by people in disadvantaged upland areas. This legislation, however, has been of little practical consequence in Guadalajara Province. Spanish law 25/1982 of 30 of June, Law of

Mountainous Agriculture (LAM) recognises the importance of maintaining the adequate demographic balance in these areas for the conservation of the ecosystem and the exploitation of resources (Ibid, p.13). Such legislation incorporates prescriptions which could be used for the promotion of participation. The decree of 30th. December 1986 (*Real Decreto* 2741/1986) prescribes the norms for the functioning of associations in mountainous areas (*Asociaciones de Montaña*) and sees these as the necessary vehicle to effect the aims of the LAM (the management and promotion of mountainous agrarian resources). Articles one to eight of this decree outline the working procedures for the formation and registration of these associations (Ibid, p.140) to work within the Program for the Planning and Promotion of Mountainous Agrarian Resources (PRORPOM) and the Mountainous Agricultural Zones (ZAM) in the MAPA (Ibid, p.25-27), involving the approval of their statutes. Individuals and groups such as agrarian trade unions can become members of these associations.

One important condition for the approval of their statutes and registration is that the associations must work on a profitless basis. This clause in practice excludes the possibility of working towards a form of organisation whose aim is to make a living of the land. The altruism expected of the members of these associations is more likely to attract people involved in conservation/ecological group activity and membership, than land users. It is absurd to assume the promotion of products, in an organized way, without expecting their marketing and profit return for the organization to be able to attract land users, so it functions in a way which entices them to stay in these areas and avoid rural desertion.

The promotion of associations has been, however, disappointing. There are no associations in the villages under study (these are included in the list of municipalities of Spanish ZAMs provided by Gomez Benito (ibid: 151). Other areas in the North of Guadalajara Province, such as Sierra de Ayllon, (see figure 5, page 108), experiencing greater rural desertion than the villages under study, although subject to development planning and promotion under PROPROM by the Spanish administration, also produced disappointing results. An official involved in the appraisal work to compile information and the elaboration of the ZAM development plan for this area, views the

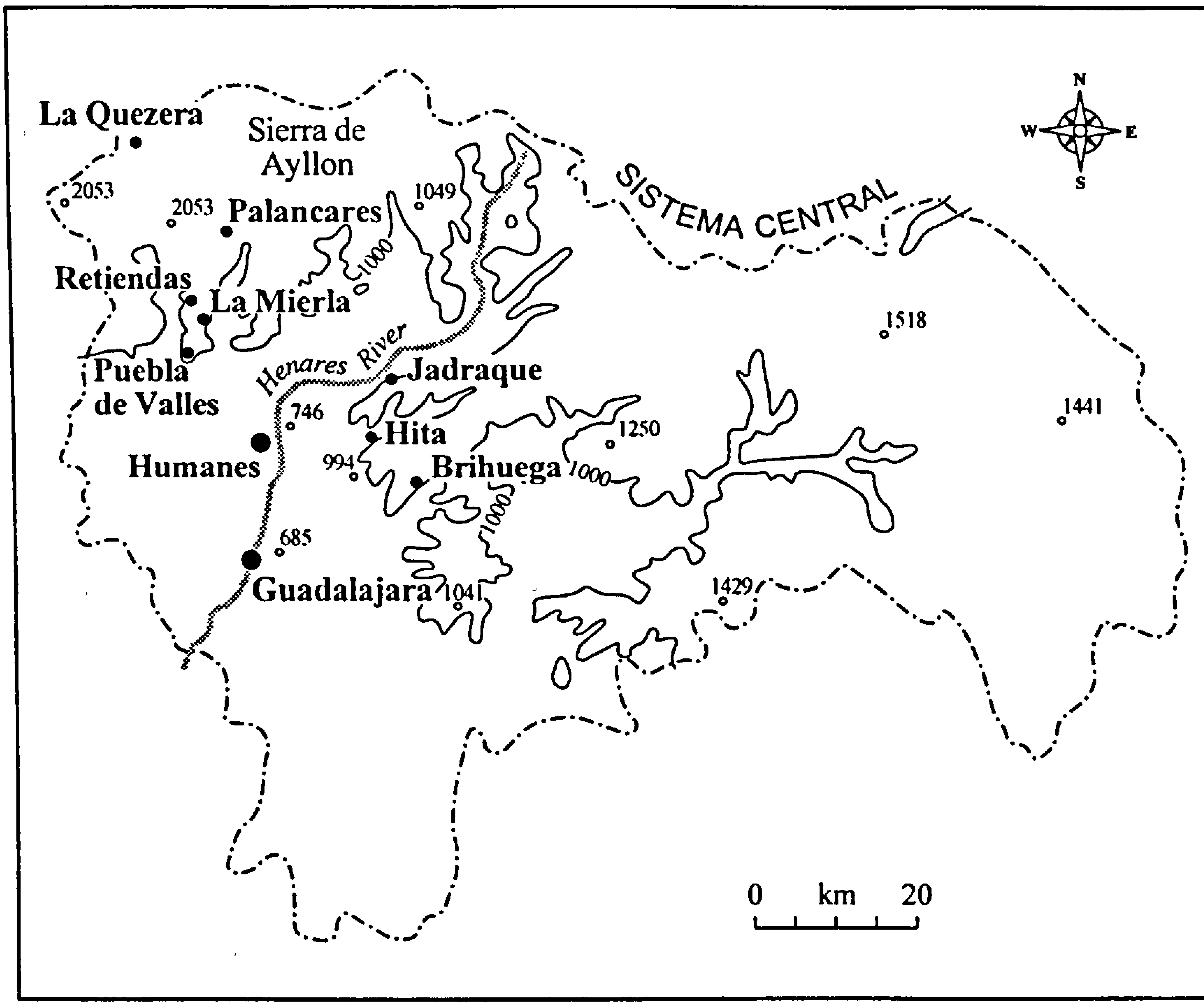

Figure 5: Relief of Guadalajara Province

exercise as a disappointing waste of effort (personal communication, March 1993). This official explained that there was no interest in the formation of any association and the PROPROM of Sierra de Ayllon failed to fulfil the minimal of its aims, the formation of grassroots organizational structures to start functioning.

The ZAMs are regulated by a EU Directive (268/75/EEC) which takes into greater consideration the social and environmental factors of the mountainous areas, acknowledging the need for different treatment and solutions for their specifically different set of problems and localities. The associations discussed above, trade unions and village councils are at the grassroots of the organizational structure of the PROPROMs.

The CAP reform of 1992 intends to increase the 'set-aside' area the previous policy failed to accomplish. The two central elements of the 1992 reform (second round of set-aside), are price cuts for cereals, oilseeds and protein crops, and the set-aside of land from production. The 'accompanying' measures of the reform starting in 1993 are for the protection of the environment, early voluntary retirement and reforestation of agricultural land. To do that, compensatory payments in the form of direct income support are given to farmers. Some of the measures for the protection of the environment include the reduction of fertilizers and fitosanitary inputs; the extensification of production, including fodder crops; the extensification of livestock production by increasing the areas of pasture and maintaining the present number of animals; the reconversion of agricultural lands to extensive grazing areas; the set-aside of agriculture land for at least 20 years; water protection; and the training of farmers in environment-friendly practices. Subsidies for farmers who agree to one or several of the measures above receive an annual payment per Ha. or unit of livestock reduced for a minimum of 5 years (Mata Porras, 1993). Complementary measures to encourage afforestation of agricultural land include: subsidies to cover reforestation expenses; annual subsidies for maintenance during the first 5 years; annual subsidies per Ha. to compensate for the loss of income; and subsidies to investments for improving forest areas.

As before, these measures are intended to regulate agricultural production and market prices by controlling supply. The neo-liberal alternative to such policies, i.e. without attendant subsidies, would be, according to Barreiro Seoane (1994), a drastic adjustment of production and prices by market forces which could bankrupt many Spanish farmers (p.7). The Reforestation Plan of Castilla-La Mancha[8] is part of three main 'accompanying' CAP Measures. The allocation of funds of the set-aside programme is the main tool to stimulate reforestation as a form of land protection and as an incentive for the retention of a resident rural population. However, the absence of participation of land users and the scepticism of government officials in Spain jeopardizes its success. The Spanish reforestation agency has adapted EU policies and financial provision to serve the particular conditions of Spain, while retaining its existing organizational structures and technocratic approaches. Part of the working practices of this administration is the existent amount of opportunism in the use of European funds[9]. Although fraud, according to Bainbridge and Teasdale (1995: 247), is fairly common by no means confined to the Spanish administration.

Conclusion

The study of the process of policy decision making for SWC contributes to the explanation of socioeconomic processes of LD. The ability of dominant social classes in Spain to 'spread their ideology, inspire concrete attitudes and provide orientations' for SWC policy, safeguards their interests in wood production, the construction of reservoirs, or irrigated agricultural production.

While organisations representing provider-users and users of water compete against each other for the control of the means of production, land and water, dominant social classes with interdependent interests are able to influence policy in their favour. These organizations and ecologist pressure groups struggle to sway public opinion through public demonstrations with limited effect. In comparison with these the collusion of interdependent

[8] The reforestation of agricultural land in Guadalajara is managed by the forestry agency. This, as part of the Spanish State policy of devolution, is under the administration of the Autonomous Community of Castilla-la-Mancha.

[9] Issues related to the allocation of funds are discussed at a greater depth in section ii of chapter five.

powerful interests continue to sway policy in their favour. The interests of the building industries in the construction of reservoirs is dependent on the need for water for irrigated agriculture. If the provision of cheap (subsidized) wood is curtailed the survival of the wood pulp and composites industries would be endangered. Conversely plantations with broad leaf trees or the provision of quality wood used by the furniture industry, could compensate for the partial loss in economic activity in the wood pulp industry.

Policies to reduce water consumption or to prevent land degradation requires a reassessment of objectives by policy makers. Although there have been recent calls for participation in land management polices, this will remain rhetoric rather than reality unless changes in the professional structure and working practices of the forestry agencies of the Spanish State and in this case the Autonomous Government of Castilla-la-Mancha are effected. The continuing exhortations by government officials for the improved management of subsidies lack effectiveness if land users are excluded from participation in the planning and implementation of SWC projects. The CAP reforms, intended to effect some control over supply and demand of agrarian products and provide the basis for sustainable economic life in marginal rural areas through the management of subsidies, is in danger of missing its target in Spain, that of protecting the soil against degradation and enticing the existing rural population to stay[10]. Greater interest in the socioeconomic processes of LD and the promotion of participation of affected people in planning for SWC, could improve the results of these regulations. This could be achieved by effecting policy reversals based on the reassessment of interests and open debate on the role of forestry in SWC[11] .

Processes operating at the wider national scale are mediated by the

[10] Issues related to the miss-allocation of EU funds and the inability of the existing forestry agency in Guadalajara to involve the affected population in the planning of the reforestation of their agricultural land, are discussed in chapter five.

[11] A discussion of the methods of data gathering proposed for the elaboration of alternative directions for forestry policy is provided in part three of the thesis and in the conclusion following the presentation of all the field evidence.

particular set of physical and social conditions that operate in particular localities. Part two presents a profile of the relevant characteristics of the area of study. In addition, there is coverage of the evolution of forestry policy and practice applied in the field location.

Part Two

The geographical area
and the experience of soil and water conservation projects

Part one of the thesis presented a broad debate on issues of importance and consequences of LD, the multidisciplinary ways of studying its processes, the concerns for the condition of land in Spain and the ideological influence in the planning of SWC through reforestation. Part two, demonstrates the SWC physical and socioeconomic problematic at the level of the area of study in Guadalajara Province. Some of the findings in this part are based on field work. In this part of the thesis, comprising Chapters Four and Five, a description of the physical and socioeconomic characteristics of the area of study, and the SWC efforts made by land users and the State, provide an empirical example of the problematic outlined at Spanish level in the previous Chapters.

Chapter Four describes the physical and socioeconomic characteristics of the area and includes some detail of the IBERLIM project which was the springboard for the research in this thesis. This description provides the necessary information to put the area of study, explored in Chapters Five, Seven and Eight, into its socioeconomic and physical context.

The SWC efforts considered in Chapter Five, examines the changes in technical strategies adopted over time by the Spanish State and more specifically its reforestation agency in Guadalajara. The socioeconomic and physical conditions encountered by this agency are explored and evaluated. Long-established strategies for land protection, based on technocratic solutions which still persist are explored in Chapter Five. These strategies are assessed to establish their effectiveness for SWC and the promotion of participation of the affected population in planning. It is argued that lack of participation, in turn, is a reason for substandard results in SWC. These arguments are further reinforced in part three of the thesis.

Chapter Four
The geographical area of study - North Western Guadalajara

An appreciation of the relevant physical and socioeconomic characteristics of the area of study is crucial in the explanation of LD processes. Among the most important characteristics to take into account are soil type and condition, vegetation cover, climate, altitude, population, land ownership and land use. The first section of this Chapter explores the physical characteristics of the area such as relief and climate (figures and plates are shown in the following page to the one they are referred to). The results obtained by the IBERLIM study (Coelho et al., 1994), to ascertain soil conditions and vegetation cover affecting the hydrology of key areas and their susceptibility to gully erosion, are explored in the second section. The third section explains the use made of aerial photograph interpretation in field work for this thesis. The main socioeconomic characteristics, such as population densities, migration, economic activities, pattern of land ownership and economic activity are explored in the fourth section . The fifth section explains the political and administrative arrangements adopted to deal with the problem of LD through reforestation.

i. Geographical physical characteristics

The area under study (8,743 Ha) is that composed of the municipalities (*municipios*) of Puebla de Valles, La Mierla, Retiendas and Palancares in the province of Guadalajara (shown in figures 4 and 5, pages 77 & 108 respectively). According to Coelho *et al.* (1994), contemporary research on the LD processes in the Iberian Peninsula tend to focus on the arid, badly degraded, but more stable areas of the south, rather than on currently productive land in central Spain. To the north of Madrid major gullies occur on erodible Tertiary sediments, and the land may be at greater risk than that in the south of Spain because of the greater volume and frequency of rainfall. The next page shows two plates of landscapes of the area of study. Some of the photographs used for the pair-wise method of data gathering, in plates 4-21 in section iii of Chapter Eight, also show the extent and the different types of erosion damage (gully, sheet, etc.) in the area of study.

Plate 1: Landscape view of gullies and *matorral*

Plate 2: View of olive grove showing the way tree trunks are left high by the effects of erosion

Coelho *et al.* (1994) explain further that:

> Relatively few data... exist on erosional processes and land management impacts [such as reforestation] in the wetter areas of Iberia although there is some evidence to suggest that they may be at great risk (p.1).

The choice of the area of study in this region of Spain, to ascertain the socioeconomic processes of LD, is explained by the force of these arguments above, and by the prospect of integrating physical and anthropogenic explanations. The IBERLIM study did not carry out any experiments in the area of Palancares or La Quesera. However, these two areas provide a vivid example of the methods of implementation of reforestation projects in existence today. It will become more obvious in Chapter Five that physical measurements of the processes of LD occurring in this area, may help to bring greater consensus to the conflictive situation, regarding the proposed approaches to land management measures by the Government of Castilla-la-Mancha reforestation office in Guadalajara. The reasons for the inclusion of the Palancares area and that of La Quesera in the study of socioeconomic processes is that these provide vivid examples of approaches to land management by the State for the control of SWC.

Hydrography

Guadalajara province is an important water catchment area. It supplies a significant amount of water for Guadalajara city, Madrid and the south east of Spain. Figure 3 (page 52) shows the main hydrographic configuration of the province and the principal dams used for recreation, irrigation or drinking water supplies. Beyond the catchment of the area of study, lie the important Entrepeñas and Buendia dams, part of a major strategic water supply system linking the rivers Tajo and Segura through a 300 km system of canals and tunnels. This system transfers water for irrigation to the south east of Spain (figure 2, page 31).

The rivers Henares, Sorbe and Jarama, through a system of dams, canals and pipes, provide irrigation and drinking water for Guadalajara and Madrid. Figure 4 (page 77) shows the rivers, and drinking and irrigation water distribution systems in the four areas of study. Figures 9-11 (pages 134-136) show the *arroyo* systems (gullies which flow following rain), which are tributaries to the Jarama and Sorbe rivers for the four village areas. Land management in a water catchment area affecting infiltration to replenish groundwater, or the flow of the *arroyos* draining to rivers, is a complex task. Barrow (1987) explains that, 'to be successful, water resources management must be aware of the linkages between land use, streamflow and groundwater storage' (p.63). He explains further that 'One of the tasks of the water resources manager is to try and ensure that various uses are compatible...' (p.61). The conflicts of interest between the population living in the water catchment areas of Guadalajara, using water as an asset for the tourist industry and for human consumption, and those receiving water for irrigation in the south of Spain, discussed in Chapter Two, show that water resources need careful political management. This management can be made easier if the physical and socioeconomic conditions are properly assessed and taken into account in planning. Changes in vegetation to reduce overland flow and erosion, increase infiltration and reduce evapotranspiration requires planning in conjunction with land users living in these areas, because it is them who, most likely, will be looking after this vegetation ensuring one of its most vital functions - to produce greater water yield to keep reservoirs full.

Relief

The mountainous *Sistema Central* (central ridge), crossing Spain east to west, (as shown in figure 5, page 108) runs along the northern border of the Province. The three areas of study are at the edge in the southern side of that ridge, close to the Valley of Henares. This figure also shows the relief of the Province and the location of the four areas of study. Plates 1 and 3 clearly show the rugged type of terrain.

Climate

The climate is representative of continental central Spain. Coelho *et al*. (1994) describe the climate of the area as seasonally arid. The mean annual temperature is 12°C. Palancares with an altitude of about 1,500m., experiences colder conditions than the lower altitude areas around Puebla de Valles, Retiendas and La Mierla. These last three will be referred to in this part of the text as the lower altitude areas. Based on data from 1940 to 1980 (de Leon Llamazares, 1991) using a Papadakis classification, explains that the climate at the meteorological station of Pantano del Vado, near to the lower altitude areas, is Mediterranean temperate. The same source shows that data from the meteorological station of Condemios de Arriba, recording weather conditions for the higher altitude area comprising Palancares and La Quesera, the climate is Mediterranean temperate cool (p.125). Similarly the average date of the first frost in the lower altitude areas is on the 20th of October and the last one on the 1st of May, while for Palancares the first frost is the 10th of September and the last one is the 20th of June (Mapa N° 4 & Mapa N° 4Bis). However, in June 1993, Puebla de Valles suffered one or two nights of frost with disastrous consequences for horticultural plants (field work data).

The same author shows that the 12°C average annual isotherm line runs close to the lower altitude areas while Palancares is placed on the 8°C line (Ibid, Mapa N° 1). The isotherm line for the coldest month (January) for the lower altitude areas is 2°C, while for Palancares it is 0°C (Ibid, Mapa N° 2). The isotherm map for the warmest month (July) shows temperatures of 20°C for the lower altitude areas and 18°C for Palancares (Ibid, Mapa N° 3). In the area of IBERLIM's experimental sites (plate 3, page 119) the mean temperature between September 1992 and August 1993 was 12°C, with Summer temperatures often exceeding 30°C (Coelho *et al.* ibid: 151).

The average precipitation for the year is 800 mm (de Leon Llamazares, Ibid, Mapa N° 11). The majority of this in the lower altitude areas falls as rain because of the relatively low altitude above sea level of 1,000m, although Palancares experiences more snow falls. In autumn (September to November) and winter, average rainfall is 250 mm, in spring 200 mm and in summer 100 mm (Ibid, Mapas N°s.12-15). Annual gross rainfall in the experimental sites was about 500 mm. Throughfall, the amount of rain water reaching the ground, beneath the *Pinus* canopy was 342 mm and under *Cistus* 361 mm. The respective interception losses, the amount of water vegetation prevents from reaching the ground, for these two types of vegetation was of 32% and 28% each (Coelho *et al.* ibid: 151). The relationship between rainfall intensity, periodicity, throughfall, interception, and soil types and conditions are extremely important for recharging groundwater. Barrow (1987) explains some of these relationships. Land cover (vegetation):

> ...intercepts part of the falling precipitation and temporarily stores it on its surfaces... When precipitation is light and brief and the rate of evaporation is high, little or none of the moisture may reach the ground. [In this case] ...it may require only

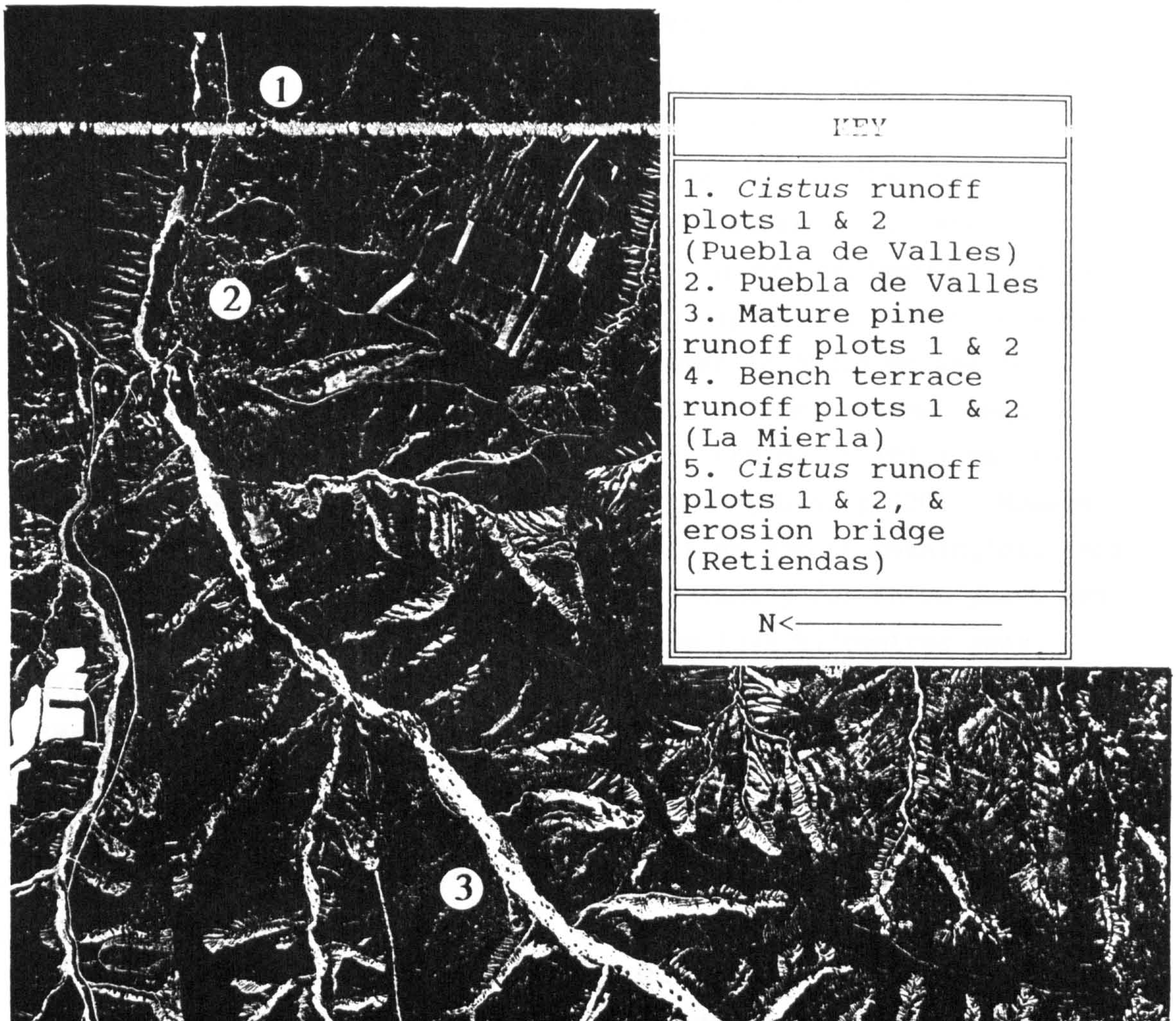

Plate 3: Main experimental sites of IBERLIM in Puebla de Valles, La Mierla and Retiendas (based on air photograph 485-C-22, flight 1979)

very sparse vegetation cover to cause total interception losses. Where there is a thick cover of vegetation even quite heavy rainfall may yield little surface flow and do little to recharge groundwater (p.81)

High rates of evapotranspiration can be the reason for soils to dry rapidly, especially in the case of free-draining soils. Potential annual average evapotranspiration (Thornthwaite) in the lower altitude areas is 700 mm, and 600 mm for Palancares (de Leon Llamazares, Ibid, Mapa N°.16). Data from the meteorological station of Pantano del Vado shows that potential evapotranspiration in winter is 33.6 mm, in spring is 140.8 mm, in summer is 360.8 mm and in autumn 160.3 mm. The station of Condemios de Arriba shows that evapotranspiration in winter is 8.1 mm, in spring is 103.3 mm, in summer is 297.6 mm and in autumn is 131.1 mm (Ibid, p.120). However, Tinker (1977) comments that "...average is an almost meaningless term in the Sahel where it may nor rain significantly for three years and then rain torrentially in one place, while five kilometres away little falls at all" (in Barrow, 1987: 80). These comments are important to bear in mind in planning a SWC project in central Spain because of the fairly erratic rainfall pattern.

Calculations on data collected at Pantano del Vado station from 1941 to 1970, show that soil moisture for the lower altitude area is "...below field capacity between 15th May and 21st November". During the severe summer drought (June to September) soil moisture deficit in August is 107 mm when field capacity is assumed to be 75 mm of water (p.151). The seasonal, often erratic rainfall and rapid action of expanding clays in the soils of the area of study reduce recharge of groundwater, and increase the danger of overland flow and erosion. The high soil moisture deficit makes dry agriculture a weather 'predictable' matter, largely accounting for frequent crop failure when the rain is not well timed to crop growth.

Geology, soils and lithology

Apart from the climate the type and condition of the soil are also extremely important for increasing water yield. The type and condition of soil affects infiltration, the replenishment of groundwater, and the level of overland flow.

Past strong erosive processes are the cause of the irregular topography in the area of study (see relief in figure 5 in page 108).

The lithology in the area of Palancares is of slate alternating with siliceous and quartz sand while in La Quesera (figure 5, page 108) it is of siliceous sand and conglomerates composed of weakly cemented clay and sand (MAPA, 1986). The geology in the higher altitude areas of La Quesera and Palancares date from the Silurian period (1986: 28).

Although the soils in Palancares and La Quesera have A/C horizons, their formation of humus and productivity is low because of the xerophitic character of its grassland. These are chestnut soils with a sandy siliceous texture where the most successful vegetation is matorral or forest. MAPA (1986), also shows that in the area of La Quesera soils classified as alfisols with horizons A/(Bt)/C predominate over entisols with horizons A/C.

The geology of the lower altitude areas (shown in figure 6, page 122) is composed of three distinguishable Miocene conglomerates, those of yellow, red, and red violet facies, Miocene conglomerates (calcareous), Pliocene conglomerates, Cretaceous and river bed gravels. According to Coelho *et al.* (ibid), the Miocene conglomerates (yellow facies) are at a

> '...maximum of 90 m in thickness consisting of fine sands, ochre and reddish silty clays, and gravel horizons of 3 to 5 m in thickness. These gravels are quartzitic and have the geometry of a braided river environment (p.155). The fine clay fraction is dominated by illite (60%) and kaolinite (40%)' (IGME, 1990, in Coelho *et al.* ibid: 155).

The lower altitude area of study is situated on the *rañas* of Western Guadalajara. *Rañas* are flat geomorphic surfaces with a detrital covering and entrenched valleys at the margins (Espejo-Serrano, in Coelho et al. 1994: 155). The soils (shown in figure 7, page 123) evolved on Tertiary and Quaternary *raña* deposits of angular quartz in clay matrix materials originating in the Guadarrama ridge[1]. These materials were transported and laid down during the Pliocene on top of limestones and marls dating from the Cretaceous and Neogenos (Pliocene & Miocene) (MAPA, 1977). The dominant soils can be

[1] The dramatic landscape of this area, the red, yellow and ochre colours of the soil and the large gullies can be appreciated in the two pictures provided in page 115.

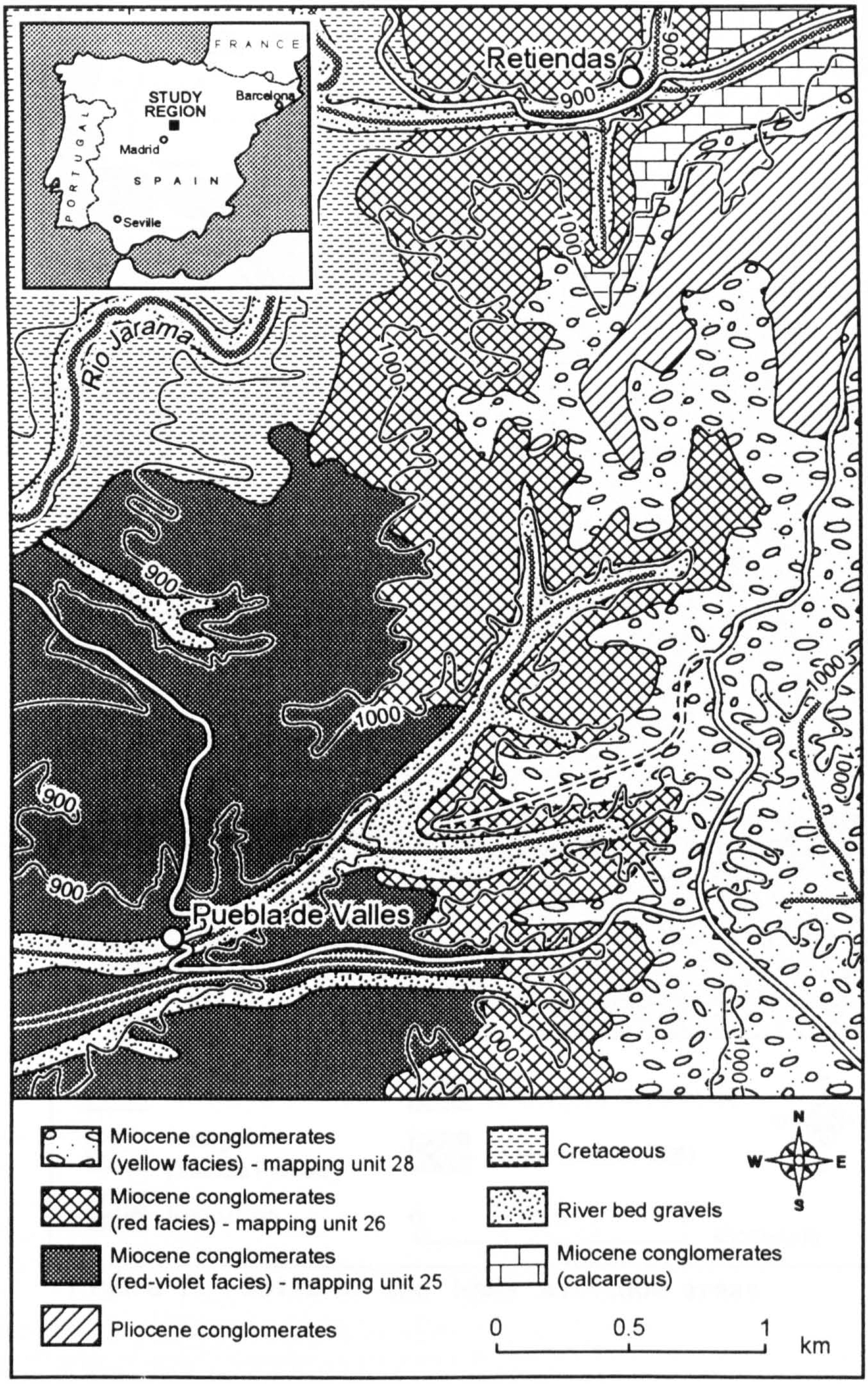

Figure 6: Geology of the lower altitude areas

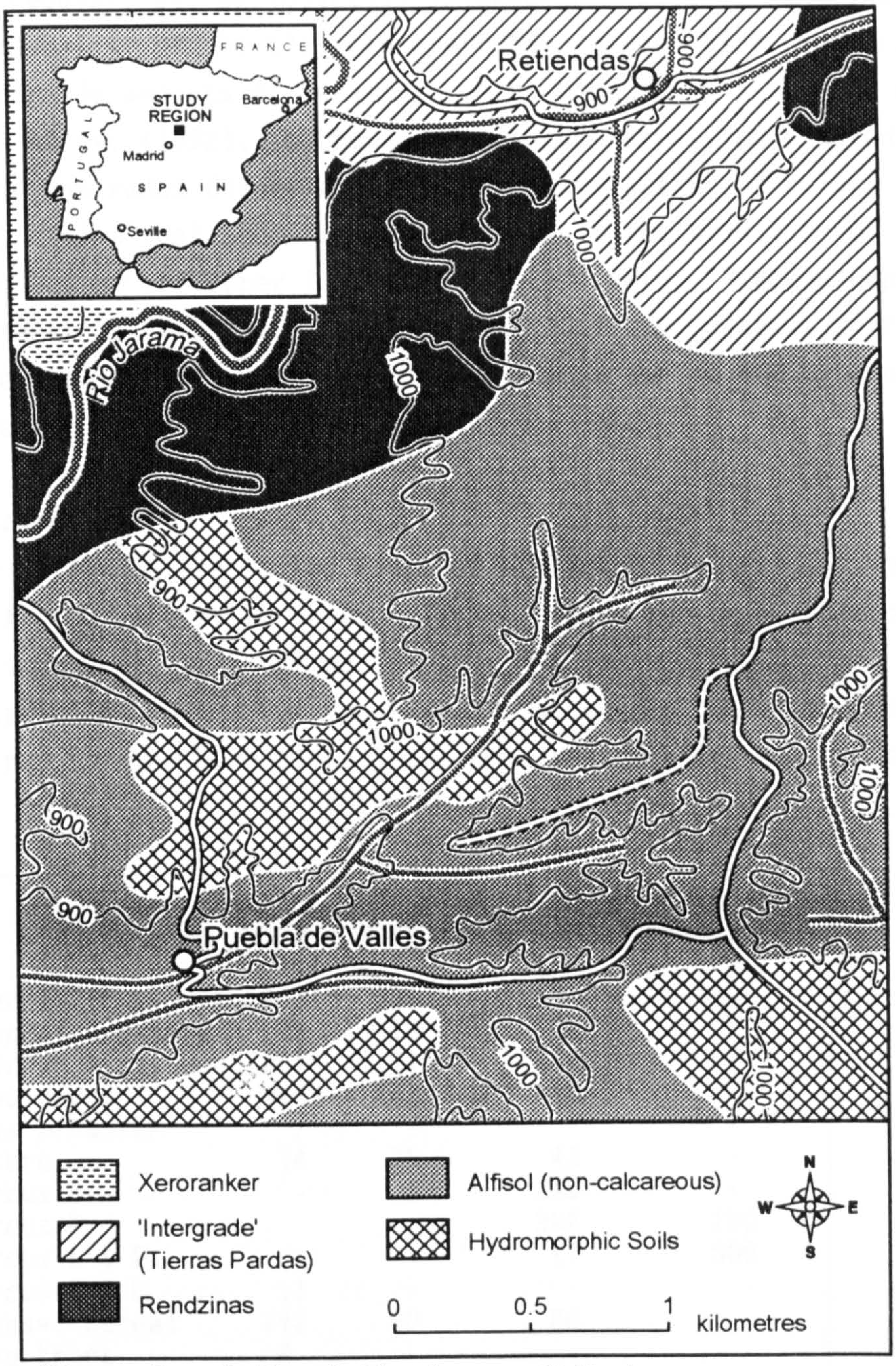

Figure 7: Soils of the lower altitude areas

classified as alfisol, with distinguishable argillic (Bt) horizons as major features. Profiles of soils in La Mierla (S2 and S1 surface) show differences between A horizons with less than 12.5% of clay and B horizons with 43 to 56 per cent clay content (pp.155-156).

The irregular, but periodically intense precipitation and the impermeability of the clay cause erratic torrential streams carrying considerable amounts of sediment. According to soil studies made by Ternan *et al*. (1992), in the lower altitude areas, cultivated soils in Pliocene *rañas* disperse easily under the action of rain. Ternan (Ibid) claims that there are differences in the stability of the soil aggregates in the upper layers of Pliocene *rañas*, Miocene deposits and Limestone. Ternan (Ibid) suggests that the greatest difference in the stability of these aggregates may be due to the type of vegetation cover and the use made of the land.

Vegetation

There is a rich and varied flora of herbaceous matorral, natural forests and reforested areas. Table 1 shows the areas covered by the most important types of vegetation. The composition of the vegetation and extent of these areas, according to local information, have not changed much since 1977, when the data was collected by MAPA.

	Puebla de Valles	La Mierla	Retiendas	Palancares
Matorral	1223	729	131	1300
Matorral & *Quecus*	98	72	66	-
Matorral & Pasture	262	31	457	-
Pinus nigra	416	703	390	-
Pinus pinaster	7	-	-	-
Pasture	14	75	42	-
Quercus I	-	5	295	-
Quercus P		-	392	100
Quercus L & P	-	-	17	500
Quercus I & L	11	-	-	-
Intensv. Cereal	142	50	60	-
Olive trees	8	-	-	-

(*Quecus*: I, *ilex*; L, *lusitanica*; P, *pyrenaica*)

Source: After data from MAPA (1977) & "CPAES" (Palancares)

Table 1: Areas of Vegetation in Ha.

Matorral is the most extensive type of vegetation in the area. It is composed mainly of *Cistus ladanifer*, *Cistus laurifolius*, *Rosmarinus officinalis*, *Thymus* and *Juniperus* (MAPA, 1977). The predominant herbaceous species are Festuca (*Festuca pratensis*), Bromos (*Bromus erectus*) and Poas (*Poa pratensis*) (MAPA, 1986: 108). In Palancares the matorral is composed of *Cistus laurifolius*, *Juniperus*, heather (*Erica spp*), and bear berry (*Arctostaphylos uva-ursi*) (CPAES).

ii. Measurement results from IBERLIM.

The IBERLIM project examined the physical details of the processes of LD in the lower altitude area of study in Spain, and in Portugal. The specific objectives of the IBERLIM project in Spain were:

> 1. To assess the impact of forest management practices (unmechanized afforestation, afforestation with bench terracing) on infiltration, soil drainage, overland flow initiation and soil loss as compared with *Cistus* dominated *matorral* areas.
>
> 2. To assess the effects of these land management practices on the physical and chemical properties of soils which influence the soil hydrology and soil erodibility.
>
> 3. To determine the erosion and overland flow limitation impacts of *Pinus* afforestation as compared with natural *matorral* vegetation communities.
>
> 4. To develop a terrain analysis procedure to identify vulnerable combination of geology, land management, vegetation and landform (p.5).

The experiments carried out in the area by IBERLIM, recorded in Coelho *et al* (1994), were under *matorral*, mature *Pinus*, bench terrace, and gully conditions.

The processes of LD have been studied at several scales by IBERLIM's scientists. Runoff and soil loss measurements were carried out at three scales - the gully scale, runoff plot scale (10-21.5 m by 2 m, figure 8, page 126), and the point scale for the period of June 1992 - September 1994. Additional measurements were made for a range of soil properties influencing their erodibility. The location of weirs and runoff plots are shown in figures 9-11 (pages 134-136).

At the gully scale some runoff and soil erosional measurements were inconclusive with runoff being primarily generated on bare soil areas near the gauging station. Gullies in the bench terrace areas showing

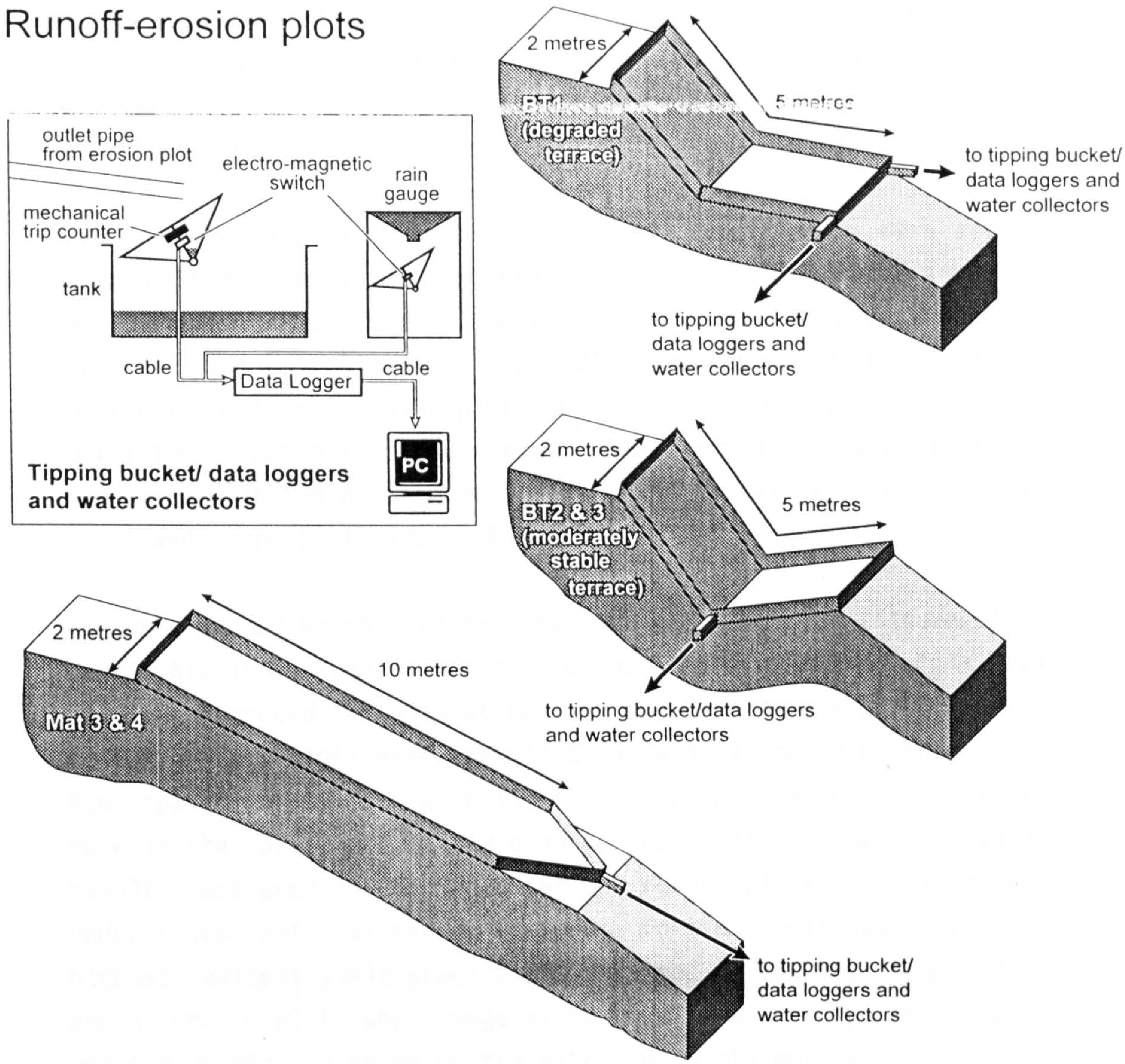

Figure 8: Mechanism and shapes of IBERLIM's runoff plots (source, IBERLIM, p 202)

lower runoff than matorral gully areas, however, recorded the highest sediment yields and can therefore be classified as a "...highly active erosion system". Sediment yield, measured in the weirs from the two *Cistus* areas, are inconclusive. The readings of one of the stations was affected by road construction and the other by visible animal disturbance in the bare gully walls (p.210-211).

At the plot scale, a total of nine bounded runoff plots were set on three different types of land use; three on bench terraced forest, two in mature *Pinus* forest, and four in *Cistus matorral*. Plots such as 'Mat 3 & 4' (in figure 8, page 127) were installed in mature *Pinus* forest and *matorral*, while plots such as 'BT 1 and BT 2 & 3', were installed in bench terraced forest. The stepped irregular surface of the terrain in the bench terraces made the installation of 'standard size' and shape plots impossible.

The area around bench terrace *Pinus* run off plots 1-3 (figure 11, page 136), is markedly different to the others examined. This area has been terraced for plantation with conifers in the 1970s. The area where the plots were installed, originally owned by the Municipality of *La Mierla* until it was expropriated for reforestation work in the 1970s, was mainly used for pastoralism. Sediment yield results, measured in the bench terrace runoff plots, are higher than under *Cistus matorral* and *Pinus* mature forest conditions. The highest sediment yield predictably occurred on the most degraded bench terrace plot, where vegetation cover was more sparse. The greater vegetation cover of the other two plots managed to reduce sediment yield but not runoff flow because of the soil conditions of the terrace. This results in cumulative runoff flow along the terraces to lower, more vulnerable points such as bare gully walls or to bridging of terrace risers (p.198).

Analysis of soil properties from surface and subsurface horizons were carried out for diverse land use areas. "Laboratory measurements of ...soils included bulk density, hydraulic conductivity, soil moisture retention characteristics, organic matter and organic carbon, aggregate stability, as well as an analysis of clay mineralogy" (p.7). "The principal objectives of the soil sampling strategy were:

> 1. To describe... those characteristics recognised in existing research as having significant influence on infiltration, hill-slope drainage, overland flow generation and soil erodibility.

2. To assess the large scale spatial variability of these soil properties in relation to the three major land-use - land management categories (mature *Pinus* forest, bench terraced *Pinus* forest and *matorral*.

3. To identify the major controls influencing variability at the small scale e.g. bench terrace morphology, catenal position, vegetation characteristics".

"Sampling and measurements predominantly relate to the surface soil horizon as this has the major influence on infiltration, overland flow generation and erosion. ...additional sampling of sub-surface horizons was carried out to evaluate potential impacts of soil disturbance arising from management practices" (p161)

Measurements under *matorral* show that soil moisture falls from an average of 12 per cent in June to as low as 4 per cent in October. The rainfall absorbtion capacity of soils in the same areas at the beginning of October is considerable, "...(on average 7 cm of rain for 50 cm depth of soil)". Moisture levels indicate that "...overland flow under *matorral* is likely to be very infrequent". Soil aggregates are highly stable due to their organic carbon content. However, at present, these areas of matorral are "...potentially vulnerable to adverse management practices [and] in a delicate state of equilibrium" (p.171). Ternan et al (1996) explains that "soils with a higher clay content have a lower aggregate stability..." and that "The most stable aggregates occur under *matorral* and may represent a lag of more resistant aggregates surviving past land-use-related erosional processes" (p181). Soils under these matorral areas and the area of the mature *Pinus* run off plots 1 and 2 (in figure 9, page 134), are similar, although organic carbon and clay contents are lower under *Pinus*. Soil moisture content under mature *Pinus*, where reforestation started in 1948, averaged 30 per cent in winter and 10-20 per cent in summer, indicating interception and transpiration losses by vegetation. The aggregates are moderately resistant but less stable than those under *matorral*. Fungal hyphae present under *Pinus*, acting as a temporary binding medium holding particles together, impedes the slaking of particles when rapidly wetted. Lower organic carbon content and poorer soil aggregate stability in these areas, indicate that "...afforestation may have increased soil erodibility". The protection of tree canopy, low soil moisture and pine litter, however, can compensate for this increased erodibility (IBERLIM, ibid, p.172). Ternan et al, (1996) explain that the least stable of aggregates are in the cultivated areas and claim that this can be caused by existing cultivation practices, when expandable clays are brought to the surface by the actions of deep ploughing (p181).

Soils in the terraced areas around 'bench terrace *Pinus* 1, 2 and 3' (see figure 11, page 136), "...are compact [specially in the inner treads of the terraces], of low hydraulic conductivity, low organic carbon content, and highly dispersable". The poor aggregate stability of these soils result in slaking when rapidly wetted. This can be a consequence of terracing, mixing soil horizons, resulting in low organic carbon and expandable clay contents also making vertical drainage slow. Soil moisture early in the summer was double that recorded under *Cistus matorral* and *Pinus* mature forest, while in September 1994, at the end of a dry summer, moisture levels were remarkably low. Soil moisture was greater at the base of the terrace riser and at the inner tread, with riser crests considerably dryer (p.172-173). Plot runoff coefficients and volumes are greater in these areas than in *matorral* or *Pinus* mature forest.

Point scale rainfall simulation experiments consisted of 1 m^2 bounded plots, with diverse vegetation and conditions of ground surface, to monitor sediment losses, using a tipping bucket mechanism and data logger. 'Volumetric soil moisture content was measured by Time Domain Reflectometer before, during and after the simulations' (pp.6-7). The findings emphasize "...the importance of vegetation in protecting the soil surface against sealing and encouraging infiltration" (p.190). The rainfall simulation experiments demonstrate the "...relatively slow overland flow response to ...simulated rain..." under *matorral*, revealing that low soil moisture increases are due to the moisture retention capacity of the "...*Cistus* canopy, and the litter and lichen cover on the ground surface" (p.185).

Under the same experiment, the mature *Pinus* area produce substantially more runoff than *matorral*. Pine litter seems to be less capable of retaining rainwater than *matorral*. "Cumulative infiltration under *Pinus* litter ...was less than under *matorral*" (p.185). Rainfall simulation results show a high runoff coefficient and considerable increase in soil moisture under bench terrace conditions. Cumulative infiltration was comparable to *matorral*, but in comparison with the *matorral* area, lack of canopy and lichen crust resulted in low moisture retention (p.185).

The difficulties of accuracy presented by the methods above, such as "...that of scale i.e. as the size of the plots increases, the rate of erosion seems to decrease due to averaging effects" (p.215), have been minimized by investigating the erosion process from other complementary perspectives. These were the Caesium-137 and erosion bridge methods. The disadvantage of these is that they are time consuming (p.215). The objectives of these two methods were "to quantify soil erosion rates within major land use management types" and to compare these with those "determined by plot and gully experiments" (p.215).

"Erosion bridge sites were installed during June, 1993 on bench terrace risers, bench terrace treads, a degraded matorral slope above a gully head, at the gully head and on the gully walls" (p.7). The method consists of a metal bar 2.0 m in length with holes drilled at 25 mm intervals, introducing an aluminium rod through these holes to measure changes in the elevation profile of the ground. "Erosion or sedimentation depths were calculated as the sum of the change in elevation for each rod divided by the number of rods" (p.215). Some of these measurements were obtained in the area around *Cistus matorral* 'runoff plots 1 and 2' and 'erosion bridge' (figure 10, page 135). This area is communally owned by the Municipality of Retiendas and was rented out for agricultural and pastoral use to peasants from the village until the late 1960s. One of the findings from the erosion bridge measurements was that disturbances by animal activity or small fires could be responsible for up to 13.4 mm soil loss per year, although no specific tests were carried out on these influences. These disturbances may cause the threshold between stable *matorral* conditions, as in the locations where the erosion plots were installed, to be crossed to create unstable degraded *matorral*, as encountered on the bridge measurements sites nearby (p215-216). However, the results from the eight erosion bridge sites suggest the need for a longer period of measurement than was possible in order to ascertain more accurately erosion and deposition trends.

The assessment of erosion and deposition over a long time scale (30 to 35 years) was carried out through measurements of Caesium-137 in "...inter-gully *matorral* sites, mature *Pinus* forest sites, check dam accumulations and gully floor depositional sites" (p.7). Caesium-137 fall-out from nuclear testing in 1963-1964, has the property of adhering to soil particles, especially those of clay and organic colloids, to provide a good form of assessing erosion and deposition profiles. Assessing erosion and deposition is done with reference to a caesium inventory (that of a level site where no erosion or deposition may have taken place). 'Comparison of this 'reference' inventory with those recorded for hill-slope sites allows net erosion (caesium loss) or net deposition (caesium gain) to be assessed'. Caesium-137 analysis shows that the mature *Pinus* area experienced serious erosion rates during plantation, and that these rates became negligible when the trees reached maturity. Caesium tests "...suggest that [the stable *matorral* area] has not been eroded to any great extent in the recent past" (p.219-220), meaning since 1954, when caesium deposition was significant.

This analysis of the results of the IBERLIM study, largely of the consequences of land management on the physical conditions in the lower altitude area, is complementary to the examination of the social and economic conditions. The complementarity stems from the point that the study of socioeconomic processes explores the possible reasons for the physical consequences as well as the reasons and consequences of the socioeconomic factors involved in LD. The two contribute to a better understanding of the socioeconomic and natural environment responsible for LD processes.

Air photo interpretation by IBERLIM

The terrain analysis carried out by IBERLIM utilized air photographs to identify combinations of geology, land management and land form characteristics susceptible to gully erosion. The advantages of the technique used are that:

> "1. provides a rapid method for producing a sample frame within which to study the distribution of gullies.
>
> 2. the presence or absence of gullies can be related to various key parameters such as geological, topographical and land management characteristics" (p.223).

IBERLIM's air photo interpretation shows that "...the geologies most vulnerable to gully erosion (see figure 6, page 122) were the Miocene/Pliocene Conglomerates... with each having over 20% of the total gullied area within their bounds". Quantification of the bare gullied areas for these geologies show that the main surrounding land-use/vegetational type was *Cistus matorral* (p.225). However, because these areas were used for agricultural production until the late 1960s, and the erosion process and the formation of gullies are likely to date to well before that, the preceding vegetation, or lack of it after ploughing, may have contributed more to erosion than the current stable *matorral*.

IBERLIM's classification of slopes according to their degree of gradient and to their polarity position (north, south, etc.), show that slopes ranging between 10 and 25°, extending from a S-SW to a S-SE orientation, "were the most vulnerable to gully erosion" (p.225). As it will be discussed in the following section, interviews with land users and data on land use showed that the lands facing south were generally used for agricultural production, and the ones facing north for pastoralism, and the collection of fuel wood (mainly *Cistus*) for household consumption. The effects of varying past land uses within the area may help explain the differences in erosion between north and south facing slopes observed by the IBERLIM study. However, taking into account respondents' views on the effects of frost and land use, these issues would have to be examined further to ascertain these differences in erosion between north and south-facing slopes. The next section examines the results of the use of air photographs in field work for this thesis.

iii. Air photo interpretation.

Vegetation change has a great effect on the processes of LD. Because of this, an attempt to ascertain and describe the variations in vegetation density that have taken place in the lower altitude area of study was attempted in field work for this thesis. Air photos for 1959 and 1979 were examined to ascertain the changes that may have taken place between these two years, and between 1979 and the present day conditions through visual fieldwork observation.

The examination of air photographs to ascertain the different kinds of mixed vegetation require long detail field work and careful scrutiny with a good stereoscope[2]. However, if what is required is simply the analysis of changes in vegetation density, with no need for great detail about species composition, air photographs alone can be a valuable research tool.

The aim of this type of field work, in the context of the thesis, was that once the most important physical characteristics of the area were ascertained, as above, the next logical step was to roughly establish the extent of vegetation recolonisation. Two simple assumptions were made, firstly, that an increase in density and extent of areas covered with vegetation indicates colonization and therefore declining erosion activity, and secondly that, this increase in vegetation could be detected by combining visual field observation, informal enquiry among land users, and air photo interpretation.

A stereoscope was carried to the field and the examination of the air photographs was done at the same time as the visual recognisance with the aid of binoculars, or by visiting points which looked as if they may have changed over time. The areas examined cover the experimental sites where detailed erosion measurements were taken by IBERLIM researchers (Coelho *et al*. 1994), between 1992 and 1994. Plate 3 (in page 119), and figure 9 (page 134), figure 10 (page 135), and figure 11 (page 136) show the location of these sites.

Through this simple method of aerial photograph examination, it could be discerned that *Cistus matorral* covers greater areas and show darker texture in the 1979 photographs than in those of 1959, suggesting greater vegetation density. Gully floors, sparsely covered by any vegetation in 1959 were more colonized in 1979.

The greater degradation apparent in the area in 1956 could have two related causes: firstly, the fact that the land was then used more intensively and secondly the regular action of frost. A good example

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[2] Plate 3 in page 118 shows an air photograph (485-C-22, flight 1979) with the location of the main experimental sites of the IBERLIM project. The great precision required to ascertain the recolonization of vegetation is not possible by a simple observation, without a stereoscope, or by comparison with the other photograph of the flight of 1959 especially reproduced for this thesis. Because of this limitation the 1959 photograph is not shown.

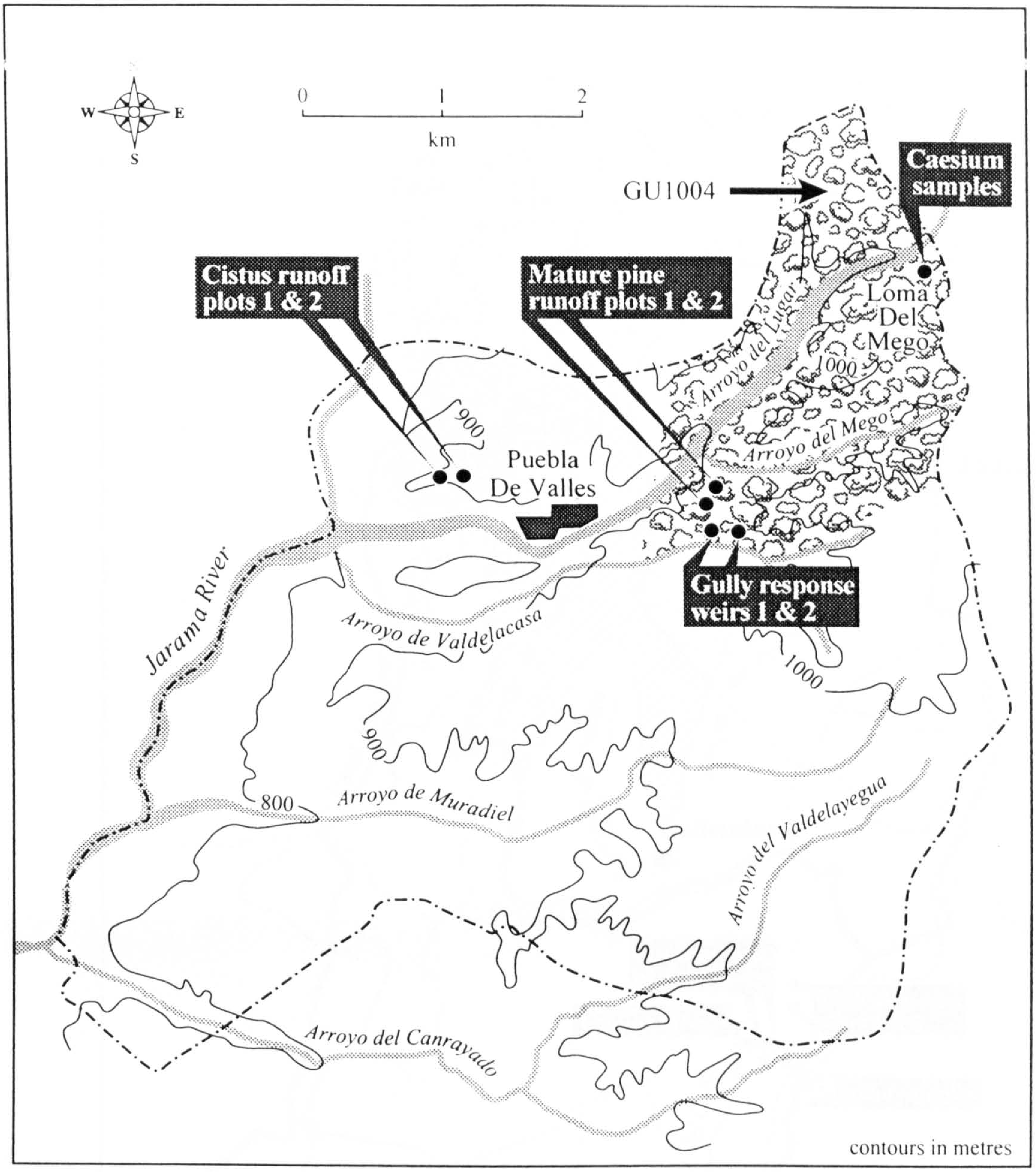


Figure 9: Village area of Puebla de Valles (*Arroyo* system, reforested area, and experimental sites)

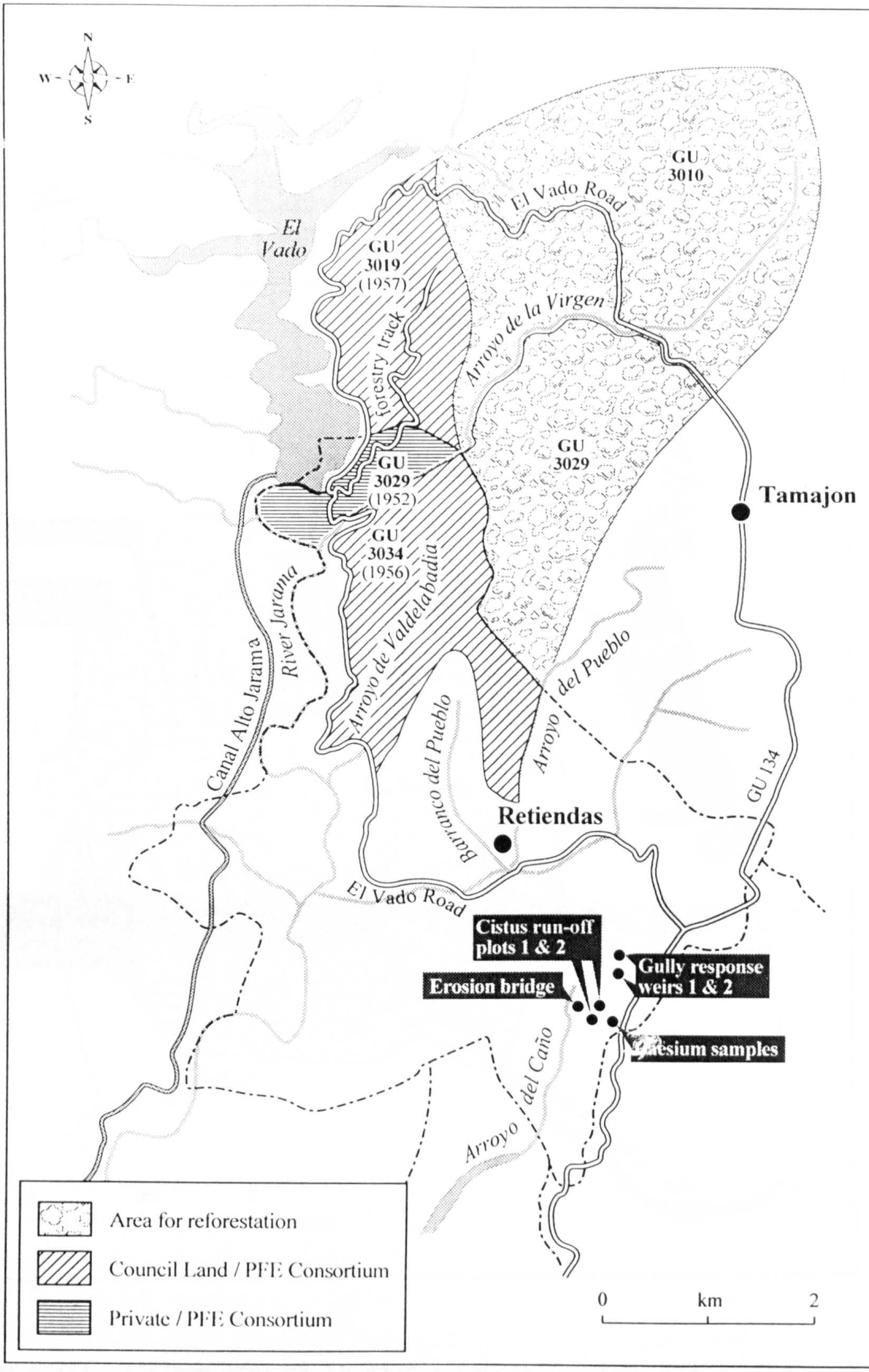


Figure 10: Village area of Retiendas (*Arroyo* system, reforested area, and experimental sites)

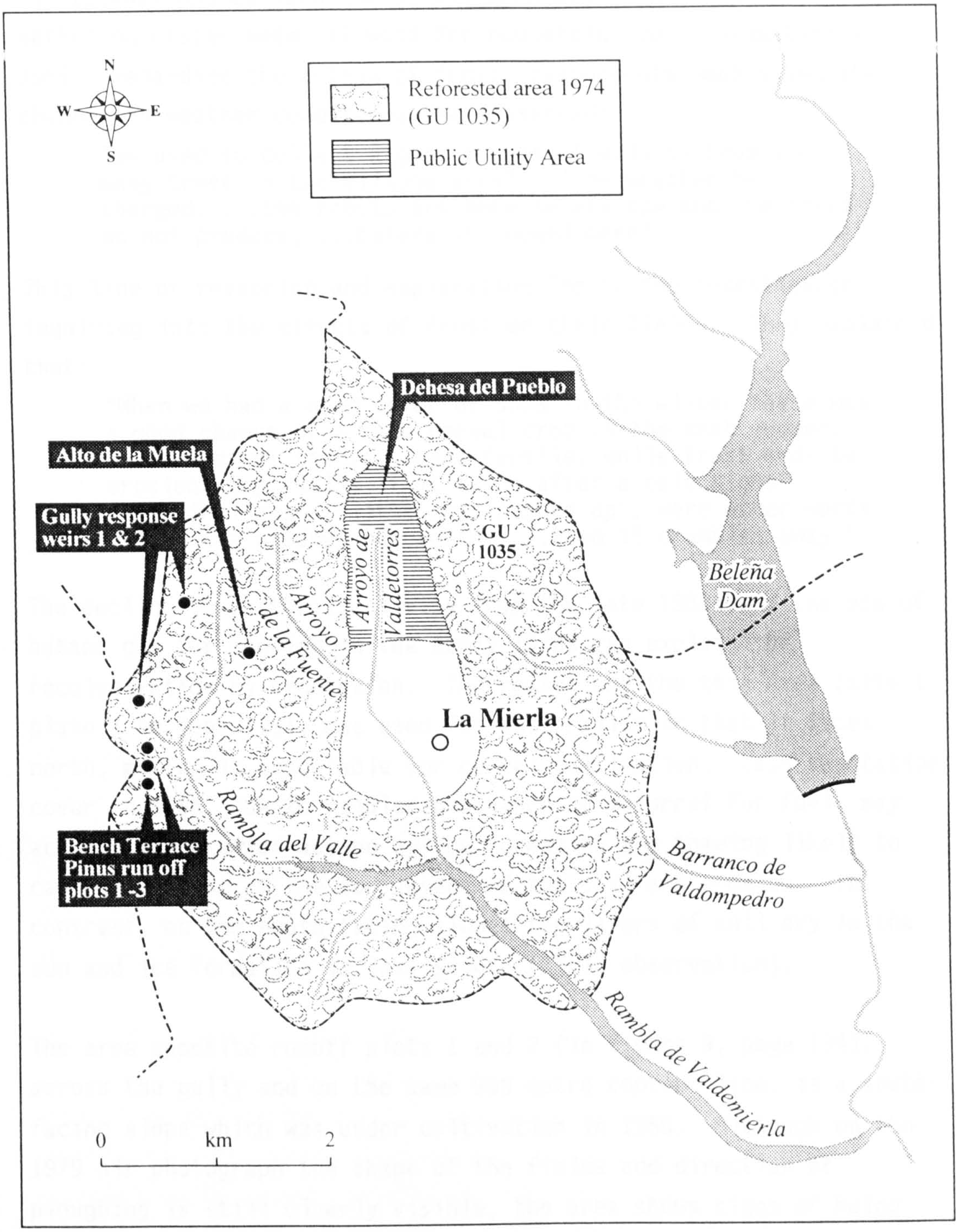


Figure 11: Village area of La Mierla (*Arroyo* system, reforested area, and experimental sites)

of the greater degradation observed in 1959 is site 1 (in plate 3, page 119), the area where *Cistus* runoff plots 1 & 2 in Puebla de Valles were installed (also shown in figure 9, page 134). According to explanations by land users, the area was used for pastoralism and gathering *Cistus matorral* wood for household fuel consumption in 1956. Regarding the action of frost, respondents emphasised the changes in weather conditions they observed:

> "We used to collect a good amount of walnuts from the many trees in the village area". "The weather has changed, ...the frosts are more severe now and the trees do not produce, ...before it snowed more".

This line of reasoning and explanation led to the investigator inquiring into the effects of frost on their fields. They explained that:

> "When we had a good cover of snow in the winter there was a good chance of a good cereal crop in the next summer, ...snow makes the soil more fertile, while frost adds to erosion, especially if it rains after a cold night". Frost 'hollows' ('lifts' or 'pushes up', were other words used), the ground underneath, ...then it crumbles away."

The decline in pastoral activity from the late 1960s and the use of butane gas for cooking in the early 1970s can explain the recolonization by vegetation. The reason why the this area (site 1, plate 3 in page 119), was used for pastoralism is that it faces north, making it unsuitable for cereal cultivation. Less vegetation cover in 1956, due to regular clearance of *matorral* for fuel, may account for greater action by ice formation and thawing likely to cause loosening of the top layers of the soil and erosion. In contrast, on the south-facing slopes top layers of soil dry in the sun and ice formation is less severe (field observation).

The area opposite runoff plots 1 and 2 (in figure 9, page 134), across the gully and on the same 900 metre contour line, is a south-facing slope which was under cultivation in 1956. Although on the 1979 air photograph the shape of the fields and direction of ploughing is still clearly visible, the area shows signs of being left fallow for some time. During field work it was observed, and confirmed at a later stage by land users, that with the exception of some fields in the *paramo* which had not been fallow for many years, the area has not been used since 1979. Both north and south-facing sides of the gully are covered by vegetation today. Whether the south-facing slopes used for agricultural production were more prone to erosion because of scant vegetation cover, especially after ploughing, than the north-facing ones, used for pastoralism, is difficult to ascertain and compare. According to observations made by IBERLIM (discussed above), the south-facing slopes are more prone to erosion than the north-facing ones, suggesting the effects of agricultural activity rather than the action of frost as the main factor for erosion.

Air photos from La Mierla in 1979 show a landscape devoid of vegetation cover because of the massive terracing carried out for reforestation a few years before (see area around key 4 at the bottom of plate 3, page 119). Areas which where not terraced, because they were inaccessible to the bulldozers, show greater vegetation cover in 1979 than they did in 1956. Unreforested areas in the *paramos* show dark spots of what most probably was *Cistus*, suggesting a long fallow period or, since all fields are in a similar condition of vegetation cover, even land abandonment. The area where vegetation was absent because of reforestation work contrasts with the well-colonized areas in other gullies inaccessible to machinery. Comparison between the vegetation cover in the gully areas left unreforested, suggest greater coverage in 1979 than they did in 1956.

Another area which was left unreforested, the *Dehesa del Pueblo* (figure 11, page 136) is difficult to interpret through comparison of air photos from 1956 and 1979. The area appears unchanged; furthermore, taking into account that pastoralism declined rapidly in the 1960s, and from field observation, it can be concluded that the area remains stable.

iv. Social and economic characteristics

The description of the social and economic characteristics of the area of study complements the description of the physical characteristics and the examination of the IBERLIM results. The major national socioeconomic changes during the nineteenth and twentieth century affected the landscape and the condition of land. These suggest increases in LD. Describing the socioeconomic conditions of the area together with the analysis of the national changes examined in previous Chapters helps to put into perspective and understand the past and present forms and objectives of reforestation in the area of study.

The area of land belonging to each village is shown in table 2. The Valley of Henares, situated south of the study area (see figure 5, page 108) which runs by Humanes and Guadalajara (city) in the direction of Madrid, is partly irrigated, with stretches of productive agricultural land. Since the 1950s it has also been an important area of industrial expansion from the capital.

	Puebla de Valles	La Mierla	Retiendas	Palancares
Hectares	2707	2037	2099	1900

Sources: MAPA, 1986:148 & "CPAES" (for Palancares data)

Table 2: Terrain distribution in the four villages of study

Administrative and social structures

Palancares, the most northerly, highest and remote of the four *municipios* studied, lost its administrative autonomy as a village *municipio*, because of its almost complete human desertion in the late 1960s and early 1970s. It is now administered by the *municipio* of Tamajon, which lies to its south. The sixty or so existing houses in Palancares are used at week-ends and during summer holidays by their owners, most of whom emigrated to work in Madrid or other areas. The other three villages retain their own municipal administration. The other three *municipios* still retain their administrative autonomy.

From the early part of the century to the early 1970s, the social and economic structure of the villages was undifferentiated. There were no identifiable social classes owning or controlling a disproportionate amount of the means of production which would have made them economically, socially, or politically more powerful than the rest. The village mayor, the village teacher and the priest were key figures in the local community. Their power derived from their political or status' position rather than from their wealth. The political power of the village mayors in Spain became more important after 1939, when the State appointed them on the basis of political loyalty, to be able to secure control in the still volatile post-war years. The priests were also major political figures. The Catholic Church in Spain sided with the military who, after three years of Civil War, eventually ceased power. Although the role and power of the Church through the village priests can be generalised for Spain, it may have varied in particular villages, where individual priests shown their political impartiality or humanitarian function towards those on the defeated side of the War. Each village has its own church and in the late 1960s the resident catholic priest often acted as primary school teacher. Village teachers were respected for their work rather than for the income they received. These were one of the lowest paid professionals in Spain in the post Civil War years. One factor that contributed to outmigration was the closing of village schools in the early 1960s and late 1970s, which required children to travel long distances to larger more modern school units or to attend school with the priest.

Infrastructure

All four villages have seen epochs of decline such as during the Civil War (1936-1939) and in the late 1960s, but also a degree of revival since the late 1980s. Land was abandoned due to migration and houses were only sporadically used during holidays resulting in their rapid deterioration. This has for the last fifteen years been reversed. The maintenance and improvement of infrastructure such as roads, water supplies and housing owes more to the influx of money earned in the industrial areas by migrants than to village economic activity. Improvements, especially to housing are due to the return of migrant ex-farmers or their offspring during holidays or permanently, improving their homes and other public infrastructure. Although piped running water was installed in the houses of the villages in the lower altitude areas, Palancares still lacks this facility.

Population/demography

During the months of July and August, these villages become centres of great social activity, with people from the village working and residing in Madrid returning to their original homes for their summer holidays. During the winter this increase in 'population' only happens at week-ends or bank-holidays.

Guadalajara is one of the least densely populated provinces in Spain. Table 3 shows the decreasing population density of this province in comparison with the increasing national trend. Furthermore, there are great differences in population density within the province. The northwestern part of the province (see figure 5, page 108), which is the setting for this study, had a population density of 4.6 inhabitants per square kilometre in 1981, while in the more fertile areas of the Henares river valley, south of Humanes, density was 39.4 (MAPA, 1986: 45). In 1994 the area of Sierra de Ayllon has a

Years	Guadalajara	National
1900	16.4	36.6
1910	17.2	39.5
1920	16.5	42.2
1930	16.7	46.7
1940	16.9	51.3
1950	16.7	55.4
1960	15.1	60.3
1970	12.1	66.9
1981	11.7	74.8

Source: MAPA, 1986: 44

Table 3: Population density (hab./sq.Km.)

population density of 1.66 hab./Km^{2}, the lowest in Castilla-la-Mancha (Lopez Carrasco, 1994: 53).

Table 4 shows the evolution of population in the four villages of study. During the Civil War (1936-1939) the recorded population remained broadly stable. However, the reality was that many of the younger men were forced to abandon agricultural work to fight at the front. As a result, economic activity, the production and exchange of products between villages, was seriously affected and even dismantled.

Years	1900	1910	1920	1930	1940	1950	1960	1970	1981
P. de Valles	291	330	356	351	312	392	290	151	75
La Mierla	237	241	221	206	153	175	161	49	29
Tamajon	1365	1299	1232	1121	906	985	842	604	178
Retiendas	424	396	366	356	434	459	381	137	40

Source: MAPA, 1986: 64-65

Table 4: Evolution of population in Puebla de Valles, La Mierla, Retiendas and Tamajon (for Palancares)

The population trends for the Province in table 5 shows the balance between actual population growth and potential population growth (population which would have present without migration). Only 0.2 per thousand of migration was to other countries of Europe (the great majority to Switzerland) in comparison with 3 per thousand in the rest of Spain (MAPA, 1986: 48).

Years	Guadalajara	National
1900-1910	-8,067	-433,332
1910-1920	-21,053	71,623
1920-1930	-18,745	-19,777
1930-1940	-8,038	554,293
1940-1950	-17,404	-225,408
1950-1960	-34,418	-874,324
1960-1970	-42,843	-491,713

Source: MAPA, 1986: 49

Table 5: Migration balance

Land tenancy

The structure of land ownership is characterised by its great subdivision and small size. Table 6 (based on the 1972 agrarian census), shows the size distribution of agrarian production units for the northwestern area of Guadalajara, a mountainous area, in comparison with area of the valley of Henares on flatter land (see figure 5, page 108).

Area	Less than 5 Ha.	Between 5-10 Ha.	Between 10-15 Ha.	More than 30Ha.	No. of prod. units
NW.	22.41	20.65	38.24	18.70	5,269
Henares	31.14	16.33	28.72	23.81	7,074

Source: MAPA, 1986: 50

Table 6: Production units (%)

More than thirty eight percent of the production units in the northwestern part of the Province (where the study areas are) have between 10 and 15 Ha. of land. In the Henares valley, there is a greater spread of farm sizes: the largest category is less than 5 Has., closely followed by those between 10-15 Ha, while there is a larger proportion of farms of over 30Ha than in the northwestern area.

The distribution of plot size and the average number of plots per production unit is shown in Table 7. This shows that in the northwestern area the percentage of plots between 1 and 5 Ha, and those of more than 5 Ha., is small in comparison with those of less than 1 Ha. In comparison with this distribution, the percentage of plots between 1-5Ha. is 13.4 percent greater in the Valley of Henares than in the NW, while the percentage of those less than 1 Ha. and those of more than 5 Ha. is greater. Dividing the number of plots from Table 7 into the number of production units Table 6 gives us

Area	< 1 Ha (%)	Between 1-5 Ha (%)	> 5 Ha (%)	No. of plots	Average plots per prod. unit
NW.	88.45	5.09	6.46	242,499	46.02
Henares	78.17	18.43	3.4	146.199	20.67

Source: MAPA, 1986: 51

Table 7: Plot distribution per production unit.

the average number of plots per production unit, as shown in table 7. The great number of plots per production unit in the NW was a great disadvantage because of the time involved in travelling from one plot to another. This made the stop-start sequences of all agricultural activities wasteful, and it was extremely difficult to use time productively.

Data on land tenancy registered in the 1972 Agrarian Census, on which MAPA (1986) data is based, may not be very accurate but it can serve as a guide. The reason for the limited accuracy of these statistics is that modern farmers do not register the land rent agreements they have to allow them to work land belonging to retired farmers with the *Delegación* in Guadalajara[3] . According to Tomás Espinosa, the *Delegado* of this Office up to 1994, not a single registration existed in the whole Province (personal communication, 1994). Table 8 provides a rough indication of the main form of tenancy, with a high level of land ownership contrasting with a smaller percentage of rented and share-cropping land, especially in the northwestern area. This proportion is smaller in the case of the Henares area where nearly a quarter of the land is rented, with the proportion of share-cropping also being negligible.

[3] The office of Agriculture and Environment of Castilla-la-Mancha Autonomous Government has got offices in each Province called *delegaciones*. The *Delegación Provincial - Consejería de Agricultura y Medio Ambiente en Guadalajara*, is the corresponding office of the Autonomous Government in that Province. A fuller explanation and chart of these organizations is given in section v below.

	Tenancy arrangements (%)				
Areas	Ownership	Rented	Share-Cropping	Other	Ha. Surveyed
NW	81.69	10.21	0.70	7.40	264,662
Henares	70.64	23.18	1.19	4.99	223,196

Source: MAPA, 1986: 53

Table 8: Land tenancy arrangements

Economy

Prior to the Civil War the local economy can best be described as essentially based on subsistence agriculture and pastoralism. Important forms of land use until the 1930s included the cultivation of cereals in rotation with leguminous crops, vines and olive trees, horticulture, fruit trees such as walnut, fig, peach, and pastoralism in forests, *matorral* and fallow fields. Farmers produced these for their own consumption and for exchange, either through for cash or for other products. Cereals such as wheat, rye, and oats, and legumes such as chick peas and lentils were produced for human consumption while vetch and barley were produced for animal consumption. Grapes were produced to make wine, and olive oil was made in Puebla de Valles and La Mierla.

The olive oil produced was of very high quality because of two main reasons, firstly the traditional method milled the flesh of the fruit but did not crush the stone as with modern methods and secondly, the type of olives produced in these areas, *cornicabra*, although a low yielding variety, is highly aromatic producing a much relished quality oil. Puebla de Valles had three olive mills at the turn of the century. Only one of them was working in the 1930s and was kept in use until the late 1960s [4]. La Mierla had one oil mill and Retiendas did not have any. Their production was processed in Puebla de Valles. Payment for the processing was made in a proportional part of the oil produced. This form of payment is still kept in operation when olives are taken to modern industrial plants in Guadalajara for processing.

[4] Villagers of Puebla de Valles feel proud of their past agrarian activity and one of the mills has been privately restored.

Wine production was important for consumption and as a commodity. Its production, and that of most other products was greatly disturbed by the Spanish Civil War. An example of this is La Mierla which was evacuated for two years. When villagers returned most houses had been damaged and wine production was never started again. An immediate and important source of food were hunting rabbits and keeping chickens. Although food was short, the importance of having a glass of wine with the meal was such that an exchange system of one egg for half litre of wine was common practice. Palancares, because of the altitude, did not produce any wine and neither did Retiendas.

Fields were left fallow in well tried sequences of generally seven years. Other forms of land use were pastoralism (largely sheep and goats) and the use of natural forests and *matorral* for charcoal making, which came to an end at the turn of the century, and also for wood-gathering. The wood was used for household consumption and to sell in Guadalajara city. This continued well into the 20th century. Since the 1940s, conifers have been planted in areas mainly used for pastoral and agricultural activity or in those abandoned and colonized by *matorral*. Fields left fallow were used by all pastoralists in the village even if they did not own the land. Unless previously arranged, pastoralists did not take their animals to graze in land in other villages.

The ending of the subsistence economy caused the long fallow and rotation periods to disappear and was accompanied by massive land abandonment in the NW area in the 1970s. Old cultivation methods were displaced by continuous yearly cultivation with modern intensive techniques and machinery using synthetic fertilisers.

Increasing outmigration to areas of industrial expansion, especially Madrid, Barcelona and surrounding areas took place at the end of the 1960s, causing the further abandonment of agriculture. Farming operations were often left in the hands of family or friends through land leasing or share cropping arrangements. In the early 1970s, a minority of farmers who were able to acquire modern machinery, such as tractors, harvesters or threshers were able to cultivate greater areas of cereals (mainly wheat). Land in Palancares was never cultivated with modern techniques and since it was abandoned it has been recolonised by matorral and trees. In the three other villages a few, but larger, farmers continue to work land belonging to outmigrants or retired non-emigrants.

With the advent of Spanish industrialization during the 1950s and the growing importance of the capitalist market (CESP, 1959, 1960a, 1960b, 1962, 1964, 1970), the process of differentiation and alienation of peasants typical of the capitalist production system (Harriss, 1982) gained momentum. This caused the abandonment of land and the relatively rapid desertion of the more marginal areas. In the 1950s, peasants combined agricultural work in their land with government wage work in, for example, the construction of the El Vado dam (see figure 4, page 77) or in reforestation. Wage work gave them an opportunity to complement their meagre agrarian income. As peasants became aware that their waged incomes were sometimes much higher than returns from their own farms, own-account agricultural work become a secondary choice, often to the point of its total abandonment. This type of public work was not carried out near Palancares and therefore was not available to peasants in that village. Table 9 shows the changes of the population working in agriculture taken place in Guadalajara and nationally (the reasons for the return into agriculture in 1983 are not explained in the source). The study area, however, is not representative of the provincial (unexplained) trend of return to agriculture, as only a few modern farmers currently work the land.

Percentage of total working population						
	1950	1960	1970	1981*	1982*	1983*
Guadalajara	73	68	42	20.2	17.3	23.8
National	49	41	25	18.7	16.1	17.2

* Enquiry by INE. First quarter. Sixteen year old and older population.

Source: MAPA, 1986: 49

Table 9: Population working in agriculture

The general trend away from agriculture is reflected in the distribution of employment by sector in Castilla-la-Mancha in 1994. As figures below show nearly half of the population works in the services sector, a clear change from the agricultural activities of the 1950s in Guadalajara.

- Agriculture	15%
- Industry	23 to 24%
- Construction	13%
- Services	49 to 50% (Lopez Carrasco, 1994: 50)

Cultivation of the steeper slopes had been abandoned in the 1970s and modern farmers today work the flat land of the valleys and *paramos*. Some older non-migrants still persevered with the traditional methods until they retired from active work. When they abandoned agricultural work and migrated to work in the industrial sector, they left all the land to be worked by three or four modern farmers in Retiendas, six in Puebla de Valles, and two in La Mierla. To these we have to add other few farmers who come from nearby villages to work the land. Land in Palancares has not been cultivated since its desertion.

Traditional farmers were incapable of competing in price and production with larger-scale, more modern market-oriented farmers with machinery. Those who did not emigrate fluctuated between subsistence and the market economy, with an increasing predominance of the latter. Those who never left the village to work outside are now retired but still practising some horticulture, keeping beehives or collecting olives - largely for home consumption and as an entertainment (field work personal communication).

Pastoralism was another important traditional economic activity which is still practised today on a reduced scale. The number of animals was greatest from the beginning of the century up to the beginning of the Civil War. Pillaging during the Civil War reduced the flocks to a few animals, if any at all, per household. After the Civil War livestock numbers recovered rapidly through natural reproduction. At the end of the 1940s, there were more than 3,000 heads of goats and sheep in each of the villages. The number of animals of each household, normally between 15 and 30, was determined by the time they had to tender them and their relative wealth. Those with less wealth could not afford sheep because these require a supply of feed during the winter which only people owning more land could provide by cultivating forage plants. Less wealthy people owned goats whose feed could be found in natural forests and fallow land.

In the early 1960s this process was reversed and numbers decreased rapidly into the 1970s. The greatest decline took place in La Mierla, followed by Puebla de Valles. In Retiendas the decline was more gradual. Palancares in the 1950s had 2,000 head of goats, 100 cows, 35 horses or mules and 500 beehives (CPAES, 1994). Today there are no animals left in La Mierla or Palancares, and about 450 sheep in Puebla de Valles, mostly belonging to one modern farmer who also works the land. In Retiendas there are about 600, mainly sheep, mostly belonging to two old shepherds. Sheep and goats graze on the tender buds of *matorral* as well as on the fallow land where there is a considerable amount of seasonal herbaceous forage.

The characteristics and potentials of the area of study are described by Lopez Carrasco, in charge of the Office of Agriculture and Environment of Castilla-la-Mancha Autonomous Government as:

Characteristics

- Possessing large forestry areas.
- Poor and declining agriculture.
- Land abandonment. Ageing population.
- Population imbalance between sexes.
- Seasonal migration.
- Deficient infrastructure.
- Shortage of services.
- Lack of industry.
- Shortage of enterprise.
- Lack of intermediate development links.

Potentials

- Forestry and lumber
- Quality natural products (eg. mushrooms, truffle)
- Ecological agriculture
- Autochthonous pastoralism
- Special aromatic and medicinal plants
- Employment in the conservation of nature
- Tourism, hunting, fishing, natural beauty
- Natural and mineral waters (Lopez Carrasco, Ibid:53).

Socioeconomic and physical characteristics to a great extent determined the administrative structure needed for governance. The structure of the State reforestation service - its professional and administrative composition, implementation methods, philosophy, deficiencies and strengths etc. - were passed down, as part of the State machinery, to the new democratic governments after 1976, and from these to the autonomous governments. One of the political responsibilities of the Spanish Autonomous Governments since 1982 is reforestation. Lack of basic reform in the bureaucratic machinery of the Provincial agencies of ICONA, when responsibilities were transferred to the Autonomous Government of Castilla-la-Mancha, is a great constraint for the successful elaboration and implementation of SWC plans based on participation. Even if the participatory approach had been seriously contemplated by the Autonomous Government, the results would most likely be poor due to officials' lack of training and experience in this type of work.

An exploration of the administrative structure at provincial and national levels facilitate the explanation of the closed association between the type of organization of the administration in relation to the problems it expected to solve. Next section explores some of the most relevant administrative structures in charge of reforestation.

v. National and provincial offices of agriculture

The objective of this section is to provide a short but concise view of the national and provincial political and administrative structures dealing with reforestation. Identifying the different offices and their responsibilities in the Guadalajara Office of Agriculture (*Delegacion Provincial de Agricultura*) is necessary, since this plays a major part in the decision making process affecting reforestation projects for SWC. Presenting the organisation of these offices in a diagrammatic form (as in tables 10-12, pages152-154) helps to clarify the complexity of their relationships and responsibilities.

The most important office which determined policy making for SWC and reforestation is the Ministry of Agriculture Fisheries and Food (MAPA), through the PFE (State Forestry Heritage). After 1986, when responsibilities for SWC and reforestation were transferred from Central Government to the Autonomous Government of Castilla-la-Mancha, the office determining policy is that of the *Junta de Comunidades* through the *Consejería de Agricultura y Medio Ambiente* in Toledo. The *Consejería* deals with agrarian policy for this autonomous region.

The organisational structure of the PFE shown in table 10 (page 152) is that corresponding to 1941. The PFE was an autonomous governmental body in which the president was the Minister of Agriculture and the executive board were members of various sections of MAPA. The director, or head executive was appointed by the Minister and so were, either approved or appointed, technicians and administrative staff with decision making responsibilities. The selection procedure for most posts was, and still is, by examination (called *oposiciones*), but final appointment, as explained above, was the responsibility of the Minister (Ministerio de Agricultura, 1966).

The resistance to reforestation by peasants created the 'need' for a forceful implementation policy, and centralised political control from above. The power of the Minister to appoint or reject candidates to influential posts at a time of great political tension, explains the 'need' for this type of structure and control over decision making to enforce what was an unpopular policy among land users.

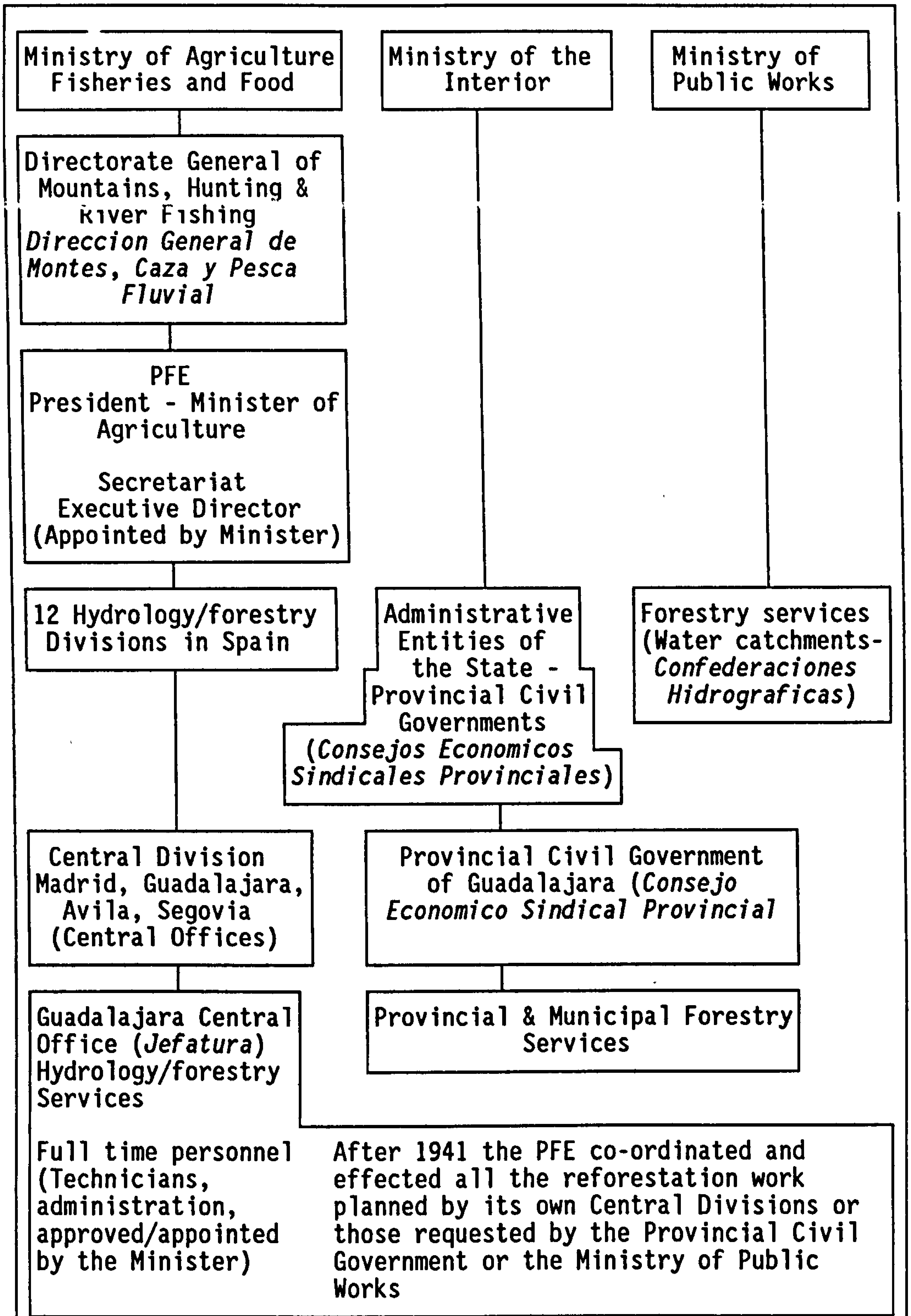
The unpopularity of reforestation grew with changes in the law regulating forestry. The book of *Disposiciones* (laws) (1966) shows the initial organization of the PFE in 1941, regulating its functions. There were several decrees, laws and orders promulgated since then until the creation of ICONA in 1972. The most important and extensive of these laws was the second in 1941, after small initial changes were effected in 1939, at the end of the Civil War. The changes of in 1941 comprised 112 legislative articles. In these there is a great insistence in the need for reforestation with fast growing species to reduce erosion. The decree of 30 May 1941, and the law of 18 October 1941 insistently urge the use of fast growing species. It is in the law of 19 December 1951 when the importance of the productive function of reforestation, in association with its protective function, begins to be emphasized, persisting with the need for the same species of trees as above. The drive for reforestation in the 1950s grew with the emphasis on the importance of production. Some of the changes in approach are detected in the way the reforestation policy was implemented in the area of study (explored in greater detail in Chapter 5 below).

The organisational structure of the diverse Governmental agencies which determined reforestation are explored below. As shown in table 10 the Ministry Public Works and the Provincial Civil Governments had a stake in forests, but neither of them carried out much, if any, work after 1941. Their role regarding reforestation was to arrange all the previous organizational work, as for instance the acquisition of land for building a reservoir, and assess the need for its protection from sedimentation. When reforestation was needed these governmental organizations request it from the PFE, and this executed the work. If any work was carried out by these other organizations, the PFE had a supervisory role, and the power to stop it, if not executed according to good technical practice. The PFE also initiated its own projects, at a larger scale.

Table 10 shows the main administrative arrangement and links of the Ministries in relation with responsibilities in reforestation. The role of the Provincial and Municipal Forestry Services was to help in the management of existing forests or to arrange new reforestation in conjunction with the PFE. These Services were at a much smaller scale than those of the PFE, to the extent that legal conflicts of control or ownership, according to Rico Boquete (1995), often arose from the PFE claiming the control, and even ownership, of these forests. The scale of involvement of the Provincial Forestry Services in forestry in Guadalajara and in most other Spanish Provinces varied widely. Its main activity in Guadalajara Province, through the *Consejo Economico Sindical Provincial* (Provincial Economic Council - CESP), was to elaborate rural development plans to promote economic growth, comprising reforestation. The PFE experienced organic changes and was eventually phased out in 1976 and ICONA replaced it.

The upward and downward organic structure of the PFE (ICONA after 1976) is that presented in table 10. The same as the PFE, ICONA was an autonomous organization of the MAPA, see table 11 (page 153). The new organism had the same reforestation objectives as the PFE but it was assigned new responsibilities, such as establishing new National Parks with greater emphasis on the conservation of nature. Both the PFE and ICONA operated at national level. In February 1984 the responsibility for reforestation and personnel working in the Provinces were transferred from ICONA to the Autonomous Government of Castilla-la-Mancha, see table 12 (page 154).

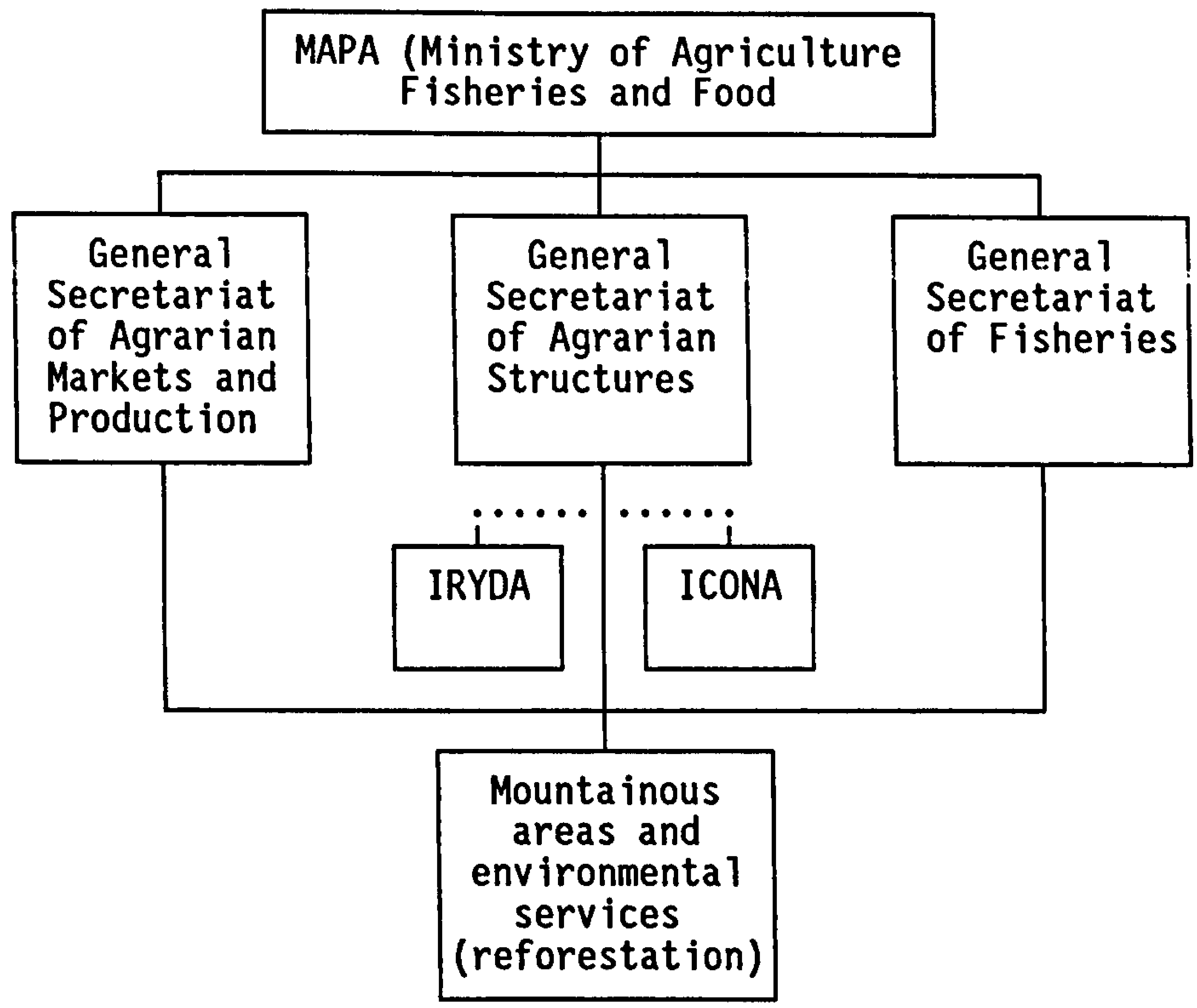
The organizational structure of ICONA at provincial level was transferred integrally to the Autonomous Government. The box in table 10, containing the Guadalajara Central Office (*Jefatura*), can



Compiled from Ministerio de Agricultura (1966)

Table 10: Forestry administrative structure

be found in table 12 under Provincial Delegation of Agriculture of Guadalajara, responsible to Consejeria of Agriculture and Environment in Toledo. Toledo, rather than the Central Government of Madrid, is



..... indicates these are autonomous organizations of MAPA

IRYDA, *Instituto Nacional de Reforma y Desarrollo Agrario* Institute of Agrarian Reform and Development

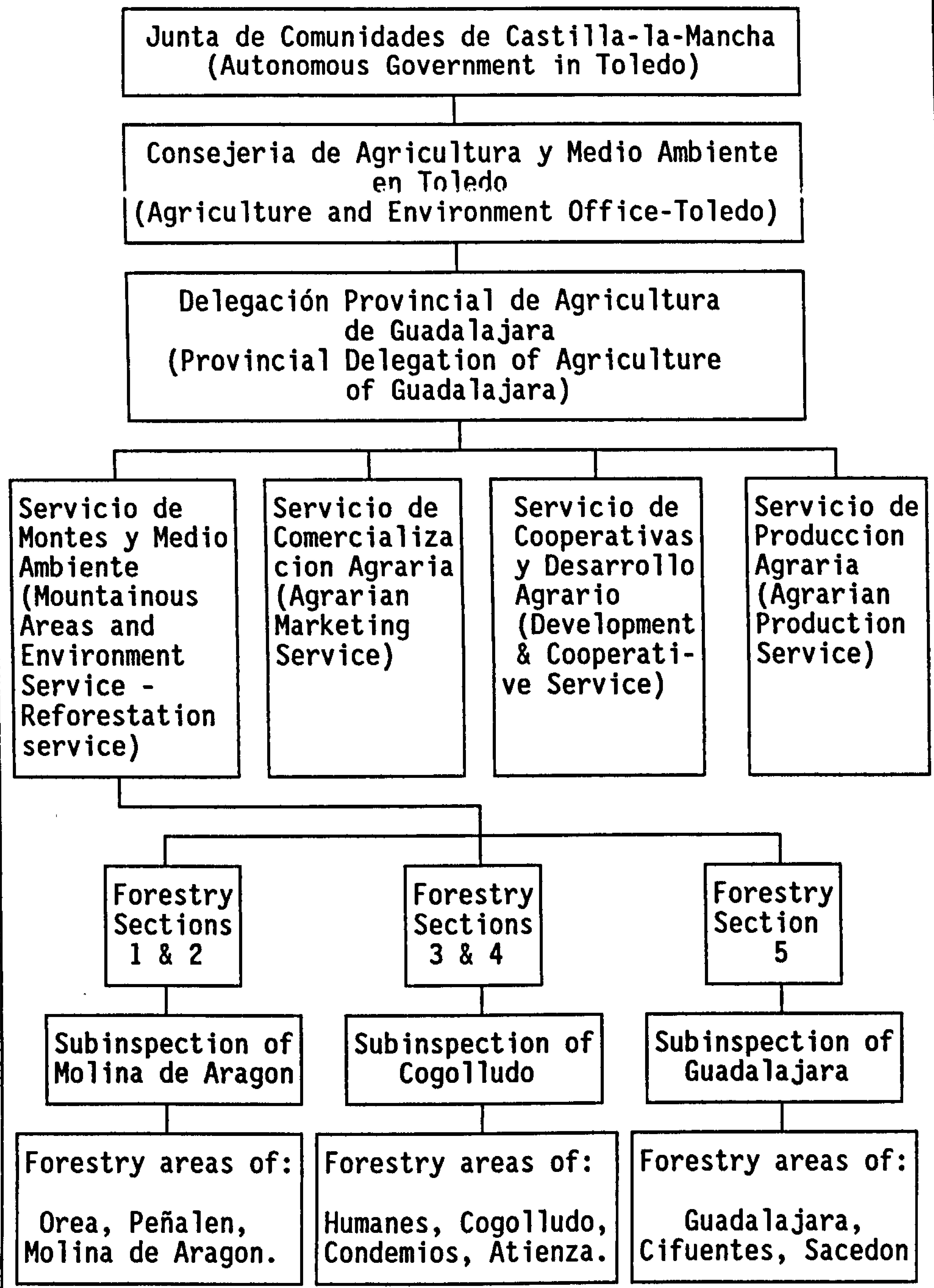
ICONA, *Instituto Nacional para la Conservacion de la Naturaleza* (National Institute for the Conservation of Nature)

Compiled from various sources

Table 11: Organizational structure of MAPA - ICONA

the seat of decision making for SWC and reforestation. ICONA's reforestation function continues at a much reduced level. Its main role is the conservation of nature, and the opening and managing new national parks and reserves, but it still carries out some reforestation work in conjunction with the autonomous regions.

The head of the reforestation service in each Province is appointed by the Autonomous Government of Castilla-la-Mancha and all the rest of the staff are selected through written and oral exam, *oposiciones*. In the Reforestation Service of Guadalajara there are three forestry engineers (including the head) with a university degree level qualification, five forestry engineers with a degree at Higher Education level (one of these with two degrees, one in agriculture),



Compiled from various sources

Table 12: Autonomous Government organizational structure for reforestation

and 67 forestry guards.

The *Consejería* of Agriculture in Toledo has offices in each Province called *Delegaciónes*. The *Delegación Provincial - Consejería de Agricultura y Medio Ambiente en Guadalajara*, is the corresponding office of the Autonomous Government in that Province. The *Delegaciónes* in turn have four main services, *Servicio de Montes y Medio Ambiente*, (the reforestation service), the service of agrarian marketing (*Servicio de Comercializacion Agraria*), the service of agrarian development and co-operatives (*Servicio de Cooperativas y Desarrollo Agrario*), and the service of agrarian production (*Servicio de Produccion Agraria*). Each of these services have their own technicians and officials working in some of the main towns in the Province. The area of study is administered from the forestry area office in Cogolludo which is also the seat of the Subinspection encompassing Humanes, Condemios and Atienza, belonging to the forestry sections 3 & 4. The Subinspections also deal with the administration for the other three services, marketing, development and cooperatives, and production.

Conclusion

The description of the physical conditions of the area provides a place-based context reference for the rest of the study. Conclusions such as those presented by the IBERLIM report, that mature pine forest, as in the example of Puebla de Valles, does not provide better conditions for SWC than *matorral*, and that the newly terraced reforested areas of La Mierla provide inferior conditions, contribute to the understanding of processes. These conclusions, coupled to the examination of areal photographs and field work observation, showing considerable colonization by *matorral*, indicate that to check erosion levels there was no need for reforestation.

Checking erosion by the PFE and ICONA has not been an easy task because of the complex interests in land use and the physical characteristics of the soil. These are not amenable to the use of heavy machinery, turning the soil, inverting horizons and making the situation worse than under undisturbed *matorral* conditions. The complex interests in land use are examined in the next Chapter in relation to the main reforestation projects effected in the area of study.

Improving the planning and implementation of SWC projects requires the understanding of these physical characteristics, the techniques used by land users and governmental agencies to tackle the problem, and the socioeconomic conditions responsible for processes of LD.

Although there were other options available to planners and land users, the socioeconomic and physical conditions of the area, and the economic and political interests of dominant classes, precluded a more successful result of the projects of SWC.

EU plans to reverse rural desertion and the protection of 'set-aside' abandoned land can be more successful if planning and implementation of reforestation practices for SWC are improved by encouraging greater participation of land users/owners. Understanding the socioeconomic and physical processes of LD is crucial to this improvement. An examination of the planning practices that contribute to decision making for SWC, which affects the physical condition of land, the social structure of the villages, and the organic structure of the administration, complies with some of the objectives of the thesis, namely the explanation of the workings of the State bureaucracy. This explanation can be more fully attained by assessing the possibilities and constraints of working through the machinery of the State, as identified by Blaikie above.

Chapter Five
Soil and water conservation projects in the area of study

Reforestation, as a form of land management for SWC must be examined in order to be able to explain socioeconomic processes of LD. This Chapter examines the planning and implementation procedures for SWC used by the reforestation successive agencies of the Spanish Government, the PFE and ICONA, from 1939 up to present days in the area of study. The main purpose of the detailed examination of the most important reforestation projects and rural development plans[1] in the area of study in this Chapter is to show the changes in their objectives, techniques and outcomes through time. The changing character of these projects and plans reflect the changing political situation, from autarky to modernization development strategies, and the decline in autocracy and technocracy in planning in the early 1980s.

One of the main problems with Spanish reforestation is that it has been approached as if it was an engineering project. In this thesis reforestation is considered to be a rural development project. Taking this into account, the first part of the Chapter looks at the reasoning behind both rural development plans and reforestation projects for Guadalajara Provincial. Rural development plans were those proposed and implemented by the Provincial Syndicate Economic Council (*Consejo Economico Sindical Provincial* - CESP), an office of the Provincial Government (*Gobierno Provincial*) of Guadalajara. Rural development plans referred to the reforestation projects in their documents, but the *Consejo* did not have decision making or management powers over them. The reforestation projects depended directly from the *Patrimonio Forestal del Estado* (PFE) (part of the Ministry of Agriculture (MAPA). The PFE became the Institute for the Conservation of Nature (*Instituto para la Conservacion de la Naturaleza* (ICONA) in 1972.

The Governor, appointed by Central Government, in charge of the *Gobierno Provincial* institutionalized economic and political matters

[1] In this Chapter the word 'plan' is used to refer to those arrangements of rural development plans proposed by CESP (discussed below), and projects refer to those by the reforestation office in Guadalajara.

in the provinces in the late 1950s. Rural development plans were devised at national level at five year intervals. They encompassed the modernization of agrarian production through electrification, mechanization, improved management and land use practices, and the re-structuring of agrarian production. Re-structuring was to be accomplished by land consolidation, the formation of agrarian cooperatives or syndicates, or the eventual departure of the less competitive households from production (CESP). It was estimated that the land of those abandoning agriculture would be worked by more competitive farmers, increasing their productivity further through a economy of scale - more consolidated land, machinery, and fertilizers.

This shows that although development plans took account of economic or social conditions, these were based on macro-provincial assessments rather than on appraisal criteria of socioeconomic and physical conditions for village based or water catchment areas. The first section of this Chapter shows how reforestation project planning procedures carried out limited ante-project physical evaluation surveys and token evaluation of socioeconomic conditions. This is ascertained by examining some important projects in the area of study.

Another, relatively recent example of SWC planning is provided by the reforestation of 'set-aside' land. The second part of the Chapter looks at the planning and implementation of this policy as an example of the ongoing influences of past technocratic practices in reforestation planning. Successive Spanish Governments assumed the problem of erosion and the measures needed to solve it were best tackled by technical specialists, mainly forestry engineers. This resulted in the narrow professionalization and composition of teams of officials in charge of SWC projects, mainly to protect dams from siltation and for the production of wood. The third part of the Chapter assesses the professional structure of the forestry administration and the social cohesiveness of rural communities to ascertain their limitations and strengths for the possible promotion of participation in project planning and implementation.

i. Past experiences

The political and economic blockade exercised against the Spanish

Government which took power in 1939, had important repercussions for rural development. Shortages of working animals, manure, fertilizers, tools, machinery, seeds, etc. reduced production output affecting the wellbeing of the rural population and the condition of soil. In 1944 and 1945 farmers' organizations reported the total absence of lime phosphates and the severe shortages of sodium nitrate for cereal production. Shortages of nitrogen and phosphorous based fertilizers were responsible for low production (CPAGG, 1944). This situation lasted well into the 1960s. Etxezarreta and Viladomiu (1989) explain that:

> At the beginning of the 1960s, 42 percent of the employed population of Spain was still agricultural, producing 23.6 percent of Gross Domestic Product (GDP). The utilisation of chemical fertilisers was very limited, most agricultural inputs were produced within the farm itself, machinery was scarce - only 35 000 tractors for the 2 900 000 farms - technology was very traditional and productivity very low (pp157-158).

This section examines the elaboration and implementation of reforestation projects as part of larger attempts to plan the development of Guadalajara Province. Development plans and reforestation projects were greatly influenced by emergent modernization postulates and technical considerations in the 1950s and 1960s.

Guadalajara Province in the 1940s and 1950s was considered to be underdeveloped in comparison with the rest of the country. Silvopastoralism and reforestation for wood production were identified in the first development plan assessment for the Province (CESP, 1959), as two important economic activities. The introduction of reforestation was depicted as a measure to improve the living conditions of local people and the nation.

It was not until the early 1950s that reforestation plans were extensively implemented. According to CESP (1959) the area reforested between 1939 and 1957 in the province was 12,773 Ha, with little of it done before 1952, when the pace of reforestation was increased. The area reforested in 1957 was 2,849 Ha, or 22 percent of the total since 1939. After 1957, the PFE plans for the province were to reforest 3,000 Ha annually. To increase the pastoral area and relieve the existing natural forests from grazing pressure, it was proposed that 7,504 Ha of pasture should be created in the

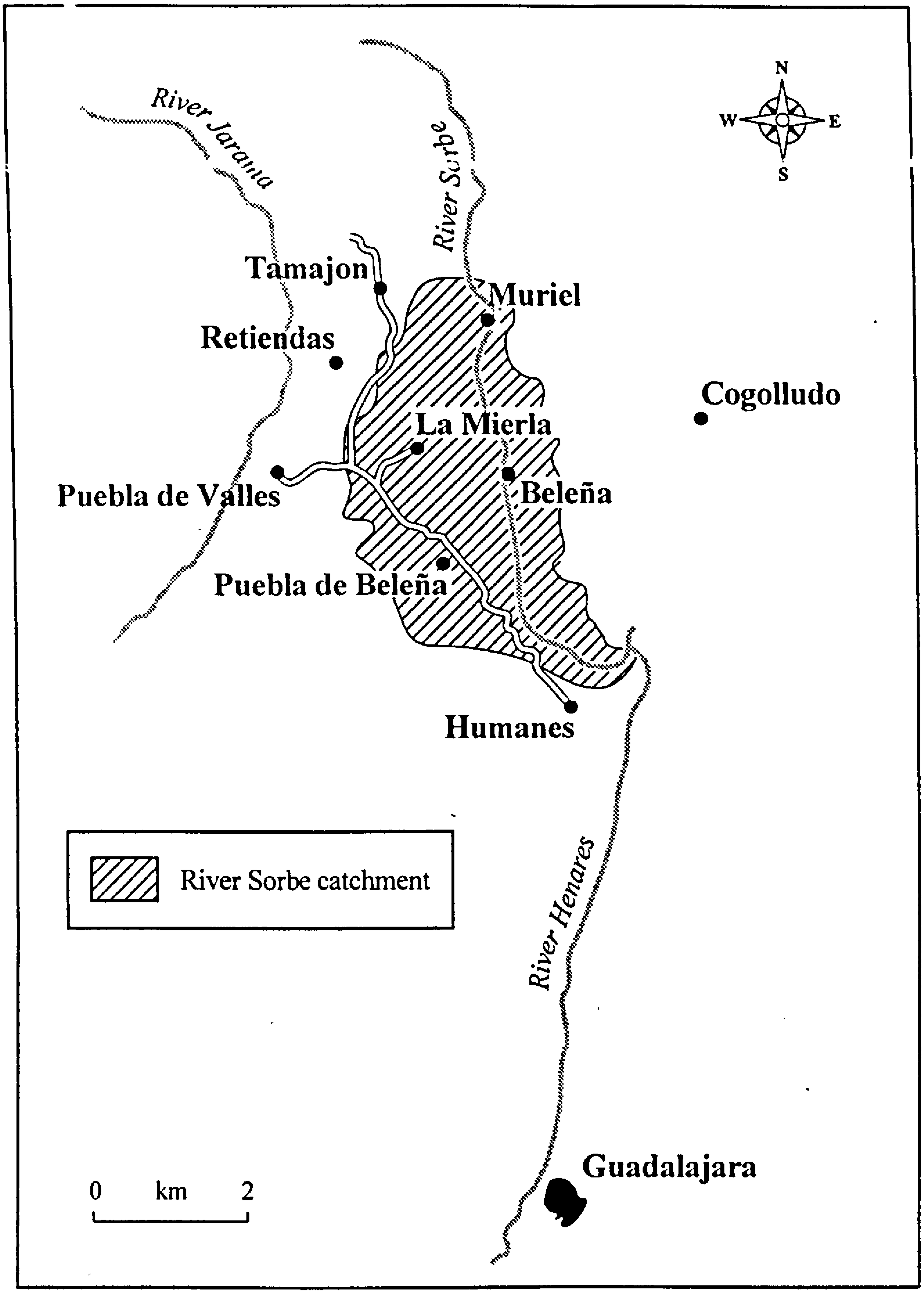


Figure 12: Water catchment area River Sorbe surveyed in 1943

Area, year of project & fig.No.	Project No. & forest No.	Year of refo resta-tion	Arran-gement	Objec-tives	Method	Tree species	Land use Ha. Pasture Agric.
R. Sorbe 1943 fig. 12	03/29/ 0003		Exprop.	Protect. Regene-ration	L.I. Sowing L.M.	M.PP. QI.Q.W.	
La Mierla 1944	03/29/ 0004		"	"	"		Pasture 285 Ha. Agric. & Exclusion
Puebla de Valles, 1946, Fig. 9	Exprop. Docs GU 1004	1948	"	Protect.	"	PL. PP.	Pasture & Agricult. Exclusion
La Mierla 1950 Fig. 12	03/29/ 0005		"	Protect. & Regene-ration	"	M. PP. QI. P. A. W.	Pasture 95 Ha. Agricult. Exclusion
Retiendas 1952, Fig. 10	Exprop. Docs. GU 3029	1953	Consor-tium, PFE	Protect	"	PP. PL. PS.	Pasture & agric. Exclusion
Retiendas 1952 Fig. 10	Exprop. Docs. GU 3034	1958 to 1962	Consor-tium PFE	"	"	PP. PL PS.	Pasture & Agricult. Exclusion
Retiendas & Tamajon 1956, Fig. 10	03/28/ 0013	1958	Consor-tium & exprop.	Protect & Pro-duction	LI. LM Dyna-mite	PP. PL. S. P. E.	Pasture & Agricult. Exclusion
Retiendas & Tamajon 1957 Fig. 10	03/28/ 0014 & GU 3010 & 3019	1958?	Consor tium & exprop	Protc & prodtn	LI. LM Use of dyna-mite	PP. PL. PS. P. E.	Pasture & Ag. ex-clusion
P. de Valles 1960 Fig. 13	03/28/ 0018 GU 6007	?	Exprop Consor-tium	"	LI. LM Use of dyna-mite	PP. PL. P.	Pasture 110 Has. Agricult. Exclusion

LI. (labour intensive). LM. (local materials). Mch. (mechanized methods). Trr. (terraces for plantation). A. (acacia). P. (poplars). PP. (*Pinus pinaster*). PN. (*Pinus nigra*). PS. (*Pinus silvestre*). PL. (*Pinus laricio*). QI. (*Quercus ilex*). W.(willow). M. (*matorral*). E. (elm).

Table 13a: Survey and reforestation projects .../...

Area, year of project & map No.	Project No. & forest No.	Year of refo resta-tion	Arran-gement	Objec-tives	Method	Tree species	Land use Ha. Pasture Agric.
P. de Valles 1964 Fig. 13	03/28/ 0026 GU 3085	1960	Exprop. Consor-tium	"	"	PP. PN P.	Pasture 200 Has. Agricult. Exclusion
Palanca-res 1968 Fig. 14	03/29/ 0032 GU 1037	1973?	Exprop	"	Mch. Terr	-	Exclusion
La Mierla 1968. Figs. 14 & 11	03/29/ 0032 GU 1030 GU 1035	1974 to 1979	Exprop	"	"	PP. PN.	"

LI. (labour intensive). LM. (local materials). Mch. (mechanized methods). Trr. (terraces for plantation). A. (acacia). P. (poplars). PP. (*Pinus pinaster*). PN. (*Pinus nigra*). PS. (*Pinus silvestre*). PL. (*Pinus laricio*). QI. (*Quercus ilex*). W.(willow). M. (*matorral*). E. (elm).

Compiled from various sources

Table 13b: Survey and reforestation projects

province in the following 15 years after 1959, and 25,184 Ha in the long term future (CESP, 1959: 17).

The development plan (CESP, 1959) asserts that the general condition of natural forests was in regression as a result of agricultural expansion into marginal land and the prevailing grazing of animals on recently cut natural forests (p,122). One of the first reforestation projects (Proyecto 03/29/0003) after the Civil War, carried out an ante-project survey of the water catchment area of the River Sorbe in 1943 (figure 12, and table 13a). This table provides a list of the reforestation projects, showing the shift in emphases in terms of purpose of reforestation and the techniques used. As it can be seen from the third colum of this tabe some of these projects were planned but never implemented. This and all other ante-project surveys examined below, except when stated, did not base their final project proposals on measurements of erosion, interception by vegetation, or sediment yield, but were visual ante-project surveys of the geographical area by forestry engineers. The ante-project survey for this water catchment area advises that areas with more favourable conditions for agriculture should be classified and registered as agrarian land, rather than as forest land, in order not to curtail the already meagre resources available to land users. This project was never implemented because land was not classified as 'most appropriate for forestry'. If this would have been the case, according to proposals of the project, there would be greater pressure from official circles in the reforestation office to enforce policy and deprive peasants of land to plant their crops. The project, however, proposes the expropriation of all land for reforestation, except an undefined area around each village considered to be more fertile and sufficient for land users subsistence, showing some divergence of ante-project 'survey' from project proposal. Greater return, it was argued, could be obtained from forest plantations. This return, because land would have been expropriated, obviously would accrue to the State.

One of the projects stemming from this first proposal was in La Mierla (Rico Jimenez, 1944), Proyecto, 03/29/0004. Although never implemented the objectives and the way this project was planned and was to be managed in 1944, can be contrasted with the one actually executed in the 1970s, and others effected in nearby areas. This project, affecting 2,021 has of land (see table 13a) assessed the social and economic conditions of the area, but rejected people's requests. Five land users objected to the way the reforestation plan was designed and requested that a 'corridor' be left unreforested to provide access to drinking water for their animals. The request was rejected but reforestation was not executed until the 1970s (see figure 11).

The forester in charge of the ante-project survey of the River Sorbe and elaboration of La Mierla project, Rico Gimenez, recommended the reforestation of gullies as a form of protecting the projected Beleña dam from siltation. This dam was planned to provide drinking water for Madrid. The legal planning sequence was that the ante-project surveyed area was declared of 'public utility', giving the Government the legislative right to, if necessary, expropriate 'urgently' and carry-out reforestation. The project proposed the acquisition of land in La Mierla through expropriation for reforestation.

The reforestation techniques proposed for the 1944 La Mierla project included the use of local materials, such as *matorral* and stone, the careful selection of appropriate sites suitable for particular tree species and *matorral*, the improvement of existing pasture, and regeneration of natural forests. An area of 1,333 Ha was to be reforested with *Pinus pinaster* and *Quercus ilex* planted in hand dug holes. Poplars, acacia and willows were to be planted on the gully floors and *Cistus ladanifer* sown in the steeper gully walls.

The project recognised that the existing *Cistus* and *Rosmarinus* vegetation would cause problems of growth for the newly planted trees. These problems, however, would be infinitely smaller than those arising if this *matorral* was removed, causing erosion and sedimentation. This project clearly concedes the value of *matorral* against LD. Slowing down surface runoff and trapping sediment would be achieved by the construction of 319 stone check dams and other dams constructed of natural vegetation. The vegetation check dams would be constructed out of 11,385 bundles of *matorral*, tied up with wire and fixed to the ground by willow poles. This type of approach to SWC meets some of Belshaw's et al (1990) technical criteria to become 'a suitable intervention'. Belshaw et al assert that exploring ways of "designing suitable interventions" for LD control must be low-cost, maximize local participation, build-up intervention on local expertise, use local materials such as vegetation rather than structures and enjoy institutional support and co-ordination (p.86).

In 1945, a modified version of the project acknowledged that reforestation would mean the exclusion of pastoralists from these areas. The expropriation of 1,403 Ha of pasture land would also reduce pastoralism considerably, causing further economic sacrifices on the part of land users. Two main measures proposed to compensate for this loss of income were, one; compensation in wages from work in the reforestation project, and two; by the improvement of pasture land.

The changes in pastoral practices proposed would have left land users worse off: the project proposed the provision of 285 Ha of improved pasture able to support 3 sheep per hectare per year, a total of 855 animals. Taking into account that there were 1,200 goats and 750 sheep in the village, the proposal constituted the elimination of goats and a slight increase in the number of sheep.

The loss of the whole goat population would affect the most disadvantaged sections of the population most. The eradication of goats was an important part of the protection strategy regardless of the social and economic consequences. This approach epitomises the dominant ideology of the Spanish State. The development plan for the Province (CESP, 1959), justifies the need to eradicate goats, more because they are representative of extreme poverty than because of the damage they cause. In societies where the standard of living is higher and work is more 'dignified', it is reasoned in this document, goats disappear. Goats should be restricted to unproductive stony areas, releasing other land they use to reforestation (p. 144). The poor and their 'undignified' work, according to fascist planning reasoning, had to be removed so their poverty was not obvious. The plan assumes the benefits provided by forestry to compensate goat herders for the loss of income. What it does not explain, however, is how alienated goat herders would obtain an income in the period between the end of plantation work and expected logging many years after.

The regeneration of the *Dehesa del Pueblo* (195 Ha) (see figure 11), was considered to be an uncomplicated task. Shoots from *Quercus ilex* roots were springing at some distance from regrowth of existing trees. *Quercus pyrenaica* and *lusitanica*, and *Juniperous oxicedrus* were also present in considerable numbers. The project recommends the plantation of *Quercus ilex*. Foraging by rodents would have had a devastating effect on the plantation if it had been attempted using acorns. The regeneration of the *dehesa* would also imply initial exclusion of pastoral practices and a reduction in household wood fuel available. The reduction in the number of animals, the rejection of a passage for animals to drinking areas, and the reduction in wood fuel, would have made the already fragile economy more flimsy, and cause tensions and long term distrust between land users and Government officials.

Although early reforestation plans were a reflection of the political ideology in power, at least the technical approach envisaged, using local materials and improving vegetation, would have given better SWC results than the construction of terraces and the indiscriminate removal of vegetation. Although terracing was not used until the 1970s, changes in techniques can be detected well before that.

The surge of the technocratic approach becomes more apparent in the changes made to these earlier 1943 and 1944 projects. The proposal to reforest 5,526 Ha in La Mierla and other water catchment areas of the River Sorbe in 1950 (Blein Zaragoza, 1950), Proyecto 03/29/0005, was modified in practice. This project envisaged a clear reduction and 'modernization' of pastoral management in the village, as shown in Table 13a. In 1950 the project contemplated the construction of 66 livestock night shelters and an unspecified number of other refuges with access to sheep pens and drinking places in the area comprehending various municipalities affected by the reforestation of the water catchment area of the projected Beleña dam, above the village of Beleña as shown in figure 12.

Table 14 compares the figures of 1945 with those of 1950 for these two projects. It can be seen that the number of Has of pasture, the numbers of animals, and more significantly the carrying capacity of the land (the number of animals an Ha of land can sustain for 1 year without irreversible degradation) have been reduced. These reductions are not explained in the documentation of these projects.

	Pasture Ha	Sheep	Carrying capacity	*Q.ilex*	Conifers
1945	285	900	3.15	195	1138
1950	95	282	2.96	195	1138

Source: Compiled from Proyecto 03/29/0003-0004 & 0005

Table 14: Pasture and reforestation figures for 1945 and 1950 in La Mierla

Since the reasons of these changes are not explained, these can only be speculated upon. The construction of animal pens and drinking places indicate a move towards intensive rather than extensive animal production. It can be assumed that if this was the case, these would have made possible an increase in the number of animals without impinging on the existing natural pasture areas. However, taking into account the shortages in farming inputs and the limited capital accumulation capabilities of the subsistence production system of these areas. a proposal for intensive pastoralism can only be considered as unrealistic, or as a sidetracking excuse to support the desirability of reforestation.

Neither the reforestation project nor the development plan attempted to evaluate, not even mention, the likely negative social effects of imposition of reforestation, nor conversely contemplated the gains that could have been made from land users' collaboration. Although they showed concern for the likely social and economic effects that a reduction in land available for agriculture would imply for local populations, these early projects confirmed that reforestation was principally undertaken because of national priorities, including the protection of soil and reservoirs.

Following this line of thought the 1959 Provincial development plan calls for the gradual transformation of economic activities to avoid harming the economic interests of the subsistence-based peasantry. However, it does not indicate how to achieve this in the event of reforestation taking place. The plan claims concern about the likely detrimental effects a change in the use of forests, from household wood fuel source and pastoralism, to wood for industrial use, would have on the local economies (CESP, 1959: 132). Nevertheless it condemned villagers to a more 'dignified' but unspecified form of living by curtailing access to pasture for their animals and wood fuel in the reforested areas. The drive for reforestation had a direct and long term effect on the condition of land and the exacerbation of antagonistic social relations between Government and land users.

Successive reforestation projects and the development plan for the Province (CESP, 1959), although illustrating the protective function of reforestation, also argue its wood productive potential (p.139). Unlike La Mierla, which was not expropriated nor reforested until the 1970s, Puebla de Valles had 336 Ha of land expropriated in 1946 (see figure 9, and table 13a) resuming reforestation in 1948 (Cuarta Division Hidrologico Forestal, 1943?).

Expropriation policy contributed to a climate of distrust which was aggravated by the ruthless and often dishonest forms in which it was implemented. When the land expropriated for Puebla de Valles was surveyed, it was realised that there were another 100 Ha which had not been legally registered. The PFE's reforestation office in Guadalajara proceeded with legal registration without further compensation for land which, because it had been traditionally used for generations, legally belonged to its users. The area is registered as property of the PFE as reforested area GU 1004.

The first reforestation of 300 Ha was carried out in 1948. The rate of failure of this first part of the project is striking. Table 15 shows the amount of initially reforested area and the areas which because of failure had to be replanted.

The reasons for the high levels of failure may have been the use of seeds (90%) instead of plants, but a contributing factor could be the opposition of villagers to the expropriation and reforestation of the area[2]. Reforestation was done through hand dug holes using seedlings of *Pinus nigra* (Austrian variety) (10%) and sowing *Pinus pinaster* (90%) in furrows ploughed by animal traction. Efforts were made to

Year	Reforestation (Ha)	Cost pts.	Reposition (Ha)	Cost pts.
1948	300	211,634		
1949			174	216,000
1952				
1953			>237	538,432
1954				
1955			87	114,246
1956			70	91,171
1958			28	76,960
1960	90	420,101		
1962	30	163,476		
1963	16	117,841		

Source: Cuarta Division Hidrologico Forestal

Table 15: Plantation and reposition of failed plants in Puebla de Valles (GU 1004)

leave the existing vegetation undisturbed in order to avoid greater erosion. The eventual accomplishment of the project was achieved after repeated reposition of failed planting and sawing. Other measures for sedimentation control were the construction of stone check dams. A house for the forestry guard was build nearby the village.

The estimated duration of the plantation before it could be logged

[2] Some of the reasons for this failure are explored in Chapter Seven when analyzing data from interviews with land users who worked in the reforestation project.

was 100 years. Logging as part of maintenance work, however, was carried out in 1960, 1963/64, 1969/70/71, 1985 and 1990. Areas where the plantation was more than 22 years old (170 Ha), produced 232.2 metric tons of logs and 29.4 of tree branches in 1970. These were sold to the wood manufacturing industry.

The reforestation projects of Retiendas are an example of the agreement reached between Government and the owners of land affected by a reforestation project. This agreement, called a consortium, was between the local *municipio*, private land owners and the PFE. This consortium agreement made in 1952 for forest GU 3029 (see figure 10, and figure 13 in the next page) comprised the *municipio* who contributed 150 Ha of land, and the PFE.

Under consortium arrangements the PFE, and at a later stage ICONA, were in charge of the technical and administrative aspects of the project. Reforestation through consortium was free of charge for land owners which may be private or institutional such as *municipios*. Twenty to forty per cent of the value of wood during the first stages of commercial exploitation was for land owners and the rest for the PFE to recover plantation expenses. When these expenses are recovered the proceeds derived from the sale of wood pertains to the owner of the land, be it private or a village council. Many of the consortia were established with village councils. The reforested land of Retiendas, although under the management control of the PFE, continues to be the property of the *municipio*. The PFE paid for the cost of reforestation and is responsible for its conservation, improvement, technical management, and administration. The benefits from logging are shared in a proportion of 65 percent for the PFE and the other 35 for the *Municipio* of Retiendas.

The ante-project survey report for this area does not acknowledge the existence of any natural trees. Under the *matorral* classification, however, the survey notes the high vegetation density and its composition of *Cistus ladaniferus, Quercus ilex, Juniperus, Sabina* and other tree and *matorral* species. It must be noticed that in its efforts to promote the plantation of fast growing species, the PFE often played down the importance of natural trees. In the case of GU 3029, natural trees, which because of overuse were in a dwarfed condition, were classified as *matorral* of small forest value. The

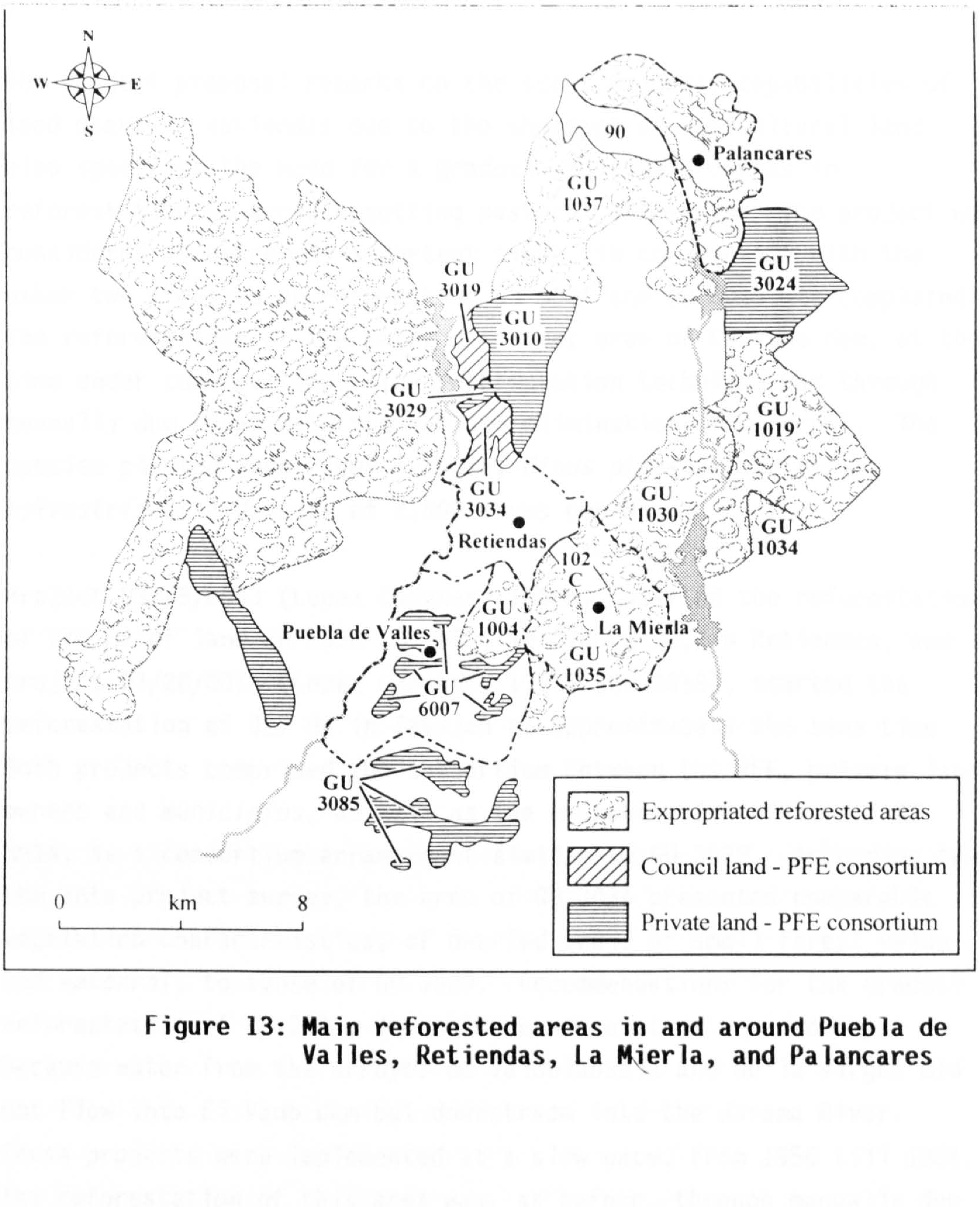


Figure 13: Main reforested areas in and around Puebla de Valles, Retiendas, La Mierla, and Palancares

importance of natural trees in that area, however, becomes evident in other related documentation. Correspondence between the PFE and the Council lists 33 oak, 58 elms and 6 *Quercus ilex* which were pulled down for the construction of the forestry track within the area of Retiendas and Tamajon (see figure 10).

The project proposal remarks on the scant economic capabilities of land users in Retiendas due to the shortage of agricultural land. It also specifies the need for a gradual and slow progress in reforestation to avoid upsetting pastoral interests. The project was considered as extremely important since, in conjunction with the other two areas to be reforested, GU 3034 and GU 3019, it completed the reforestation of the water catchment area of El Vado dam, at that time under construction. The reforestation technique was through manually dug holes with the partial elimination of *matorral*. The species planted were *Pinus laricio*, *Pinus pinaster* and *Pinus sylvestris* at a density of 2,500 trees per Ha.

Project 03/28/0013 (Lopez Cadenas, 1960b), started the reforestation of 370 Ha of land in 1958 (GU 3034 in figure 10, in Retiendas, and project 03/28/0014 (Lopez Cadenas, 1957) (GU 3019), started the reforestation of 327 Ha in Tamajon at approximately the same time. Both projects comprised the consortium between the PFE, private land owners and *municipios*, as well as the expropriation of land. GU 3034, is a consortium arrangement similar to GU 3029. According to the ante-project survey, the area of GU 3034 presented comparable vegetation characteristics, of dwarfed tress of small forest value and *matorral*, to those of GU 3029. Recommendations for the gradual reforestation of GU 3034, it could be speculated, were perhaps because water from the *arroyos* de Valdelabadia and de la Virgen did not flow into El Vado dam but downstream into the Jarama River. These projects were implemented at a slow pace, from 1956 till 1964. The reforestation of this area was, as before, through manually dug out holes and sowing of *Pinus pinaster*, *laricio* and *sylvestris*. The density of the reforestation was 2,500 trees per hectare and the minimum period of pastoral exclusion was 10 years. Elm and poplars were also planted on the gully floors.

The careful concern not to disturb existing vegetation to avoid erosion shown in the 1943 and 1944 projects, changed in the Retiendas and Tamajon projects to the use of explosives in order to level out some of the steeper gully walls to make tree planting easier. The use of explosives was approved by the Ministry of Agriculture with the condition that they would be utilized in an experimental basis to be considered for other projects.

Possibilities for the improvement of the existing land management [such as through improved pasture and pastoralist practices], to provide greater soil protection and support the local economy, were abandoned in favour of a wood productivist strategy (Groome, 1990; Garcia Dori, 1994). Lopez Cadenas, the forester who drew up the Retiendas and Tamajon projects and project 03/28/0019 (1960a), emphasize the increase in the value of land when reforested. He calculated that the likely economic return from logging to be as high as 1,500 pts. (at then current values) per hectare/year. These are examples of the dichotomy between what is still portrayed by the reforestation office in Guadalajara as the main objective of reforestation, protection, and the need to recover reforestation expenses by the State, i.e. production. The way the 'protection'/production of land was planned, because of its long term investment and the reduction in land available for pastoralism, was not in the interests of local land users. It excluded them from land indefinitely, greatly reducing their already meagre incomes.

Project (03/28/0018) drafted by the same forester, Lopez Cadenas (1960c), for Puebla de Valles, was only partially implemented in scattered areas of land (shown in figure 13, as GU 6007). The only physical measurements carried out by the study for this project are those of runoff flows in the main gully floors. As with the other projects above, no studies of erosion, sediment yield or soil protection by vegetation were carried out. The proposal for this project considers that the classification of 318 Ha of this area as 'agricultural land', in the previous ante-project survey (as discussed above), had been more in response to the need of the local economy of subsistence agrarian production than to a rigorous scientific classification. The project considered that the production effort made by peasants in this area was a worthless endeavour, because of the extreme temperatures, the variability of rainfall, the irregularity of the terrain and the old-fashioned cultivation methods used. It calls for the introduction of modern machinery. Unlike the projects in Retiendas, this project intends to create 110 Ha of pasture out of the affected land to compensate for the loss of land due to reforestation. Land for reforestation would be obtained by the PFE through expropriation or through consortium with the *municipio* of Puebla de Valles and private land owners. The specified objectives were protection against soil erosion as well as an economic return from logging in the long term. The reforestation of 1,444 Ha and the construction of 33 Km of forestry roads emphasizes the intention of logging for wood production. In reality a much smaller area, as shown in figure 13 was reforested.

The veiled argument for the reclassification from agricultural land to forest land made by Lopez Cadenas in the project above is also present, in a more open form, in the documentation of the development plans for Guadalajara Province. The development plan (CESP, 1960a) explains the condition of land as the result of the careless and 'suicidal' attitude of land users who did not think of the future consequences of their actions. The plan argues that the protection of existing and projected dams required the reclassification of land. Out of the 1.22 million Ha in the Province, 55.000 Ha should be classified as solely suited for forest production and never be allowed to be used for agricultural production again. This plan emphasizes that reforestation was seen as having not only a protective function, but also productive and social functions, both immediate and in the longer term. The immediate function was providing employment to local communities, and the long term one the reduction of wood deficit in the country.

This plan, concerned about the low productivity of land users in the Province, is an indication of the 'modernization' drive in Spain. It proposed changes in agricultural practices and in the social structure of production through greater mechanization. The use of modern ploughs, tractors, harvesters. etc. would make a reduced number of land users more productive, releasing the surplus labour for work in the incipient industries or in newly colonized irrigated land. Lack of manure, it was suggested, could be corrected by ploughing in leguminous plants and increasing the animal stock. The plan advised against the burning of stubble and straw and proposed its use to feed the animals to make manure.

Apart from the agreement between development plans and reforestation projects about the need for the reclassification of land, there was great divergence between them in the way projects should be approached. This is reflected in the differences in sections dealing with proposals for reforestation and for agriculture in the documentation of the development plans. The agricultural development section in the plan (CESP, 1960a) explains that areas of marginal land at higher altitude, unable to compete with more productive capitalist agriculture and the gradual introduction of modern machinery, helped to accelerate the process of social differentiation - the abandonment of the less productive land by the poorer households and migration to the cities. The abandoned land would be incorporated into that used by the already more successful farmers using modern methods of production and able to sustain a working, albeit reduced. Large numbers of subsistence farmers of marginal land migrated to work in the industries of Madrid and Barcelona and their less productive land was abandoned. The plan saw social differentiation and migration as a natural result of modernization and it proposed to increase and improve the areas of pasture and reforestation to stimulate the rural economy for those farmers who did not migrate. These were visualized as modern farmers fully integrated in the capitalist system of production using modern methods rather than a continuation of traditional practices for subsistence. It proposed that leguminous plants could be partly grazed and partly ploughed into the soil to increase pasture and soil fertility, as a means of improving land management. The use of the existing natural forests should be improved by converting them into *dehesas* for silvopastoral use and lengthening the time of pruning and logging for household wood fuel or charcoal making.

Apart from this proposal to improve existing natural tree areas and reforested areas in an integrated agrosilvopastoral form and the 1943 and 1944 reforestation project's proposal to use local materials, no other reforestation project nor development plan proposed the improvement of *matorral*.

The social and economic effects of reforestation on pastoralism were played down in the forest section of the development plan (CESP, 1960a). Reforestation was justified on the basis of protection, profitability, and the reduction of seasonal unemployment in agriculture. This section explains that the 12,000 Ha reforested until 1960 were a mere 1.7 percent of the whole area used for pastoralism in the Province, 170,000 Ha. It argued that although animals were excluded from grazing in the reforested areas, this would not have an impact on animal production. Relating the whole area of the Province to the reforested area is misleading because villages such as Puebla de Valles, Retiendas or La Mierla had a great percentage of their land reforested, while in other villages no land was reforested at all. The forestry section of the plan proposed the reforestation of 3,000 Ha per anum and the creation of 25,000 Ha of pasture in 15 years.

The section dealing with reforestation in the CESP development plan (1960b) recommends the extension of forestry roads, the reforestation of water catchment areas with fast growing species, a change from existing species to fast growing species (if considered economically beneficial), and the reduction of pastoralism. Apart from the protection of reservoirs, the reforestation of 195,000 Ha in the water catchment areas of the Province are justified to protect roads, villages, providing employment, as well as the production of wood, resin, firewood and other products. To improve the productivity of land users this section proposes land consolidation and the promotion of local communities' interest in new methods of land management to avoid degradation. Most of these 'new methods' meant the use of modern machinery,

While the reforestation approach in the projects of PFE and within the forest sections in the CESP's plans is unequivocally based on fast growing species, consequent development plans tried to modernize agriculture and pastoralism by making use of existing social and economic structures comprising the abandonment of more fragile land. The CESP questioned the viability of the existing unit of production, the household, because of the small size and scattered distribution of its plots (CESP, 1962). The negative effects of differentiation and migration were seen as unfortunate but necessary to ensure the prosperity of agriculture. The ability of the peasant household to survive in the face of adversity by jumping from a subsistence economy to a capitalist one, and vice-versa depending on circumstances, or combining agrarian work with employment in public works, was seen as a constraint for the modernization of the agrarian sector. This ability to survive and their reluctance to migrate to the cities to work in the emerging industry is explained in the development plans as part of the conservative character of land users and their attachment to village life. The 1962 plan explicitly states the reduction of 10,000 households in the Province, amounting to about half of the rural population, as desirable for the modernization of agrarian production. The remaining land users would have access to larger consolidated plots where modern machinery for agriculture and intensive/extensive animal production would be combined. By 1962 land consolidation effected in 26 Municipalities had already covered 31,500 Ha and the plan envisaged the consolidation of another 100,000 Ha in the next 15 years. The modernization, through rationalisation, of pastoralism required the creation and improvement of pasture, and the construction of buildings to facilitate intensive animal production mainly based on animal feed. The main social and economic constraints which the plan suggested could threaten the successful 'take-off' in agriculture were the low accumulation and capitalization potential of the household, land users' irrational attachment to their property and their lack of motivation for collective action (the formation of cooperatives).

The following plan (CESP, 1964) acknowledges the social alienation experienced by those abandoning their land and migrating to the cities and calls for greater State organization to mitigate the distress caused by their migration. In contrast with the former plans which focused on the irrationality and backwardness of land users, this plan identifies and examines the variety of the products, the small size of each unit of production, and the small, closed, and self-sufficient market conditions in the area, as reasons for the resilience of the household and subsistence economy in the area. In its evaluation of the previous plans it concludes that land consolidation did not result in a parallel formation of cooperatives, as envisaged would happen in previous plans, which would encourage economic activity providing employment, but finally resulted in land abandonment.

The assessment, by the 1964 CESP, of the results of the previous plans to modernize agriculture through greater mechanization, concludes that these were only partially successful. The greater investment in machinery was counterproductive because the high interest payments which these incurred drastically reduced accumulation, capitalization and investment in further agrarian production. The evaluation concludes that nothing had been achieved as regards the proposed regulation of agrarian activities, such as pastoralism, cereal production or integrated forestry use for soil protection. The plan (a reflection of Central Government decrees for agriculture) calls for a national approach to agricultural development which takes into account the geographically diverse social and economic conditions of Spain. The CESP in Guadalajara emphasised the backward conditions of its agrarian structure coupled to the mountainous and isolated character of its geography, and argued for greater help from Central Government.

The PFE, however, persisted in regarding reforestation as a form of compensation for the low levels of accumulation in the Province. Reforestation project 03/28/0026 (1964), proposes the reforestation of an area south of Puebla de Valles, GU 3085 (see figure 13). The project emphasizes the need for soil protection through forestry plantation in abandoned land of such small productive value for anything else but second-rate extensive pastoralism with goats. Although the project is justified on protection grounds, it calculates that wood production from plantations (1,025 Ha) of *Pinus pinaster* and *Pinus nigra* would yield more than 2^3 metres Ha/annum and 10^3 metres from the poplar plantation. The productive expectation of the plantation is stressed by the construction of 7 Km of forestry roads. The project proposed the creation of 200 Has of pasture, to compensate land users for their exclusion from this land.

The land for the plantation of this area was to be acquired by the expropriation of 1,511 Ha. In reality, a smaller area was reforested, that of GU 3085, as shown in figure 13. The plantation method was by sowing in 65 cm. wide terraces constructed by ploughs pulled by animals and using dynamite to bring the steeper gully walls down for plantation.

Although the water catchment area for the River Sorbe had been surveyed for reforestation in 1943 and 1944, it was not until 1968 that this project was reconsidered and eventually implemented. Project 03/29/0032, covering a much larger area than the previous one, (compare figure 12, with figure 14 in the next page), explains that the reforestation of the area in 1944 had been interrupted because of social problems caused by the exclusion of pastoralists from the planted land. Even in 1968, when pastoralism was in clear decline, the project recognizes that this still was one of the most important economic activities for land users in the area, yet it was still felt that appropriation of land for afforestation was justified on the grounds of higher profitability.

Within the surveyed area, land on the eastern part of La Mierla (figure 15) and most of the land from Palancares (figure 16) was to be reforested. In Palancares 1,570 Ha out of the entire 1,892 Ha of municipal land was seen as in need of reforestation. The area of Palancares is described as insufficiently covered by *matorral* leaving the soil exposed to erosion. Although this ante-project survey (03/29/0032) in 1968 was intended to serve as guidance for the elaboration of the final project of reforestation, it does not specify the form of reforestation but proposes the conservation of 167 Ha of natural forest, 87 Ha of cultivated areas, and the improvement of pastoral management and *matorral* on 68 Ha. The area to be reforested to stabilize the water catchment areas around the Beleña dam, due to resume construction at that time, included part of the land from La Mierla (figure 15). Neither the Palancares nor the Beleña projects specify the methods, nor the species to be used in reforestation, or the potential of *matorral*, as a form of erosion control. The reforestation plan, however, proposed the reforestation of large areas of land without specifying any improvement of pastoral management or *matorral*.

Although la Mierla was eventually reforested in the early 1970s, attempts at reforestation in Palancares were halted by local and outside opposition in 1973 and thereafter. Concerns about the environmental effects created by the plantation methods and forced expropriation prompted the opposition of ecologist groups at local and national level at a later stage[3]. The most controversial parts of these projects were the removal of existing vegetation and use of heavy machinery to construct plantation terraces. The methods of these projects contrast with those of the 1940s, which proposed the

[3] These are explored in greater detail in sections ii and iii of this chapter.

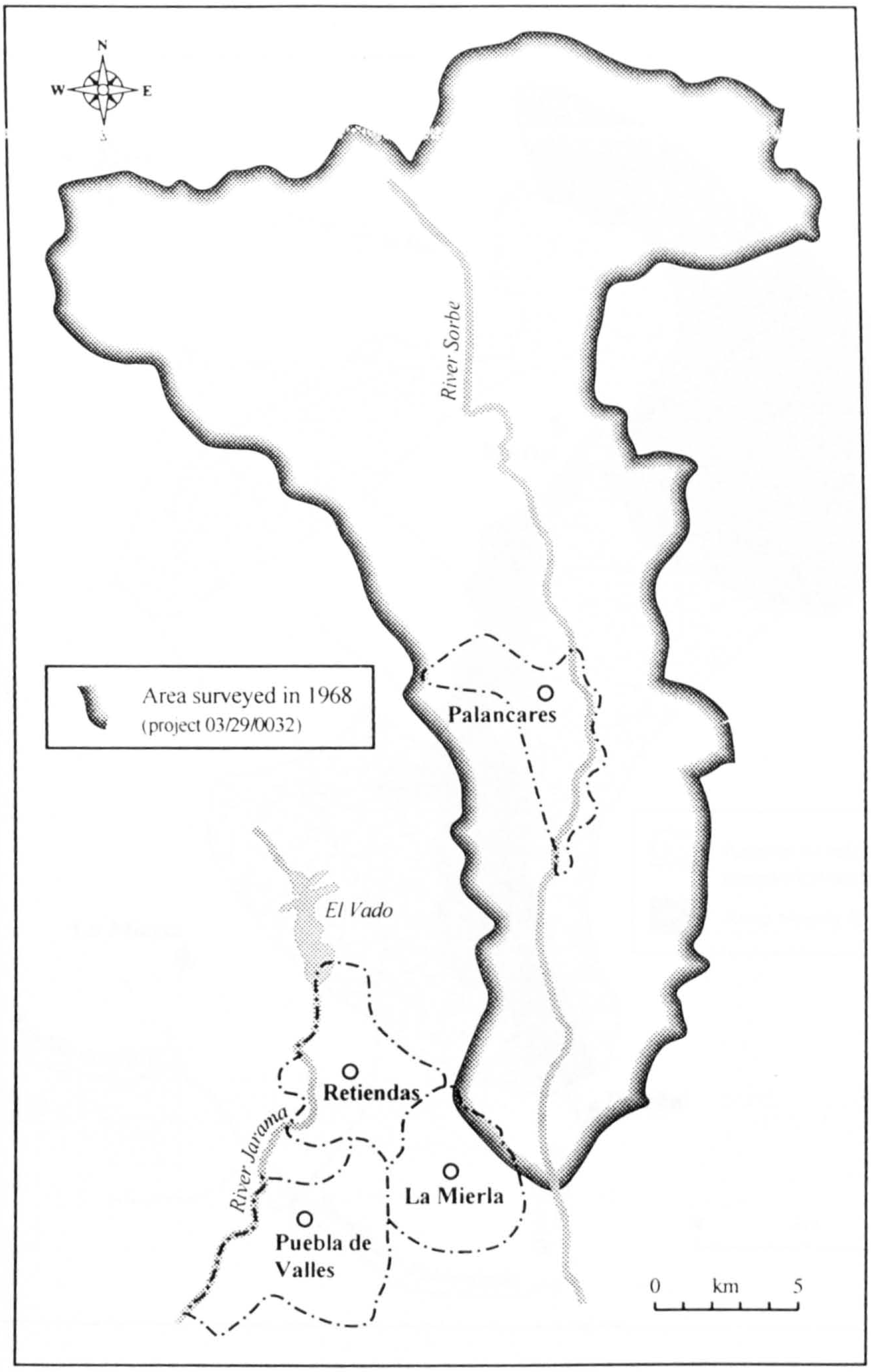


Figure 14: Area of Project 03/29/0032, River Sorbe surveyed in 1968

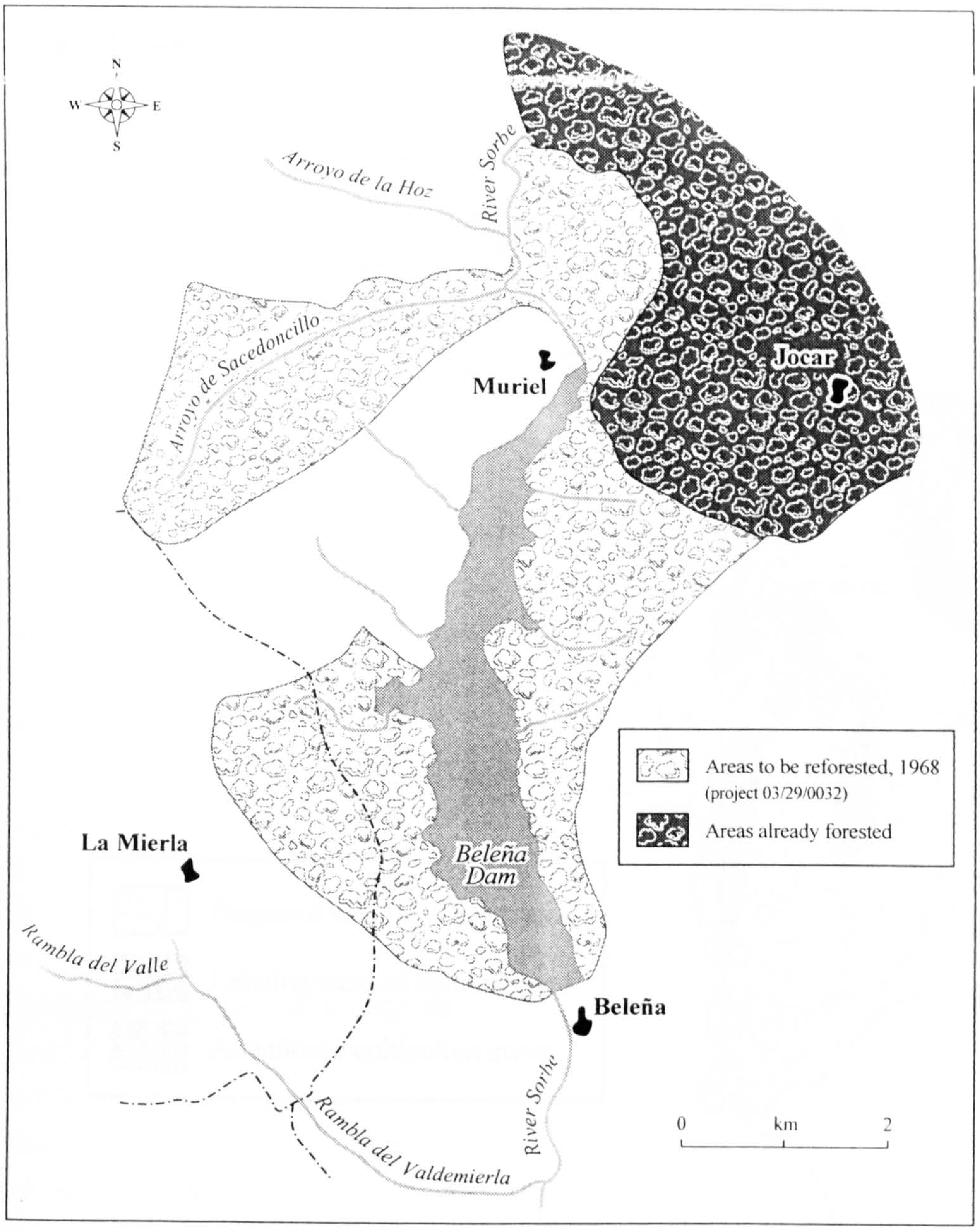


Figure 15: Reforestation of Beleña dam water catchment area. Project 03/29/0032 (1968)

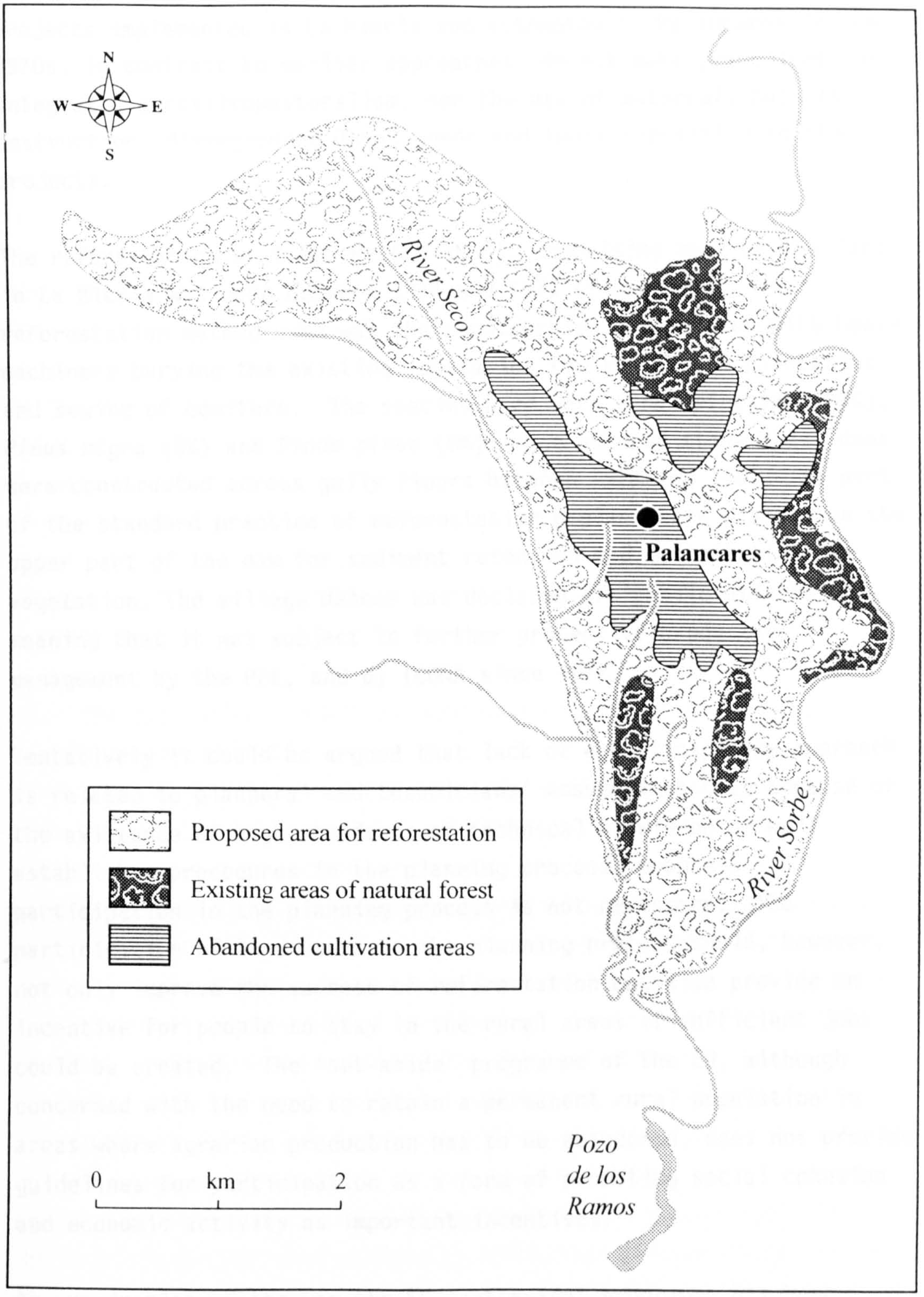


Figure 16: Village area of Palancares (Arroyo system, and reforested area)

use of local materials including *matorral*. The reforestation projects implemented in La Mierla and attempted in Palancares in the 1970s, in contrast to earlier approaches, do not make provisions for integrated agrosilvopastoralism, nor the use of *matorral*, but its destruction, disregarding local needs and their opposition to the projects.

The reforestation of 1,685 Ha (GU 1035), comprising most of the land in La Mierla was done between 1974 and 1979 (figure 11). The reforestation method used was the construction of terraces with heavy machinery burying the existing vegetation for the manual plantation and sowing of conifers. The species used were *Pinus pinaster* (90%), *Pinus nigra* (5%) and *Pinus pinea* (5%). One hundred stone check dams were constructed across gully floors between 1977 and 1981. As part of the standard practice of reforestation poplars were planted on the upper part of the dam for sediment retention and colonization by vegetation. The village *dehesa* was declared of 'public utility', meaning that it was subject to further protective/productive management by the PFE, and by ICONA since 1972.

Tentatively it could be argued that lack of a participatory approach is related to planners' and technicians' assumptions that because of the existence of high standards of technical knowledge or well established procedures in the planning process, people's participation in the planning process is not necessary. The participation of land users in the planning process could, however, not only improve the success of reforestation but also provide an incentive for people to stay in the rural areas if sufficient jobs could be created. The 'set-aside' programme of the EU, although concerned with the need to retain a permanent rural population in areas where agrarian production has to be abandoned, does not provide guidelines for participation as a form of promoting social cohesion and economic activity as important incentives.

An examination of the way the EU 'set-aside' programme has been applied in Guadalajara is necessary to discern if the participatory experiences in data gathering, planning, and implementation used in developing countries are feasible in the Spanish and EU context. The following sections look in detail at the attempts by the Spanish reforestation office in Guadalajara to implement Spanish reforestation projects, in Palancares, La Quesera and Puebla de Valles since the 1980s. These sections also look at the management of those projects financed by the EU through the set-aside programme in Guadalajara province. These cases exemplify firstly: the assessment of the 'necessary' coercive as well as the supportive role of the State (as identified by Blaikie and Brookfield, 1987: 246-247) to promote a 'bottom-up' and participatory approach, and secondly; the assessment of the organizational capabilities of rural communities to plan and implement more successful projects, as an important requirement identified by Chambers, V. (1991: 474).

In the next section it is argued that although the coercive and autocratic force of the State diminished with the democratisation experience after 1976, it did not totally disappear. It rather changed to one based on co-option through subsidies, in a persistently technocratic and 'top-down' way. The supportive role of the State and the EU mainly consists of the distribution of financial incentives.

ii. The persistent autocracy: evidence from Palancares, La quesera and Puebla de Valles

Although the State may not be using its earlier coercive power, the present trend geared to dispel criticism and distrust, encounters difficulties because of the past negative coercive experiences. Lack of involvement of rural populations and groups with an interest in the condition of the environment, can result in confrontational situations detrimental to creating a climate of trust. Kr. Breving (1991) asserts that political actions are taken according to public opinion in relation to ecological, social or economic reasons (p.130). How far these political actions are conditioned by one or the other are often a reflection of the power of groups behind them. In the cases explored below, it can be argued that public opinion, although exerting a considerable influence, has not changed the official 'appetite' for autocratic strategies. Attempts to reforest a large area of Palancares, a recently burned area in la Quesera (see figure 5), and proposals for a hunting project and reforestation in Puebla de Valles are examples of a continuing 'top down' approach with little regard for public opinion, the condition of land, and the ability to conserve water. Recent proposals of reforestation are more akin to past wood production strategies than to genuine SWC.

Building terraces for the plantation of conifers, which involves the destruction of the existing vegetation, thereby leaving the soil unprotected until the growing trees start providing protection again, has been heavily criticised by environmental groups and recognised by ICONA, and by high officials in the *delegación* in Guadalajara (personal communication), as an ecologically harmful reforestation practice.

Palancares
The reforestation attempts in Palancares demonstrate the continuing autocratic approach, which is the antithesis of participation. As explained above, the Spanish Government classified 1,524 Ha of land in Palancares as 'public utility', surveyed the area in 1968 (figure 14) and attempted its 'urgent expropriation' for reforestation (see figure 16) in 1973. The expropriation procedure was opposed by the land owners, who considered reforestation unnecessary. They argue that village land, bought in 1887 with great economic sacrifice by their ancestors at the time of the disentailment policy, would be reforested by them if this proved to be necessary. To deal with the Government's threat of expropriation they organized an association called the Community of Land Owners of Palancares (*Comunidad de Propietarios de Palancares* - CPP) in 1975.

The struggle for the management and ownership of Palancares land started between the Government reforestation office, ICONA, and CPP, and continues today between CPP and the Autonomous Government of Castilla-la-Mancha. Open opposition to the type of reforestation carried out by ICONA coincided with the attainment of democratic political rights in Spain in 1976. The case of Palancares became a testing ground for the strength of two opposing ideologies and interests - those of Government and land users.

In the dispute over the use and ownership of Palancares land, on the one hand there were a core of still influential officials in ICONA, supported by legislation and clinging to their technocratic methods. On the other there were a growing number of officials such as Costa Morata, P. and Parra Supervia, F., who became increasingly critical of the political system and joined forces with well known scientists, such as Gonzalez Bernaldez, F., Santiago Castroviejo and Javier

Pedraza, an active ecologist movement, and the CPP (CPAES, 1994[4]). The sequence of events, as explained in CPAES, can be divided into three main phases. The first was the bargaining process for the expropriation price of the land. The second was the initial attempts at reforestation by ICONA, the forceful opposition to it by land users and supporting ecologist groups, and the unsuccessful negotiations for the exclusion of natural forests from expropriation and reforestation with conifers. Thirdly the beginning of land users' own reforestation, the legal attempts to reverse expropriation and new attempts at reforestation by ICONA.

In 1943 land in Palancares was declared of 'public utility', but no attempts were made to reforest it either through a consortium arrangement nor through expropriation until 1973. Bargaining for the expropriation price of land started in 1973 and ended with the attempt to reforest the area by ICONA in 1984. The calculations of the value of land is given in table 16 below.

1976	ICONA estimation:	8	million	pesetas
1978	ICONA "	: 10.6	"	"
1983	CPP "	: 1.8	billion	"
1983	ICONA "	: 40.5	million	"
1983	independent "	:330	"	"

Source: Compiled from CPAES (1994)

Table 16: Calculations of the value of land in Palancares

The calculations in 1983 are given sequentially with a few months difference from each other. In 1984 ICONA deposited 40.5 million pesetas in a bank account, and notified land owners to withdraw the expropriation payment for their land. Some land owners cashed their payment, but approximately two thirds of them refused to receive it.

The second group of events, which started in 1984, were a missed opportunity to find a solution through compromise. The transfer of the responsibility for reforestation from ICONA to the Autonomous

[4] The history of the struggle in Palancares, compiled by CPAES (1994), comprises nearly 200 pages of documentation, newspapers cuttings, court litigation between CPP and the reforestation agency ICONA, and letters of support opposing reforestation by prominent Spanish scientists.

Government of Castilla-la-Mancha in February 1984, could have presented a new way forward. However, it did not. The autonomous Government's response was in line with what would have been expected from ICONA. Negotiations for the exclusion of natural forests from reforestation with conifers, and the evasive way the Central and Autonomous administration dealt with it, contributed to land users' disappointment and greater distrust. Even during these negotiations, bulldozers were sent to construct reforestation terraces. In the terracing work some indigenous species of trees were cut down to be replaced by conifers. The reaction to this was physical opposition to the reforestation work and further pressure on Government by widening the scope of the conflict, through publicity stunts in the national and local press. Popular rejection of reforestation with single species of conifers intensified because of, as recognised at a later date by Barbero Martin (1985) and Castroviejo Bolivar (1985: 25), the poor track record of ICONA

In view of these and the petitions and efforts to find a compromise made by land users, Barbero Martin, the then director of ICONA, promised to revoke the plan to reforest areas of existing natural forest with conifers. As a result of a meeting between CPP and Barbero Martin at the end of July 1984, land users and members of ecologist groups opposed and stopped terracing by force. This consisted of physically placing themselves in front of the machinery from the early hours of the morning, before work started, till the machine operators ended their 'working day'. CPP's feelings are that Barbero's promises were made to gain time so terracing could proceed (personal communication). Due to the disturbances in public order and the bad publicity the terracing for reforestation was receiving in the local and national press, the bulldozers were withdrawn on July 1st, but returned on the 10th of September to resume work again. Opposition to terracing continued until the 6th of October. By that time the terracing of 350 Ha was completed without planting any trees.

The administration took some of the people to court (local residents and members of the ecologist movement) who stopped the terracing work by forceful means. The hearing in 1985 prompted a considerable debate of wider social and scientific significance about the ecological implications of terracing and reforestation. Eminent

Spanish scientists, such as Gonzalez Bernaldez (Head of Department of Ecology and Biological Sciences, Universidad Autonoma Madrid) and Santiago Castroviejo (Director of the Royal Botanic Gardens of Spain), and others (CPAES), sent letters of support to the judge arguing the innocence of the accused and the appropriateness of their actions in order to stop what they considered was an attempt to damage, rather than assist nature.

They argued that the existing *matorral* was part of the seral stage recovery of natural vegetation. Removing it caused great damage and reduced the chances of recovery, increasing erosion. Planting mainly conifers would retard rather than advance the seral stages. The Palancares project of reforestation with 1,900 conifers, 60 *Quercus ilex*, and 2 chestnut trees per Ha, they claimed, was an attempt to justify a falsely mixed reforestation. This group of scientists point out the evident contradiction that while on the one hand ICONA, in "Tecnicas de Reforestacion" (1975), recognizes terracing as having great long term damaging effects on the soil, on the other it sanctions its construction.

Some of the conclusions from this group of scientists as regards terracing are similar to those arrived at by Coelho et al. (1994) on the effects of terracing in La Mierla. They emphasize that the inversion of soil horizons result in long term damage to the seral evolution by reducing prospects for the creation of a stable and well structured 'A' horizon. The results are that the accumulation of clay fine sediment in the terrace reduces infiltration and increases overland flow. Similarly to the processes recorded in the IBERLIM report, Chaparro et al, (1993), in a study in Murcia Province, also emphasizes the negative effects of terracing and the inversion of soil horizons.

The official defence of the Palancares case is that reforestation creates wealth. Serrada Hierro, the official in charge of the reforestation office of ICONA in the Province at that time, sees this type of reforestation as a form of wealth creation for future generations, (clearly a productivist rather than a protective argument). He also defended the construction of terraces in Palancares, as technically correct and in accordance with what is recognized and recommended in other countries (<u>Prensa Alcarreña</u>, 11-

x-84). Serrada Hierro (1990), although warning about the negative effects of these techniques on the condition of the soil, makes important exceptions when these are compensated by beneficial hydrological effects. One of these exceptions, it can be assumed Serrada Hierro would argue, is the case of Palancares). He recommends the construction of terraces when soils are less than 20 cms deep, insignificantly evolved, lacking active limestone or salts, or on gradients between 30 and 65% (p.458). In the case of this list, it can be argued that because the exceptions cover such extreme variation of situations, they become widely applicable, thus making this the general rule.

The failure of CPP petitions to ICONA for areas of natural forest to be excluded from expropriation and the refusal to consider the reversal of expropriation are, according to CPAES, an indication that the real intention of the administration is the control of the land through its ownership in Palancares[5]. CPP requests for the reversal of expropriation, it is believed by CPAES, was what precipitated reforestation work. Spanish legislation gives five years to start working on expropriated land. If no work for which land has been expropriated is effected, the previous owners can request the reversal of expropriation. More than eight years after land had been expropriated, CPP requested its reversal on 15-10-82. CPAES points out that the two attempts of reforestation coincide with the two requests made for the reversal of expropriation, in 1982 and in 1992.

The third group of events, that of CPP's own reforestation, started in 1984. Ecologist pressure groups, such as ARBA, COMADEN, FAPAS-FORESTAL, Fondo Patrimonio Natural Europeo (European Natural Heritage Fund) in conjunction with CPP have organized the plantation of *Quercus pyrenaica*, *Quercus lusitanica*, and *Castanea sativa* twice or three times a year. The use of mixed species is an objective defended by ARBA and COMADEN through, not only practice, but also in academic publications, such as that by Alonso Lorenzo, (1991). This is an ongoing process requiring careful organization months in advance. Villagers organised in CPAES keep a tree nursery, to supply

[5] This is a feeling which was also often voiced in Puebla de Valles during interviews with land users regarding the expropriation of GU 1004 in 1948. The results of these interviews are analyzed in chapter seven.

these groups when the came to plant. They regard the involvement of these groups as demonstration to the Autonomous Government of the broad opposition to reforestation with conifers. The opportunity for collaboration and participation these groups present to the *delegación* has systematically been ignored. The most the Guadalajara forestry service has been able to achieve is sending officials to witness the plantation work (field observation, 1993, 1994). However, CPP regard the persons sent by the *delegación* as 'spies', and no attempts at dialogue over the matter take place. The passive presence of these officials rather than their attempts to establish a dialogue and partnership to replant the area exacerbates distrust.

In November 1990 CCP again requested the reversal of expropriation. In June of the same year the Autonomous Government of Castilla-la-Mancha passed legislation for the conservation of soil and the protection of natural vegetation (JCCLM, 1990). In spite of this recognition in legislation of the importance of existing vegetation, and the strong arguments made by Spanish scientists, ecologist organizations, and land users for the need to protect it, in February 1992 terracing started again. The second reaction to terracing by ecologist groups and CCP was to stop it and the consequences have been similar to those in 1984 - arrests and charges for obstructing the work. This time they were found guilty and the result of the appeal is still pending judicial review in the courts.

In November 1992 the CCP proposed to the administration three main points or alternatives to solve the problem. Firstly, the elaboration of a reforestation project by a group of independent technicians acceptable to them and the administration, in consultation with land users, ecologists and the administration, specifying the species and techniques to be used in planting. Secondly, the reversal of expropriation of all the land or, thirdly, the reversal of expropriation of natural forest land. This as an example that initiatives shown by CCP could have been used as a starting point for collaboration between the *delegación*, land users and other social groups. None of these, however, have been accepted by the administration or pursued for further exploration of alternatives.

La Quesera

The examination of a case of reforestation of a burned out area in la Quesera[6] provides further evidence of the autocratic appetite of the administration (the reforestation service of the Autonomous Government of Castilla-la-Mancha in Guadalajara Province). The area in La Quesera registered as "Mountain 1032" with the reforestation authority of Guadalajara, was reforested in the 1970s. The method used was building terraces and planting conifers. For unknown reasons it burnt in 1991. Sagasta Azpeitia, an influential forester, reflecting popular anxiety about forest fires, asserts that the vulnerability of natural resources does not allow room for imposition of reforestation. He states that it is necessary to mobilize the will and involve the affected population in the procedure of reforestation, if these incidents (fires) are to be avoided (1979: 179). A top official in the reforestation office in Guadalajara is convinced that the burning of the area of La Quesera was arson (personal communication). The majority of the local population (personal communications) and the ecologist group Greenpeace are against reforestation with conifers in la Quesera. They argue that the area should be left to recover naturally, or should be reforested with mixed natural species (Siete Dias, 14-4-94; Nueva Alcarria, 22-4-94; El Pais, 25-4-94).

Although the area was already heavily colonised by matorral, at the beginning of 1994 the reforestation authorities of Guadalajara decided to reforest it. Preparation for reforestation involved the use of heavy bulldozers to rebuild the terraces, with the consequent destruction of existing vegetation. This method is perceived by the local population and ecologist groups such as Greenpeace, COMADEN, and ARBA, as causing great soil damage and, at least in the short term, increasing erosion. According to Greenpeace, farmers and other people living in the areas nearby, there was little danger of erosion under the rapidly colonizing matorral. Greenpeace and other groups opposed the reforestation project which the service in charge of reforestation in Guadalajara defended on technical grounds (Siete Dias, 14-4-1994).

[6] Although La Quesera is not part of the 'areas of study', La Mierla, Puebla de Valles, Retiendas and Palancares, its inclusion provides the opportunity to examine one of the most recent cases of the ways in which the reforestation office of Castilla-la-Mancha in Guadalajara is still functioning.

As a result of a formal complaint issued by Greenpeace, the Regional Government of Castilla-la-Mancha ordered the stoppage of the works until a satisfactory arrangement could be found. However, according to sources in Greenpeace, because it took a few days to foresters in Guadalajara to follow the orders from the Autonomous Government, the reforestation work continued for a few days (personal communication). The degree of cunning which was used by the reforestation service in Guadalajara in trying to avoid the stoppage is difficult to ascertain but it took further legal pressure by ecologist groups before reforestation work was finally halted (Nueva Alcarria, 22-4-94). The problems of opposition encountered by the reforestation authority verifies what has been clearly stated by Graupera & Luna and widely recognised by other authors above, that if the elaboration of a plan does not involve and maximize the participation of groups and affected persons, its implementation is likely to be problematic (Robert Graupera & Luna Serrano, 1991: 290). In the example of la Quesera the result has been further distrust of the real intentions of the reforestation service in Guadalajara.

Discussions between representatives of Greenpeace and officials of the Castilla-la-Mancha Government to find a solution to the case of La Quesera, indicate a change in attitudes at least at that level of Government. In these discussions the findings of the IBERLIM report were used as an example of the possible consequences of terracing and the removal of existing vegetation on the condition of soil (Gonzalez del Tanago, M., personal communication, 1995). An outcome of these discussions was that a land management proposal, would be elaborated by COMADEN, ARBA and Greenpeace (1994) as an alternative to that of Government, and presented to planners in Castilla-la-Mancha. However, the acceptance or rejection of this alternative depends on pending reforms in legislation to deal with land management, including that of SWC and *matorral*. If the new reformed legislation is approved by the Government of Castilla-la-Mancha, Rodriguez Vargas who is in charge of land degradation issues in Greenpeace, hopes their alternative project could be accepted and implemented (personal communication, 1995).

This alternative strategy puts special emphasis on avoiding damage to the existing vegetation and the management of its restoration. The five main objectives it proposes are:

- Protection against erosion
- Reestablishment of the original vegetation cover
- Restoration of bio-diversity
- Improvement of water, air and soil quality
- Promotion of potential eco-tourism managed by local people

Another important issue in the document is the detailed study of local conditions required for the plantation of trees. Species such as *Erica arborea* and *australis* survived the fire in La Quesera. Shoots from these trees and other *matorral* can provide protection from the sun for young beech (*Fagus sylvatica*). This and Pyrenean oak (*Quercus pyrenaica*), round-leaved oak (*Quercus rotundifolia*), Birch (*Betula alba*), Montpelier maple (*Acer monspesulanum*), Holly (*Ilex aquifolium*), Common yew (*Taxus baccata*), Whitebeam (*Sorbus aria*), Rowan (*Sorbus aucuparia*), Wild cherry (*Prunus avium*), Elder (*Sambucus nigra*) and Sessile oak (*Quercus petrea*), are other species which, according to area-specific ecological conditions should be considered for reforestation. The method of plantation proposed is by hand dug holes or with small machinery so as not to damage the soil and existing vegetation. Plantation in line should be avoided and spaces between terraces should also be planted.

The actions of Government since the initial attempts to reforest this area and the proposals of Greenpeace are of great contrast. They are markedly different but are not mutually exclusive. Although the autocratic form of action of the forestry office in Guadalajara has been detrimental to the possible participation of groups with an interest in conservation, the Autonomous Government has been more amenable (by choice or force) to these groups. The next case shows in greater detail the operational approaches in project elaboration and implementation of the Autonomous Government Office in Guadalajara.

Puebla de Valles

The third example, the rural development project of Puebla de Valles proposed by the service of agrarian marketing (*Servicio de Comercializacion Agraria*) in 1994-1995, if not exactly autocratic, can still be considered a top-down one. This project provides an example of the constraints for negotiating compromises between the administration and rural people. The constraints of the administration are mainly because of rigid procedures and officials' professional limitations regarding the promotion of their own projects and that of participation.

The transformation of the existing scattered small plots owned by each household into larger and less dispersed plots has been portrayed by the National Government, provincial Governments until the late 1970s (through CESP), and land users alike as a measure to improve the agrarian potential. The two following examples of rural development proposed by the *Delegación* in Guadalajara for Puebla de Valles, for reforestation and/or hunting, are based on the anticipation of land consolidation. The Regional Government of Castilla-la-Mancha approved a project for land consolidation in 1990 (DOCM, 1990, p.3105), after a request by land owners in this village. This request would have reduced the existing 9,100 plots to 850 at a cost of 97 million pesetas (approximate £ 500.000 at 1995 exchange rates) (Castilla-la-Mancha, 1990, N°· 61, p9). Although the project for land consolidation was approved it was not put into effect. In November 1993, the Council of Puebla de Valles (CLCAPV, 1993 (documents), and in October 1994 the newly formed Commision for Land Consolidation and Afforestation of Puebla de Valles (CLCAPV) (CLCAPV, Oct. 1994), were pressing the *Delegación* in Guadalajara for the implementation of the project.

One of the main aims of this project (Laso Rhodes, 1994) is to increase the amount of communally owned land for reforestation and/or hunting. The proposal for land consolidation is as follows:

Dryland cereal production.....	600 Has.
Irrigated land	150 "
Pastoralism	300 "
Reforestation	1000 "

(Laso Rhodes, 1994: 10)

The proposal for reforestation envisages difficulties if this was to be done in scattered plots planted at different times. The land consolidation proposed would give each land owner a share in the reforested area corresponding to that contributed, and not as some land owners wanted, consolidated areas of land individually owned. However, owning a share was not acceptable making the project un-accomplishable.

Hunting and the reforestation of agricultural land are identified by Lopez Carrasco (1994: 53) as development potentials for mountainous areas in Castilla-la-Mancha and part of EU strategies. Hunting has become a profitable business in Castilla-la-Mancha, due to increases in the price of game meat and changes in preferences from small to big game on the part of hunters, who pay considerable sums for a day's session, (Martinez Garrido, 1991). The other option in this development project proposed a hunting area for Puebla de Valles involving fencing off well over half of the village land (see figure 17). Much of the reasoning to entice land users to accept the project was based on the likely economic gain which it could bring to the village. The two main animal species already in this area are wild boar (*Sus scrofa*) and roe deer (*Capreolus*). The cost of this land consolidation-hunting project was calculated to be 58 million pesetas (approximately £ 300,000) (Laso Rhodes, 1994: 11), one fourth of the cost of the other alternative for land consolidation-reforestation above.

Villagers' concerns with the hunting project were threefold. Firstly there were fears about the difficulty of free access to the fenced land. Although entry would be provided at diverse points through padlocked gates, as per map 14, travelling from the village to one of the most frequently used areas of land, that used for horticulture on the banks of the Jarama river, would involve unlocking and locking two gates. The second type of concerns were of a cultural character. These are seldom taken into account in development planning. Fieldwork observation showed the 'open' social character of this village. Doors are often left open even when people are working in the fields somewhere away from the house. Although people in this particular village did not have any negative experiences with outsiders, references are often made to conflicts in nearby villages. The case of Retiendas, visited by a considerable number of people in the summer, is often used as such an example of confrontations between visiting and local people which should be avoided. Retiendas is popular with campers, who sometimes are the cause of social strain because of security as in the case of possible forest fires.

During a few days after the presentation and promotion of the hunting project by officials, people in Puebla de Valles often commented on the uncomfortable feeling they perceived when hunting parties of outsiders from the urban areas visited the village. They felt 'looked down upon' and demeaned by the conspicuous opulence displayed

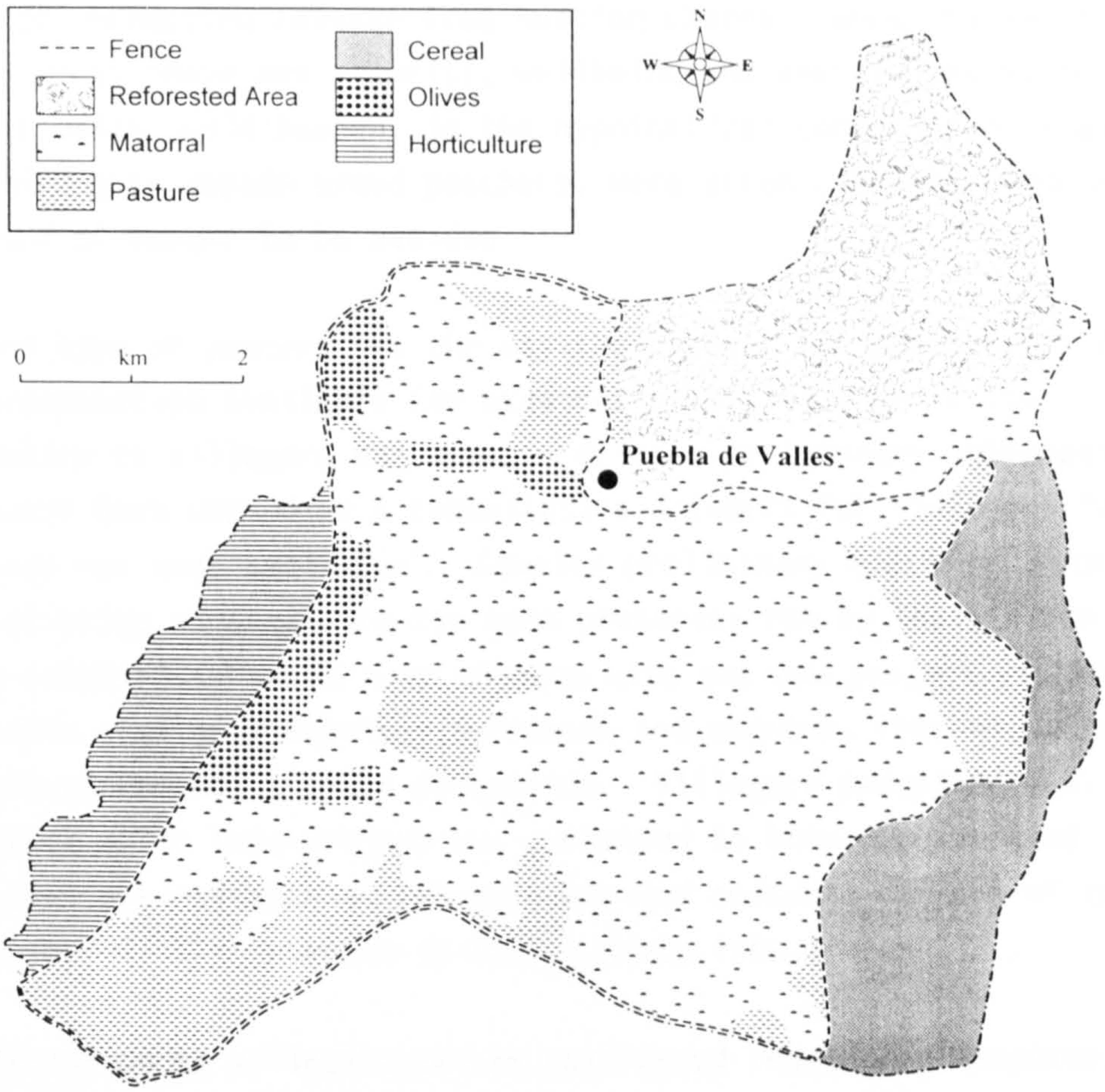


Figure 17: Area of development project for Puebla de Valles

by wealthy hunters who come mainly from the urban areas. Villagers refer to these outsiders as 'Rambos'.

The possibility of creating employment for villagers as game keepers, beaters during hunting, converting their homes as occasional guest houses, or increasing revenue from hunting charges, were quelled by concerns about their own security, wellbeing and peaceful existence. Accidents which could happen, in the hypothetical condition of a game keeper trying to impede armed poachers, were often commented upon as situations of danger to be avoided.

The third type of concern was the way the project was presented. The only documentation available for examination at the time of its presentation to villagers was a map. Written preliminary information which could have served as a consultative document for villagers to study, was not made available[7]. Complex preliminary questions such as how existing arrangements for game preserves ran by the village hunting association[8] would have changed with the new project, in view of possible greater financial investment and eventual returns, were not explored further than in discussion. Villagers perceived that the form in which this project was presented to them demonstrated little previous research of the economic and cultural factors of the village, and little interest in taking these into account.

This perception by villagers can be considered reasonably accurate. During a short informal interview with officials involved in the elaboration and presentation of the project in the village, the main justification given for such a project stemmed from their personal

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[7] Access to this document was also denied to the author during a visit to the *Delegación* in Guadalajara a few days after. The only documentation available was a copy of the map from which figure 17 was produced. This document, Laso Rhodes, A. 1994, was eventually obtained by CLCAPV after a formal request was made to the *Delegación* of Guadalajara in February 1995.

[8] These are the traditional hunting village associations regulating this activity. They are formally registered in the *Delegación*, and among other things the committee re-stocks the area with animals, usually rabbits and partridges, from the funds obtained from their members. They are able to 'invite' other hunters from other associations, often charging them a fee. All land in the village is regulated in this form, including the privately owned. Land owners do not have the right to exclude hunters from their land.

enthusiasm for hunting and the economic benefits it could derive for the village. The reasons for the rejection of this project, in the eyes of officials incomprehensible, were fears of security and the effects it would have on villagers freedom of movement. Suggestions that these villagers' fears were genuine and could be justifiable, were rejected in favour of explanations of their backward and conservative attitudes.

The concentration of a higher number of animals in the fenced area could have increased erosion. Soil disturbance by animals increasing sediment yields in the measurements taken by IBERLIM rendered these inaccurate for comparison with other *matorral* experimental sites. What is significant in the IBERLIM findings is that the passage of animals disturbs the already fragile soil, increasing erosion. A higher than normal concentration of game animals in a fenced area would have a similar erosive effect to that of domestic livestock by trampling. Lack of environmental impact assessment in the planning of the hunting project would have caused the opposite intended effect to the objective of 'set-aside' - land protection against degradation and erosion caused by game animals.

After the rejection of the hunting element of the project villagers organized into the CLCAPV (Commission for Land Consolidation and Afforestation of Puebla de Valles) to press for land consolidation and the reforestation of this land. The catalyst for the formation of CLCAPV was the opportunity presented to them by the 'set-aside' programme. The formation of CLCAPV emerged from a series of meetings in the village *municipio* to try to find ways to make use of this opportunity. The committee was formed through an informal village meeting in the *Municipio's* office where consensus, consent and nomination of candidates play a part as important as secret ballot.

Letters were written by CLCAPV to all land owners asking their authorization to include their land in the land consolidation project and ninety five percent of these agreed. A new major obstacle for this project is the opposition of the five percent still against it and some ecologist pressure groups. The ecologist pressure group 'De Raiz' published a small article in the journal Quercus (November 1994), asking its readers to send letters of complaint to the President of the Government of Castilla-la-Mancha and to the

Commissioner in charge of agriculture. As a result other ecologist pressure groups such as 'Grupo Ecologista Turon' and 'Casa de la Mata', and some individuals wrote letters of complaint in September to December 1994, against the proposed project of land consolidation and reforestation of the area. They argued that the reforestation of this land constituted an attack against the environment and its natural recovery through the natural evolution of the vegetation. Some of these letters, specifying their opposition to the reforestation with conifers are, according to a member of CLCAPV, inaccurate, and grossly distort the expectations of the majority of the villagers (CLCAPV, 1995).

This and the following short examination of the way in which the reforestation of agricultural land under the CAP programme has been handled in Guadalajara, reveals that the present trends are still largely top-down and technocratic and that the Provincial forestry service cannot operate other than through autocratic approaches for the implementation of technocratic solutions. The basic political climate in which land management issues are being worked through has changed with the democratising process in Spain since the mid 1960s, but the ideology and inertia of the bureaucracy resisting these changes, makes still more evident the need for the study of its operations.

The set-aside programme in Guadalajara

This section examines the operations of the Guadalajara Office of Agriculture regarding the administration of funds as incentives for the reforestation of set-aside land. A few organizational drawbacks account for land users' initial lack of enthusiasm for the 'set-aside' reforestation programme in Guadalajara. Approval of the Spanish proposal for reforestation of 434,500 Has. and the improvement of 200,000 Ha of existing forests from 1993 to 1997 (Agro Cajas, 1993, N$^{os.}$ 85, 86, 87), suffered delays in Brussels because of its large size. This gave rise to uncertainty with reports in the Provincial press that reforestation funds were not available (Nueva Alcarria, 20-8-93; Guadalajara 2000, 2-11-93 and 25-1-94). Other drawbacks to the plan were that land owners, after paying for the total cost of reforestation, were not assured of the time it would take them to recover these costs, and were concerned about the lack of provision for compensation in case of natural disasters such as fire. Pending EU approval for funding, the Ministry of Agriculture defused some of these negative effects by arranging with Spanish agricultural banking institutions that money to cover for the expenses of reforestation should be paid (Agro Cajas, 1994, Nº 96) to those who effected reforestation. These uncertainties, in addition to the conditions of the plan, being mostly out of land users' control, did not help in building confidence and trust.

Although these institutional mishaps produced uncertainty, the Plan for Castilla-La-Mancha was oversubscribed. However, table 17 shows that if we take into account that the objective for the Region was to reforest 132,000 Ha between 1993 and 1997, at approximately 5,000 Ha per province per year, we can see that Guadalajara lagged well behind the rest of the provinces.

According to an official in the Office of Agriculture in Guadalajara, lack of financial security and consultative capabilities on the part of the reforestation service to deal with local conditions account

Castilla-la-Mancha			Guadalajara		
Province	Petitions	Ha	Agency	Petitions	Ha
Albacete	406	8,781	Atienza	84	488
Ciudad Real	387	5,984	Brihuega	12	7
Cuenca	735	7,000	Jadraque	2	4
Guadalajara	224	2,389	Cifuentes	7	50
Toledo	379	4,947	Checa	20	123
			Horche	10	77
			Molina	25	248
			Pastrana	11	269
			Sacedon	8	216
			Siguenza	6	172
			Yunquera	16	41
			Guadalajara	23	694
				Total Ha	2,389

Source: Cortés, J. I. in APAG Nº 37, Sept., Oct., 1993: 10-11

Table 17: Requests for afforestation of agricultural land in Castilla-la-Mancha

for lower subscription than in the other Provinces of Castilla-la-Mancha (personal communication). It was not until the last few days before the deadline for petitions of reforestation was due to expire that a greater number of land users handed in their applications in the reforestation service of Guadalajara Province. The Department of

Agrarian Promotion and Development in Guadalajara (APDG), explains that only about 60 requests for the reforestation of 700 Ha were received a few days before the deadline for the presentation of documentation was due to expire (Guadalajara 2000, 31-8-1995). The reason given by APGD for this late application is that absentee land owners in Guadalajara return to their village for the summer holiday in August, and it is then when they talk and make decisions about reforestation (Cortés, 1993: 10-11).

The province of Guadalajara is special in relation to the other four provinces, where rural desertion is not so acute. It is under these social conditions in Guadalajara where the promotion of participatory approaches, or basic consultational ones, are all the more necessary and would give best results. This does not mean that participation in the other provinces is not needed because they achieved their reforestation objectives fulfilling their reforestation quotas. A participatory approach implies working toward building long-term social cohesion in the villages[9] (in the face of continuing negative demographic trends and desertion) as well as achieving the implementation of, in this case, a plan for the protection of soil and rural development, as one of the objectives of the EU explored in section iii of Chapter Three. Building up social cohesion between villagers and between these and Government officials would be a form of slowing down rural desertion as an essential part for the success of reforestation as a development plan. The need for careful post-reforestation management, pruning and keeping the undergrowth to a level which minimises the danger of fire, are labour intensive operations which could induce local people to stay in their village rather than migrating.

An influential official in APS (Agrarian Production Services - see table 12) of the Office of Agriculture in Guadalajara acknowledges that better results could had been achieved if sociologists were involved in the promotion of the Plan (personal communication). Feelings that the involvement of sociologists (or any other social scientists with relevant skills to facilitate the promotion of participation in planning) may improve plan performance have not,

[9] Chapter six explores issues of participation, some of its objectives, constraints and opportunities, making use of experiences from the developing world.

however, been translated into legislation or regulations to modify the professional composition of the forestry or other departments in Guadalajara. The professional composition of the four-person team in charge of running the EU Reforestation Plan for the 'set-aside' of abandoned land in the Province cannot be considered the most ideal to promote or deal with the whole range of social, economic and political complexities of its implementation. Although specialists in their own field, the one veterinary expert, one forestry engineer and two agronomists lacked training and experience in dealing with the social and political problems which such a plan entails. As a result they did not address conflicts of interest between land owners and land users, or between land users. Nor was the Plan promoted so that petitions for reforestation would be made by groups of land owners rather than by individuals (subsidies for groups with adjoining fields were 20% higher than for individuals).

Some of the greatest conflicts of interest are rooted in the ownership of land. Only 10% of the requests for reforestation in Guadalajara province came from land users (APS personal communication). The rest are from existing landowners or their descendants who in some cases do not benefit from modern farmers using their land. Landowners see in reforestation an opportunity to increase the value of their land or after twenty years (the minimum that the Plan stipulates the trees must be planted before they can be cut down), make some profit from logging.

Social and economic conflicts of interest rooted in land use since migration from the villages in the late 1960s and early 1970s requires knowledge about these issues and training in ways of solving problems through participation. Pastoralists who traditionally used fallow land for pasture do not want their flocks excluded from these fields if reforested. An additional problem for pastoralists is that they would be forced to take longer routes in order to avoid the reforested areas and to be in control of the animals at all times. Another common problem which is difficult for existing projects to solve in the area of study, and many other parts of Spain, is that of the demarcation of fields. With the use of modern machinery many of the fields' markings have disappeared. In the past, landowners who worked their own fields know the approximate location of boundaries, but on their death, many of their inheritors do not have this intimate knowledge. The few modern farmers left using the land, who in many cases do not pay any rental for its use to the owners, do not see the reforestation of agricultural land, or the exact demarcation of fields, to be in their own interest.

Attempts to promote the reforestation of the land of Puebla de Valles through the set-aside arrangement in 1994 and 1995 ended in failure. It was thought by Government officials that this village could be used as a testing ground for the promotion of the reforestation Plan. The 'innovative' Governmental proposal consisted of changing a long standing request for land consolidation into a project of reforestation. Planners proposed that individual land owners would own an indivisible share of the newly reforested area proportional to the amount of land they provided. That share could be sold any time or at the end of the minimum period of twenty years after reforestation took place, the wood could be sold.

Land qualifying for EU funding under the 'set-aside' programme must have been used for agrarian production at least once in the last ten years. Although this was a clear stipulation of EU conditions, most of the land proposed for reforestation has been abandoned for twenty or more years: in the case of Puebla de Valles, it is obvious that the *Delegación* in Guadalajara would have turned a blind eye to this requirement. As explained above, the meeting to promote the Laso Rhodes project (1994) (working in the Service of Agrarian Marketing - see table 12) at the *municipio's* hall was arranged by Government officials to promote the reforestation of most of the land in the village. The meeting took place in an atmosphere of suspicion, because of lack of trust between both parties, a viewpoint expressed by both officials and land users (personal communications).

Villagers criticise the way the reforestation Plan was presented to them, without previous consultation or providing any written explanations upon which they could reflect in view of a possible second meeting. They also resented that officials did not provide details of what reforestation methods and species would be used. Insistence by villagers that reforestation could take place only if land consolidation was implemented first, was rejected outright by officials. Other options were not suggested or discussed. Officials explain the rejection of their proposal as an example of the grave problems they have to face because of the irrational and backward character of land users and landowners - regarding them as the problem rather than as potential partners.

The outcome was a stalemate situation in which the Government left to the villagers the elaboration of their own plan, which would have to be drafted by a qualified forest engineer, for later presentation and official approval. The opportunity of promoting participation presented to Government officials to work out an answer in conjunction with villagers was missed. Villagers with little or no experience in bureaucratic and technical matters, according to legislative planning procedure, were left to find their own alternative. Eventually they organized to form a group (that of CLCAPV) to promote land consolidation and reforestation.

These conflictive issues were left to be solved by elderly retired peasants, and land inheritors (some of them have only a partial and limited knowledge of what is best for the social and natural environment of the village, since most of them live in the urban areas), and modern farmers whose interests in agriculture and pastoralism are in opposition to what the Plan has been promoting - land 'set-aside' and reforestation. Government officials know perfectly well about the group, as representing possible 'divergence' in the 'local community'. What they do not seem to be able to do, however, is to promote their participation in planning to accommodate the diverse and often conflictive interests in land use. That requires a multidisciplinary team promoting participation.

Some members of CLCAPV (personal communication) believe that the articles in the provincial and national press and the letters of protest of those ecologist groups against reforestation made the *Delegación* in Guadalajara revoke the reforestation plan, including that initially proposed by Laso Rhodes (1994). Some individual land owners, however, have plans to reforest their land with mixed species of trees without waiting for land consolidation.

The potential social, economic and ecological advantages of requests for reforestation by groups rather than by individuals were lost because of inadequate operational capabilities of the reforestation office in Guadalajara, as well as lack of organisational experience and social cohesion in the villages. The Plan provided the Government with a good opportunity for the encouragement of greater social cohesion between villagers and officials. The use of a participatory method, involving land users and ecologist pressure groups may have produced a proposal for a reforestation plan similar to that for La Quesera. In the case of Puebla de Valles the participation of members of ecologist pressure groups in planning and participation can be explained not only by the 'rights' they 'acquired' (some of them own land in the village) in the decision making process, but also as members of ecologist pressure groups, claiming concern with environmental management. Ignoring or challenging the 'rights' of these groups can be resolved in the arena of conflict and the struggle for power, on the basis of strength, while integrating them in the decision making process, the extent of their 'rights' can be settled in the arena of debate and consensus finding through participation. Whether the participation of such groups is acceptable to Government planners or not, is at this stage a matter of speculation which the outcome of La Quesera and Puebla de Valles will demonstrate. Whether the *Delegación* and the Autonomous Government choose to incorporate the observations and advice of ecologist pressure groups or abandon the project, rather than be involved in negotiations with such groups, is a matter for further *a posteriori* research.

Policy issues arising from the cases above

Tentatively it can be advanced that a participatory approach to planning from the start of project elaboration would have created greater understanding gained from the experience of villagers, Governmental officials and ecological pressure groups working together. This could have served as a solid base for future projects.

Working as a group could also have created the basis for organization so reforestation requests were made by groups, rather than by individual landowners. Requests for reforestation by groups, highly desired by the Government, would have meant larger areas to be reforested and cheaper reforestation. Many of the petitions for reforestation by individuals had to be discarded because the area was far too small and isolated to be planted. Reforestation costs in these cases are substantially higher than for larger areas. The ecological advantages of reforestation of larger areas[10] are also enhanced if land users and landowners identify the micro conditions of smaller areas in need of special attention.

Declarations of intent for the participation of land users in forestry planning made by influential foresters such as Barbero Martin (1985) and Gonzalez Hernandez (1984), respectively heads of ICONA recently, show that this is considered to be an important issue. As shown above, however, these declarations have not been followed up by action in the form of changes in working practices by foresters. These would need to be trained in handling situations of distrust and little organizational experience among villagers. Chambers, V. (1991), brings attention to what she calls the "legitimization of forestry programmes through token participation of communities" and compares it with the "self-help approach", where people in joint action effect "positive changes in their community". A prerequisite for success of the 'self-help approach' is that the community should have some experience of working together in an organised form or enjoy access to resources or information helping them working with the authorities. She identifies the constructive role of foresters (assuming these are not 'technocrats'), in bridging the gap between the government and the people (including the urban public) and describes this role as realistic and with great chance of success. A precondition for this success is that foresters are "willing" to listen to people at the community level (p.472-473), not the standard model of forester in Guadalajara.

Apart from applying their technical knowledge to SWC problems, foresters must also understand the social, economic and political processes of LD. To avoid the danger of LD which the monoculture of conifers, as an intensive way of wood production, may cause, Pardo (1991) proposes the formulation of a new long-term management and sustainable forest policy. He argues that a new approach to policy formulation "should recognise the multi-sectoral nature of forest

[10] The areas to be reforested are regarded as ideal for forest rather than for agricultural practices. Reverting this land to forest, if damage to the existing vegetation cover such as *matorral* is minimized, can be considered to be an ecologically sound SWC measure. As well as that, reforestation with Conifers only has been abandoned by the forestry agency and, a mixture of Conifers and Quercus is what has been used for 'set-aside' projects.

land management" and give a "greater role in policy formulation to interest groups ...and rural people". He suggests changes in the professional composition of teams or individuals in charge of forestry planning. He argues that new ideas for policy, although they may look good in paper, are still generated by the same forestry bureaucracies with "foresters talking to foresters who come-up with policies and programmes to be carried-out by the same foresters" (p.100).

Blaikie and Brookfield (1987) see the "coercive as well as the supportive" role of the State as indispensable for the promotion of a 'bottom-up' and participatory approach (p.246-247). Although the coercive force of the State for the implementation of autocratic measures diminished, it did not totally disappear. It rather changed to one based on co-option through subsidies, in a continuing technocratic and 'top-down' way. The supportive role of the State and the EU is reduced to the distribution of financial incentives. In addition to Spanish and EU technocracies' large technical backing, their bureaucracies distribute subsidies according to hegemonic State ideology, in the case of Spain, favouring reforestation for wood pulp production and the transfer of water to the South. The links between this efficient distribution of EU subsidies by the *Delegación* and the people receiving them, need to be strengthened by the promotion of participation.

The Provincial Delegation of Agriculture in charge of reforestation in Guadalajara (see table 12), as in most parts of Spain, does not possess the necessary organisational expertise or professional capacity to effect a participatory strategy nor even a proper consultational one.

If a participatory approach was introduced today, the most likely result the present forestry structure could achieve, would be one resembling a "...token participation of communities" (Chambers, V. 1991). There are three main reasons for this hypothesis. The first reason is lack of experience. Spanish professional foresters with no experience on any other method but top-down designed ones, would find it extremely difficult to implement a participatory plan. The second reason is lack of training. The professional composition of the teams dealing with reforestation planning and implementation are well qualified forestry engineers. As Pardo realises, foresters have only technical forestry expertise (Ibid: 101). They, however, lack the sociological or anthropological training that the promotion of participation requires. Lack of social subjects studied at university by new forestry engineers in Spain makes them ill-equipped to promote and deal with participatory requirements. That foresters are willing to "...listen to the people at community level", as proposed by Chambers, V. (Ibid), is, however, an essential precondition but not a warranty for success. The type of forester that she may have had in mind, it is assumed, must have been one adopting a multidisciplinary approach or with great practical experience in participatory work.

The third reason for the hypothesis is that the professional composition of the teams working in forestry continues to be based on forestry engineers and/or agricultural technicians. Rather than multidisciplinary foresters, who may be hard to come by in Spain, a multidisciplinary team with especially trained sociologists, anthropologists, and/or geographers, etc. as well as foresters in their technical capacity, is a more realistic proposal to promote participatory approaches.

Conclusion

The deficiencies in Spanish forestry planning have included a lack of consultation with land users, inadequate assessment of physical conditions and scarce evaluation of socioeconomic circumstances. This in most cases resulted in reforestation providing no better stabilization of soil conditions than those of *matorral*, and greater impoverishment of land users. Advice for careful implementation of reforestation in the documentation of some projects, so the already fragile economies were not disrupted, however, was in contradiction to either plans for expropriation and/or exclusion. The ideological persuasion of the State after 1939, and the PFE as part of it, imposed an autocratic form of planning and implementation based more on reaction to 'destructive' land use practices (those imputed to the irresponsibility land users) than on the rational assessment of the socioeconomic and physical contributing factors of LD.

The coercive methods of the State ensured expropriation and exclusion from newly reforested land but caused resentment and uncooperative attitudes in the rural communities. Expropriation antagonises and alienates local populations. The coercive methods went hand in hand with disregard and, according to Groome (1990), even contempt for traditional peasant organisation, their knowledge and ways of living (p.115). These were grounded on the ideological tenet that 'top-down' technocratically based reforestation was what it was needed. The supportive methods that, according to Blaikie and Brookfield (1987), are needed for the promotion of a 'bottom-up' strategy, were absent in the 'top-down' policy model.

The State decision making process for SWC through reforestation did not give land users the opportunity of refusing or working out other acceptable alternatives. Land users had to decide whether compensation for the expropriation of their land or the proceedings from logging was more beneficial for them, on the basis of little information. Although reforestation was portrayed by the State as highly profitable, land users had to be 'persuaded' of its advantages by the threat of expropriation.

The top-down approach meant that foresters were not given the opportunity of using their own initiative and did not gain experience in participatory work resulting in great long-term cost to their professional abilities. If participatory work by today's foresters were to be considered, it could not be enforced immediately, but must be visualised in the medium term rather than within the next one or two years. The slow adaptation to change by Governmental administrative and technical structures, as claimed by Prats (1991: 237) and Pardo (1991: 100), due to their own bureaucratic inertia retarding adjustment to new policies, and foresters' lack of expertise in participatory work, justifies that conjecture.

The technical methods of reforestation adopted initially in the area of study, using local materials and the management of *matorral*, were abandoned in the rush into reforestation in the 1950s and 1960s. The objectives, protection of dams against siltation and wood production, were achieved through modern reforestation techniques requiring greater use of machinery and the plantation of conifers. The effects of the adoption of modern plantation techniques, especially those using dynamite and the construction of terraces, were detrimental for SWC. These techniques were adopted and used without preliminary field trials to ascertain their suitability to local conditions. Evaluation of local conditions, it can be assumed, was done visually. Available methodologies to calculate rates of soil loss, the varying conditions of soil and vegetation in particular areas providing data for a more varied type of plantation were and are still not used [11].

The new trends of reforestation planning in Guadalajara Province are a continuation of the past experiences. Although the protective effects of *matorral* are recognised and declared as areas of ecological interest by the Autonomous Government of Castilla-la-Mancha (JCCLM, 1990), past reforestation practices which give preference to plantations still prevail. The two main persistent trends in SWC planning and implementation in operation for 'set-aside' land are firstly, the replacement of *matorral* with plantations and secondly lack of participation in the planning process by affected people.

With regards to the first trend, European and Spanish Government funds designated to reforest 'set-aside' areas which have been used at least once in the last ten years for agricultural production, are to a great extent being used to reforest *matorral* areas abandoned in the late 1960s and early 1970s. The drive for reforestation still continues with the objective of wood production rather than SWC. The plans of reforestation under set-aside in Puebla de Valles is an example in which land protection is not the issue, since the conditions of erosion under *matorral* are minimal, but reforestation for wood production.

With regards to the second trend, the lack of participation, a self-help programme, as suggested by Chambers, V., cannot be expected to emerge solely from existing community organisations, if at all, because of their lack of experience in working together. A participatory approach would need more than statements of intent, such as those made by Barbero Martin and Gonzalez Hernanadez - it needs the supportive role of the State, as a necessary facilitator

[11] Derisory comments dismissing the validity of IBERLIM findings by Government officials during the meeting with Greenpeace, were based on the assumption that foreign scientists fail to understand LD and erosion processes in Spain (Rodriguez Vargas, personal communication, 1995). The IBERLIM project, however, was rated with one of the highest marks by EU assessors.

for the relevant conditions to evolve. This implies listening and actively working with land users in their community with the objective of finding solutions to their reforestation problems, involving them as partners avoiding, as Chambers, V. (Ibid) puts it, the dangers of "...legitimization through token participation". Although it is generally agreed that the actions of external actors can influence change and patterns of behaviour among respondents (Seur, 1992: 119), in this case the influence of the author's presence/influence during fieldwork and/or, at a later stage, the provision of written documentation to respondents such as García Pérez et al (1995) and the IBERLIM report (1994), in the formation of CLCAPV is difficult to ascertain, but according to Long and Long (1992) important to take into consideration (p275). Ascertaining this influence would require further *a posteriori* research, by the same or other researchers, as proposed by Seur (1992), as a method of 'restudy'.

Lack of participation is a reflection of the political structure of the State and the operations of its bureaucracy. Exhortations for participation by Barbero Martin and Gonzalez Hernandez, can be interpreted as calls to gain the support of people in urban areas to put pressure on land users and other social groups, such as ecologist pressure groups, opposing reforestation, rather than the involvement in planning of genuinely interested groups, such as in the case of the people of Palancares.

The physical and socioeconomic results of reforestation, at Provincial and local level should serve planners, at regional, national and European level, as models from which to learn for future action. The findings of the IBERLIM report, the growing opposition to reforestation with monocrop species and mechanized methods by ecologist pressure groups, and the long lasting rejection to these by land users, provides an indication of the things which should be avoided in SWC planning. These broadly are, avoiding autocratic and technocratic approaches and the implementation of reforestation methods not adequately suited to the specific physical conditions of the area. Avoiding autocratic and technocratic approaches imply greater involvement of land users in the planning and implementation processes. Many agencies, such as the World Bank (Bhatnagar and Williams, 1992) and UNESCO (1986a: 95), are concerned about the lack of participation of rural communities in the planning and implementation of these type of projects. This, however, mainly refers to the developing world. In the case of Spain and the EU a participatory strategy has been and still is absent. The reasons for this absence in EU policy making needs further investigation.

An evaluation of new methodologies and methods for data gathering, analysis, project elaboration and implementation through participation, presented in part three of the thesis, will help to put into context some of the shortcomings of the existing official system, as well as explaining the one used for data gathering for the case study. This is proposed as one example of the options available, not only to official agencies to adopt, but also of research value for explaining LD processes and the changing nature of data collection in academic studies.

Fieldwork methods, results and recommendations

Although the need for multidisciplinary teams in planning and implementation for SWC through reforestation may have always been present, the recognition that there is more to reforestation than just planting trees according to soil type, climate etc., is growing. The changing social, economic and political composition of rural society and expectations for greater regard for the environment require adjustments at Government level and the adoption of a 'bottom-up' strategy in planning. An indispensable part for the success of SWC projects is that perceptions of the problem by rural communities are taken into account.

Acknowledgement, in the form of declarations of intent, that land user participation bring about greater success in reforestation is only a form of acceptance which can be transposed to practice. To do that in Spain the State must broaden the professional composition of forestry planning teams to facilitate understanding of the perceptions of rural people and promote participation.

Worldwide concern about the great limitations of 'top-down' forestry programmes and other forms of rural development has prompted the need for improvement in the way they have been planned and implemented. Gil (1986) claims that cooperation by affected people in setting up rural development objectives and the elaboration of plans must be achieved through their active and free-will involvement. If cooperation is not accomplished plans are condemned to failure from the very start (p.137). As shown in previous Chapters and judging by the ample experience and examples available from less developed countries, 'top-down' approaches have a lesser chance of success than 'bottom-up' ones.

A fundamental way of gaining the 'free-will' cooperation of Spanish rural people for the elaboration of a SWC project, is by finding out how they perceive the problems which affect them. According to Millington (1989), the main criterion for the introduction of planning for soil conservation is the perception of the problem by peasant communities and individuals rather than by experts (p.288), if the objectives of such SWC programmes are to serve the needs of those communities. Some of the arguments made for the participation of the land users and other social sectors in the planning, designing and implementation of reforestation in developing countries can serve as guidance for the Spanish planning case.

This third part of the thesis examines changes in the methods of data gathering for the study of socioeconomic processes of LD and the promotion of participation in planning for SWC through reforestation. Multidisciplinary methodologies (those presented in section 'v' of Chapter one) and the methods of data collection and analysis, in this part three of the thesis, were tested in fieldwork in the areas of study. The results of the analysis of this data are proposed as an explanation of the socioeconomic processes involved in LD in the area of study, and as empirical evidence of the desirability for greater participation in planning and implementation of forestry practices for SWC in Spain. Part three of the thesis attempts to show that the adoption of these methods constitute a form of collecting information which is rapid, reliable, explanatory of the processes and promotes the participation of affected people in planning and implementation.

The basis for the choice of methods of research used in field work in Guadalajara Province is examined in Chapter Six. Chapters Seven and Eight use two different methods of data collection in field work. These methods are, in Chapter Seven, a interview based study of land user's perceptions of LD in terms of a combination of 'factors and effects'. In Chapter Eight the visual perceptions and opinions of danger of erosion among social groups affecting the decision making process of SWC is ascertained through the use of 'pair-wise' photographs. These methods and the methodological approaches used are shown to be of scientific and policy making value.

Chapter Six
Methods of data collection and participation

This Chapter reviews Rapid Rural Appraisal (RRA) and Participatory Rural Appraisal (PRA) methods of data collection for the explanation of processes of LD and the promotion of participation in planning.

RRA methods are quick and cost-effective fieldwork forms of data gathering. While RRA methods mainly extract information from respondents, PRA strives to facilitate their *involvement* in the collection and analysis of this data, often with the purpose of facilitating their empowerment. The exploration and explanation of the socioeconomic processes of LD is needed before plans for SWC projects are drawn to improve their rate of success. Much of the experience in RRA and PRA has been gained in developing countries and materialised with the need for more cost effective forms of data gathering for researchers and decision makers. It is essential that decision makers have access to data which is reliable and up-to-date. PRA emerged from the 'deficiencies' of RRA, the needs for refinement and the involvement of respondents, not only in parting with reliable information, but also as 'research partners' in the process. In this thesis the methods of RRA and PRA provide an example of data gathering which if adopted in Spanish forestry planning could improve the results of reforestation projects.

The improvement could arise firstly, because of a greater amount of and more reliable social data gathered is made available to decision makers. In the past, as shown in Chapter Five, social data was not made available to, or not required by, decision makers. Secondly, in terms of the participatory effects of gathering that data, extending the decision making process to affected people, could improve not only the planning, but also, in the medium and longer terms, the operations of implementation and maintenance of forestry projects.

As already explained above, one of the main assumptions of this thesis is that reforestation projects for SWC and/or wood production, basically are rural development projects. One of the main problems with reforestation in Spain is that it has been treated by technicians, such as foresters, as engineering construction works. This accounts for much of the initial or long term failures of these projects in Spain.

Most agencies are aware of the dangers of single discipline approaches to rural development planning, such as reforestation, especially when these disciplines are only partially suited for the task. Cernea, writing for the World Bank, stresses that:

> "...present day planners and technicians quite often do

> poor social engineering, unassisted by the professional competence derived from sociological and anthropological knowledge. ...Planning agencies or policy bodies should be wary of relying on mechanical engineers to do social engineering" (Cernea, 1991: 30).

In Spain forestry planning has been done by forestry engineers with little training in gathering social science data. The reforestation plans for Guadalajara largely ignore the social conditions crucial to successful planning of a reforestation project, not an uncommon occurrence in the forestry sector. Shepherd (1992), explains that:

> decision makers need to understand that ...the political, social and economic causes of the [deforestation] problem are also part of the solution. Foresters have not had this task in the past. They were able to talk of managing or protecting forest, and to treat people who got in the way of these processes as an impediment (p.8-9).

Unlike engineering works, the unknown outcome of development projects requires changes in direction or emphasis which can only be detected and modified by monitoring and evaluation during project implementation. Monitoring and evaluation, as an ongoing process can best be achieved with the interest and commitment of rural people. The organizational structure of projects must allow for feedback modifications to be inserted, monitored and re-evaluated, from the very start, in a flexible and timely way.

Explanations of LD often emphasised land mismanagement, with the blame placed solely on land users' irrationality, ignorance, conservatism, etc. No attempt is made to understand the reasons for these apparent attitudes and actions. Field visits by planners in Spain, if they take place at all, are mainly to ascertain the physical characteristics of the area to be developed. The use of remote sensing alone, which otherwise could be a great help in planning for SWC, carries the danger of displacing field work for the collection of social data still further. Spanish reforestation planners' appetite for modern technical methods of this kind is considerably greater than for participatory approaches. The spread of the ideology of modernization, inspiring concrete attitudes and providing orientations for action (as debated in Chapter Three above), instrumental for the current approach taken for reforestation, influence the choice of methodologies and methods considerably, hampering the emergence of participatory approaches in Spain. The first section of this Chapter examines the main characteristics of RRA methods of data collection, and section ii those of PRA.

i. Rural appraisal methods and socioeconomic processes of land degradation

Understanding land users' practices, knowledge of their social and economic circumstances and aspirations, and their participation in planning and implementation can improve the success rate of SWC projects. Academic approaches to the study of LD change in order to adapt to changing social circumstances. Smith claims that:

> Economics has been displaced by sociology (and in particular interpretative sociology) and anthropology (especially its ethnographic tradition) as major influences on geographical practice. The impact of strands of anthropology is notable, for it could be argued that it is in this discipline that the interplay of case study, method and theory has been most clearly articulated (1988: 262)

Methods of collection of socioeconomic data have been changing from the use of questionnaire surveys to other rural appraisal methods. The main problem for questionnaire surveys is that they can be time consuming yet still unreliable and can be difficult to conduct effectively in rural situations. The growth in importance of RRA as a rapid method for data gathering, initially tried in the field in an *ad hoc* form by researchers trying to improvise ways of saving time in data collection, acquired greater social scientific rigour by the contributions made by social anthropology.

More cost effective methods, such as RRA and PRA, which allow outsiders not only to collect data but also to learn, grew out of the recognition of the valuable knowledge of rural people. These methods can provide valuable information for assessing decision making processes and SWC measures used by land users. Cernea (1991), presents RRA methods as a form of data gathering underlined by the idea that "...the rural people themselves are the most knowledgeable, but often the most overlooked resource of information on local problems and activities (p.514). Paying due attention to land users' knowledge through RRA methods of data collection, constitute a sound basis for the explanation of socioeconomic processes of LD.

There is a great wealth of experience in the use of RRA methods in the developing world which can be applied successfully in Spain and other European countries. These methods have already been tried in countries of the North to train practitioners and to train trainers (Robinson, 1994). Their systematic use, with the 'supportive role of the State', as envisaged by Blaikie and Brookfield (1987), would establish better planning practices for SWC through reforestation and produce great environmental and economic benefits.

The use of RRA dates to the 1970s when researchers, concerned with the time needed for data gathering through conventional formal interview and questionnaire surveys for statistical analysis, started practising 'shortcut' methods. The emergence/acceptance of these methods took time because of the entrenched faith in conventional questionnaire surveys. Chambers (1994a) explains that:

> "In the late 1970s, though, most of those professionals who were inventing and using methods which were quicker and more cost-effective than 'respectable' questionnaire surveys, were reluctant to write about what they did, fearing for their professional credibility" (p.956).

As a result of that fear, Howes (1981) also notes that, explanations of rural appraisal methods were "...seldom aired in books or articles..." (p.41).

RRA emerged as a form of information gathering which was "...relevant, timely, accurate and usable ...to decision makers, and cost-effective for outsiders ...to learn about rural conditions..." (Chambers, 1985: 33). Between 'quick-and-dirty' RRA, whose findings can be seriously misleading, and the 'long-and-dirty' methods used by anthropologists and economists through long survey questionnaires, whose massive amount of data may,

> "...never be coded, or if coded never punched, or if punched never processed, or if processed and printed out, never examined, or if examined, never analyzed or written up, or if analyzed or written up, never read, or if read, never understood or remembered, or if understood and remembered, never actually used to change action",

Chambers proposes a "fairly-quick-and-fairly-clean" approach. RRA methods, however, have been hampered by "brainwashed professionals" subservient to the "hegemony of statisticians and their failure to treat statistical methods as servant not master". Unless questionnaires are short, Chambers proposes qualitative data gathering. Although this does not avoid superficiality and error completely, it controls them, achieving "...cost-effectiveness through optimal ignorance [what is not worth knowing], and appropriate imprecision [the degree of accuracy that is unnecessary]" (Chambers, 1985; Chambers, 1983: 199-201).

Minimising error and superficiality can be achieved through the use of RRA and PRA as methods which are practical in the field under time constraints for those parting with information and those collecting it. The origins of these methods are identified by Chambers (1994a) as lying with three main groups of problems: Firstly, "..dissatisfaction with the 'biases' ...of rural development tourism", secondly, "...disillusion with the normal process of questionnaire surveys and their results", and thirdly, the need for "...more cost effective methods of learning [which] were sought" (p.956). The biases distorting information for decision making or research were, spatial; where professionals, either collecting data for research or officials during field visits, tended not to call on and neglect areas with poor road access because walking or using unconventional forms of transport present practical inconveniences to visitors, project; backing those with already official support and neglecting those who may be in greater need but lacked established official links, person; meeting men, elites and users of services, but not the poor who are less outspoken and more submissive, seasonal; visiting the areas when weather conditions are suitable for officials and decision makers, but perhaps less important for information gathering at these times, and diplomatic; not making an effort to witness poverty to avoid causing offense, often arranged in conjunction with local elites, especially when it is in their interest to hide the existence of poverty and inequality. These biases can account for serious distortions in perceptions of the reality, deforming the results of the analysis of data with detrimental results on the effectiveness of project planning and implementation.

In the early 1980s, working practices and theoretical foundations were developed for RRA. Adaptations of the basic principles of RRA, especially to ascertain land users' knowledge, evolved according to the needs of each specific field work situation and through academic debate. Although constituting a better way for outsiders to learn than through questionnaire surveys, RRA is a means of information extraction. It has limitations for the promotion of participation because respondents are excluded from the analysis of their data. RRA is often used in the initial stages of data gathering for academic research or planning. There are good grounds, however, to assume that RRA, because it probes into people's knowledge, often discussing and assessing their predicaments, provides a greater chance for their involvement in planning and decision making than if data gathering was done through structured conventional survey questionnaires. McCracken et al, (1988), categorize RRA into four broad classes: exploratory, topical, participatory and monitoring. These authors explain that exploratory RRA is well equipped to obtain initial information about a new subject or agroecosystem. "The output is usually a set of preliminary key questions and hypothesis". There are several types of exploratory RRA. Four of these are exploratory and topical surveys, informal agricultural surveys, *sondeo*, and agroecosystem analysis.

Examples of exploratory surveys are: the identification of a zone of study of a target population; the exploratory survey "...using semi-structured interviews with guidelines for questioning", and; the formal verification, a final questionnaire evolving from the exploratory survey. The technique of exploratory survey methods have been used for the construction and verification procedures of the final list of questions for data gathering for the 'factors' and 'effects' used in these case studies in the following two Chapters.

Another type of exploratory RRA is the 'informal agricultural survey' relying more on direct observation than on the use of a questionnaire. This type provides the basis for formal verification and assessment of the feasibility of a project. The *Sondeo* approach utilizes a multidisciplinary group of scientists working in pairs to carry out interviews with land users. The other type of exploratory RRA is 'agroecosystem analysis', producing diagrams, maps and transects describing "...spatial patterns and, in particular, the location of particular problems and opportunities" (McCracken, ibid: 50-53). This system of analysis is an example of a method which could be useful for land users to identify areas in need of particular land management practices such as erosion control on a continuing basis.

Exploratory surveys and 'topical' RRA, are highly relevant methods to this case study. One of the working characteristics of topical RRA is that at the same time that it narrows research it deepens the analysis. McCracken (Ibid), explain that "...a valuable end product... is an extended hypothesis. ...rather than a definitive answer to the question...". Through topical RRA researchers provide a summarized explanation of the situation suggesting causal factors responsible for the problem being studied. The hypothesis can then be used as a working hypothesis providing recommendations for actions or as a further research hypothesis, to be either validated or disproved. The same as the working hypothesis, the research hypothesis can also entice recommendations for action (1988: 61). The testing for the working hypothesis can be tried through the implementation of recommendations for action.

In this thesis recommendations for the adoption of RRA and PRA methods for explanation of LD processes and the promotion of participation in Spain, are based on the results obtained in the two following Chapters. RRA and PRA would be especially well suited to the first stages of data gathering for project elaboration. The implementation of projects of reforestation for SWC, using the results of the data obtained has not been empirically tested. This requires greater effort than a single researcher can master, and the testing for the working hypothesis would require the involvement of the reforestation agency of Government and the affected people on a long term basis. Rather than the full process what has been empirically tested is simply the suitability of RRA and PRA for data gathering and the promotion of participation.

All these classes and types of RRA methods are, as in the case of the participation of respondents in the construction of final questionnaires, to a great extent participatory, since they rely on the interaction between the researcher and the informant. Interaction through dialectic exchanges, investigation by discussion and logical disputation, with respondents can develop into partnership in the process of data collection. The main drawbacks of these methods have been the inability to include respondents in the *analysis* of their information.

In contrast with RRA, the use of PRA methods in data gathering is conducive to the promotion of participation in planning. The next section reviews the main characteristics of this method as an explanation of its application to the case study and as a feasible proposition for its adoption by Spanish planners.

ii. Rural appraisal methods and the promotion of participation

The spread of participatory approaches to studies, implementation and evaluation of rural development projects is a useful indication of the possibility of its insertion in the Spanish SWC planning system. A look at its importance, as the precursor of 'ideological' reversals, from 'top-down' to 'bottom-up' approaches among researchers and governmental planners, would be helpful. Chambers (1994b) emphasizes the reliability of data collected through PRA in comparison with that collected through more traditional methods. Explanations of the growing popularity of PRA include reversals such as from "...individual to group, verbal to visual, and measuring to comparing; and from extracting information to empowering local analysts" (p.1253).

The way PRA methods are put to use has great implications for the interpretation of results (in this case explaining socioeconomic processes of LD), and the promotion of participation in planning for SWC. PRA has been described as:

> ...a growing family of approaches and methods to enable local (rural or urban) people to express, enhance, share and analyze their knowledge of life and conditions, to plan and to act (Chambers, 1994b, 1253).

The view that "...manuals of methods should be avoided; that the PRA principle of 'use your own best judgement at all times' [permits and encourages] creativity..." (Chambers, 1994a: 959) is a valid one especially for those well versed in its principles or with some practical experience in its application. Using the researcher's own judgement, however, should not exclude the utilisation of handbooks or source-books, (those cited in Chambers, 1994a: 964), such as the several source books on methods and training being prepared by IIED as a contribution to the diffusion or guidance of PRA. Encouraging the application of PRA methods through other forms of diffusion, such as publications in academic journals or books is not contested because they are seldom used as manuals/textbooks to be 'learned' and applied. Much may depend on whether the manual should be treated as guidance in the 'learning' process rather than as a 'bible'. The way

PRA manuals are utilized may have to be explored further, especially in societies where the education of potential users of handbooks, including decision makers and planners, has been based on text book 'learning', rather than on self taught library research for course work as in British universities. The Spanish situation is the absence of both participatory efforts in planning and PRA manuals. Even if PRA manuals were introduced a third complication related to the constraints of the education system, based on text book 'learning' for repetition in exams, would most likely arise. Bringing the use of PRA manuals to the attention of Spanish forestry students and into planning procedure would be an improvement if used as guidance, avoiding rigid 'mechanical' application in practice.

Different forms of RRA and PRA are intended to trigger imaginative adaptations to concrete situations, 'using best own judgements at all times'. The construction of rigid barriers between RRA or PRA could result in stifling and inadequate applications of the research method giving misleading conclusions. It is important to visualize the use of RRA and PRA methods as interdependent and able to evolve in field work situations, flexible and open to creativity. Often what has started as RRA evolves into PRA, leading "...on to planning, action and participatory monitoring and evaluation, carrying the PRA label with them" (Chambers, 1994a: 959). Equally so it could happen that what was planned to be working as PRA is used as a data extraction exercise by, for example, researchers confining it to the range of RRA, with little control over the interpretation and analysis of this data by informants, and a relatively small empowering effect.

The evolution and application of RRA methods from data gathering to "...data sharing and empowerment" through the progression to PRA, Chambers (1994d) suggests, amounts to a paradigm shift from development to participatory development thinking. By participatory development Chambers does not mean the cosmetic labelling applied by some Governments or donor agencies so the project gains credibility, nor co-opting practices so local people participate in "our" project, but its reversal, through the empowering of people so "we", Governments, donor agencies, and researchers, participate in "their" project. Chambers acknowledges the coexistence and overlap of paradigms and detects a shift from a paradigm of things, dominant in the 1950s and 1960s, to a paradigm of people and empowering. This, according to Chambers (1993), requires a change from both neo-Fabian and neo-liberal development ideologies, to one of reversals. Chambers (1994b) explains that RRA and PRA are methods which have been developed by practitioners trying to make things work who have little time to ask themselves why they work - which is more the concern of academic theorists. Basing his analysis on the experience of these methods he posits the idea of 'reversals', as noted above, "...meaning directions away from normal professional practices and toward their opposites", as an explanation of the reasons why these methods work (p 1262). These changes in paradigm from 'things' to 'people' and from forms of data gathering such as RRA which are data extractive, to those of PRA which through the handing-over process in planning and action involved in data gathering are empowering, can be detected in the evolution of objectives in these two methods. Table 18 below provides a useful comparison of the evolution between RRA and PRA.

The new paradigm visualizes changes in professional values, training and rewards, encouraging "...individual professionals to fight within the structures in which they find themselves... Major shifts come not just from big decisions ...but also gradually through a multitude of small decisions and actions which together build up into a movement". The basic issue in these shifts is power in the form of the powerful helping the empowering process for the powerless (Chambers, 1993: 13-14).

This paradigm shift is based on four new practices: by outsiders giving rural people confidence to do things for themselves; by utilizing experienced PRA village trainer/facilitators in other villages; by building up a visual illustration of their knowledge, judgement and preferences increasing commitment, consensus and self confidence, with the role of the outsider as a facilitator; and by reversing the behaviour and attitudes of outsiders and villagers so that outsiders listen and facilitate and villagers are empowered (Chambers, 1993: 11).

This last practice, based on building up rapport, is important for gathering data which is not only rapid but also more reliable. Chambers (1992) explains that showing "...humility, respect, patience, and interest ...paying attention, listening, watching and not interrupting" reinforces rapport and the participatory process (p.22). This type of reversal, however, must not be taken as security against 'tailored' information, such as when villagers stress or omit information if it is seen as detrimental or beneficial to their interests. Although building rapport is extremely important

	RRA	PRA
Period of major development	Late 1970s-80s	Late 1980s-90s
Major innovators based in	Universities	NGOs
Main users at first	Aid agencies Universities	NGOs Government field orgs.
Key resource earlier undervalued	Local people's knowledge	Local people's analytical capability
Main innovations	Methods Team management	Behaviour Experiential training
Predominant mode	Elictive, Extractive	Facilitating, Participatory
Ideal objectives	Learning by outsiders	Empowerment of local people
Longer term outcomes	Plans, projects publications	Sustainable local action & institutions

Source: Chambers, 1994: 958

Table 18: RRA, PRA compared

to maximize the reliability of data and encourage participation, Cornwall (1993) warns that the outsider's transfer of control to villagers is not a guarantee for unbiased information. The motivations of outsiders "...behind the guise of open minded curiosity may continue to be questioned" (p.23) and be a reason for the provision of 'tailored' information.

Although many government organizations claim, at least, an interest in the promotion of participation, institutional support for action, as for example through the provision of 'facilitators' in the planning process, is often thin on the ground. "The past decade has witnessed more shifts in the rhetoric of rural development than in its practice" (Chambers, 1994a: 953; Cernea, 1992 in Cornwall, 1993: 12). Nevertheless, different kinds of participation are gaining ground at government and NGO levels.

Disagreement on the degree of participation may arise from different interpretations of participation. There are great difficulties in encapsulating the meaning of PRA, mainly because of its dynamic rather than static character. Uphoff (1991), explains that "without setting up any absolute standard for judging participation... [projects tend] ...toward what might be called 'pseudo-participation'...", leaving people to judge it according to their own criteria and definitions (pp. 477-478). Divergence of opinion on the form and degree of participation "...lie in [the] fundamental differences in perception of the development process" (Oakley and Marsden, 1984). There are two main views of participation, firstly: those who visualize it as an empowering process through "...voluntary, spontaneous and often gradual growth of organized group activity, preceded by ...collective reflection [and] ...active involvement of members and by self-reliance arguing for participation for liberation. Secondly, those visualising it as a way of mobilizing people "...to implement activities generally decided by outsiders..." (Oakley and Marsden, Ibid).

Apart from the difficulties in what can be considered participation, there are problems in defining what constitutes liberation and mobilization. These, as in the case of RRA and PRA, may not be mutually exclusive in practice. The organizational capability of outsiders to 'mobilize' people to accept and engage in their development projects determines the possibility of implementation. In the case of participation for liberation, activists encourage the intrinsic capacity of people to organise their own development in a group context and are themselves often 'involved' in the empowering plan. However, because of the fluidity of organic social structures, participation for liberation can also become a fertile ground for 'mobilization' by outsiders. Greater organisational capabilities can be co-opted by governments eager to implement their plans. Contrary to this, because 'mobilization' requires collective reflection and stimulus for group activity and organization to accept or reject a project, its higher level of organization, can also become an entry point for activists and participation for liberation. For example the efforts of a Government agency to 'mobilize' a group so a project is accepted and the affected group engage in its implementation can create organisational conditions which can be coopted by activists encouraging the group's empowering. Claims that "An important element of self-reliant participatory development is the Analysis-Action-Reflection cycle..." (Burkey, 1993: xviii), however, cannot disclaim that people who have been 'mobilized' and work in outsiders' projects can also operate the same cycle. An important condition for the development of the Analysis-Action-Reflection cycle is the level of the organisation of the group, and this can occur out of the experience of 'mobilisation' or 'empowerment'.

The value of knowledge in PRA

If one of the most important attributes of PRA, that of generating knowledge, as something which "...is produced through the interactions of people in particular situations" (Cornwall, 1993:8), is fulfilled, participation can be considered of great value for understanding processes and promoting planning. Arce & Long (1993?) emphasize that knowledge is not about discovering the real facts waiting to be discovered, but that created through the interaction characteristics of particular individuals or groups (p212). "Advocates of PRA argue that the production of knowledge and the generation of potential solutions should be devolved onto those whose livelihoods' strategies formed the subject for research" (Cornwall, Ibid, p.21).

The problems of integration of scientific and practical knowledge should be carefully considered by researchers or foresters looking for solutions based on local people's perceptions and understanding. This is because "...researchers and farmers use different frames of reference when thinking about agriculture" (Scoones and Thompson, 1993: 5). Local people's knowledge (LPK), of for example, the microclimatic or soil conditions of the area they cultivate, should be taken into account and used according to the original circumstances from which it emerged - their own working practices and expectations of the ecosystem. Scientific knowledge mainly derives from experimentation with the objective of obtaining scientific results. The integration of scientific knowledge and LPK imply marrying different criteria and methods of information and assessment into one.

Transferring knowledge from one system to the other is not a simple task and no guarantee for empowerment or mobilization. Scoones and Thompson (Ibid), view "...knowledge as a social process, and knowledge systems in terms of a multiplicity of actors and networks..." for information negotiation, and not as "...single, cohesive structures, stocks or stores" (p.0) for easy usage and transfer. These authors stress that "...social processes do not follow straightforward systemic patterns and cannot thus be manipulated..." by outsiders transferring power, as for example in the form of technology, to insiders. In this case these authors challenge, what they call the populist view, that technology can be transferred as a form or knowledge propagation. They criticise both the view that Rural People's Knowledge (RPK) is primitive, unscientific and in need of modernization, and the view that it should be "...incorporated into formal research and extension practice..." to achieve more sustainable strategies of development. The first should recognize that RPK and western science "...represent contrasting multiple epistemologies produced within particular agroecological, sociocultural and political economic systems". The second, regarding the combination of RPK and extension "...must address fundamental issues of power and need in development" (p.2).

Knowledge, as a social process, or knowledge systems, as embodying a multiplicity of actors and networks, in their power relations context, are, however, important tools in planning through participation. Whether knowledge is sustainable, as a mixture "...of the social, the scientific, the local, the technical, the natural, and perhaps even the magical..." (Murdoch, 1994), or it is complementary to scientific knowledge (Pawluk et al, 1992), it must be taken into account in planning. The promotion of participation through people's knowledge and explanations of processes of LD, encourages participation in planning for SWC and improves the integration of RPK and scientific knowledge.

Land users' knowledge is often dismissed by powerful technocracies. In informal interviews during fieldwork in the area of study, planners such as Camacho Lopez, N., often dismiss the importance of observation and understanding of physical and socioeconomic processes of LD by land users. According to this official, the most the few old farmers left in these villages can explain are anecdotal events such as landslides in certain places (personal communication, 1994).

Land users' capacity for understanding these events and the processes of gradual degradation and erosion, and linking them to socioeconomic forces and physical conditions, through working the land and continuous observation are dismissed. Contrary to Camacho Lopez's view of land users knowledge, Burkey (1993), who under Scoones and Thompson classification could be pigeonholed in the populist camp, provides examples of self-reliant rural development through the usage of people's knowledge.

A large body of literature termed 'Farmer First' (FF), as for example Chambers *et al* (1989), Thurp, (1987), has exercised considerable influence in helping to counteract the hegemony of modern 'scientific' rural development, which systematically discredited RPK. Although the support given by influential Spanish scientists and the ecologist movement to land users' opposition to reforestation in Palancares, as discussed in Chapter Five, may not be because of the influence of FF literature, they give credit to local knowledge and actions. Another illustration of the challenge to the prevailing technocratic approach which deprecate the knowledge of local people, is that of the actions of CLCAPV (the Commission for Land Consolidation and Afforestation of Puebla de Valles), also discussed in Chapter Five, trying to provide alternatives to Governmental top-down proposals for reforestation. These examples are signs of ideological reversals - from regarding land users as irrational and ignorant, to the recognition of their actions in defense of nature, or the organization of land users as a sign of incipient empowering principles at work. One of the main shortcomings of FF literature, however, is that it does not examine the existing interaction/problematic between farmers, scientists, and policy makers. Scoones and Thompson (1993), argue that farmers and scientists are differentiated by their relations of power. Equally so officials and land users are differentiated by these long lasting relations in Spain, a legacy of the ideology of the past political system taking its time to change.

The extent and form by which participatory approaches have been evaluated - and by whom, may lead to conclusions that these approaches facilitate environmental and economic sustainability. Chokor and Odemeroh (1994), in their study of Southern Nigeria found that land users' traditional knowledge of land evaluation of degradation and management, is an important component to be integrated in sustainable conservation management of agriculture. Darkoh (1990), argues that the social and environmental conditions in the arid and semi-arid lands of Kenya, precludes these from making a contribution to national GNP in a sustainable economic form through international trade. Darkoh concludes that, rather than trying to make a significant contribution to national GNP, the population in these areas could rather secure a form of sustainable development achieving a standard of living which is as high as possible. Murdoch (1994), however, warns that not all local knowledge in traditional agriculture is always environmentally friendly and sustainable, but the same as scientific knowledge, it should be investigated on its own merits, in 'action'. Barbier (1987) argues that for development to be sustainable, project design and implementation must be tailored to the needs and capabilities of the affected people. Barbier's description of sustainable development (1989, cited in Bryant, 1991) to encourage "...grass-roots participation [with] the primary objective [of] reducing poverty" ...minimizing resource depletion, environmental degradation, cultural disruption, and social instability", is criticised by Bryant, because these criteria are devoid of politics (Bryant, 1991). Bhatnagar and Williams point out that participation, particularly in forestry "...tends to build commitment, which in turn tends to lead to greater sustainability" (1992, p.4). Empirical examples of success or failure of participatory approaches in developed countries are few, but what is crucial, as Bryant (ibid) argues, is to ensure the positive engagement of the State in supporting these approaches if these are to succeed. The applicability of appraisal methods which encourage and facilitate participation are growing and in the process of being tried and adapted from experiences of developing countries. The large list of RRA and PRA methods tried in the north (Robinson, 1994), is an indication of the spread of these experiences, methods and knowledge from the south.

Some influences of PRA

The influence of participatory approaches in planning for SWC is difficult to ascertain, given the diversity of criteria available to judge. An example of successful use of RRA/PRA methods is provided by Cernea (1992) who documents the mobilization of rural people through the involvement and support of the Mexican Government for the establishment of PIDER, an agency in charge of the promotion of participation. This agency came to a halt because of central government cuts in their budget in public expenditure, and with it much of the institutionalized participatory arrangements for capacity building. This form of 'mobilization' was dependent on external funding and organization, and what in this case failed was the link within the organizational structure of Government due to lack of funding for those directly involved in the promotion of participation in PIDER. One of the gains, however, is the improved organic capacity of people in rural areas to build a lasting social cohesion capable to operate PRA in Mexico. It can be argued that since what was achieved through PIDER was largely accomplished by rural people, the experience they gained in social organization and dealing with power cannot be ignored or repossessed.

Potential users of research findings, information and/or RRA - PRA manuals of participation in Spain, including foresters, ecologist pressure groups, or NGOs, are curtailed by constraints on research and/or dissemination through publications. Although research and published material supported by organic institutions, such as MAPA with its large collection of books and journals published, is important in Spain, research and publications regarding the potential for participation is extremely scarce. The evaluation of participatory methods of research or planning by a minority of Spanish academics, planners or forestry practitioners, if any, rely on published accounts and experiences from outside the country.

The successful demonstration of the viability of RRA and PRA is possible if the State provides a 'supportive' role ensuring the interests of affected people are represented. Spanish reforestation programmes for timber production and the great majority of even small projects for SWC imply a need for Governmental and State involvement. Blaikie and Brookfield (1987) see the "coercive as well as the supportive" role of the State as indispensable for the promotion of a 'bottom-up' approach, and they argue that "it falls to governments to decide where to concentrate their participatory and farm-based initiatives". In a similar manner Ostermeier and Yu (1991) also argue that "if multiple interests are to be represented in the policy process, it will be Government's responsibility to see that these interests are represented." (p.83). According to these, it is also the responsibility of the Spanish Government to encourage research, the dissemination of findings and their evaluation to improve planning processes for SWC through participation.

Conclusion

To increase the value of research, findings should have a practical application. In this Chapter it has been shown that RRA and PRA methods are highly applicable, as innovative forms of data gathering for explanation of processes of LD as well as methods to promote the participation of affected people in the planning process. The explanation of LD processes involves the self-evaluation by land users, in a historical perspective, of their inherent social and working conditions and extrinsic relations of power with the State, producers from other areas, or other social groups, such as the environmental movement, claiming an interest in the ecological consequences of land use.

The utilisation of PRA methods by land users is a valuable form of data gathering if made to encourage a participatory and constructive response in planning for SWC. Two strong factors in this response are firstly, that their explanations, grievances, or aspirations are taken seriously into account by planners from the very start in the data gathering process, and secondly, the possibility of economic gain. Marrying economic gain with environmental protection and aspirations is a task of Government which can be best achieved by the usage of RRA and PRA methods of data gathering if integrated in existing planning practices in Spain.

The application of these methods to data gathering, according to Chambers (1994a), spreading especially fast from developing to developed countries (p 962) point to a change in direction from 'top-down' to 'bottom-up' strategies of development planning and practice. However, RRA and PRA have not yet been put to work by Spanish reforestation planning agencies.

The use of participatory approaches for this thesis has minimized distortions in the data collected by the use of the methodologies used, especially the anthropological approach which is fundamental to RRA and PRA methods. The combined approach of participant observation methods[1], dialectical discussion with respondents, and most importantly, their involvement determining the way field work was conducted, reduced possible data distortions. As a result, tentatively, it can be argued that the formation of the Commission for Land Consolidation and Afforestation of Puebla de Valles (CLCAPV), has been influenced by the way data for this thesis was collected, through the discussion and problematisation of land users' dilemmas regarding the possible reforestation of much of the land in their village. If the form of data gathering influenced the formation of CLCAPV, it could be claimed that the methods used have contributed towards the empowerment of these villagers involved. The organization of CLCAPV required considerable effort and determination on their part, rising the stakes in negotiation with the forestry office to find solutions which are acceptable to all groups involved, including those claiming an interest in the ecological effects of the reforestation project, the ecologist movement. In this case the testing for the working hypothesis, that RRA and PRA methods provide a reliable explanation of LD processes and encourage the participation of people in planning, has been tested in field work and proved appropriate.

The next two Chapters describe how the methodologies and methods were put into practice, the form of analysis of data, and the use made of some of that data when published[2]. The methods and methodologies in fieldwork, firstly sought to ascertain the perceptions and explanations of socioeconomic processes of LD by land users in the villages under study, as an example of a PRA method. The second method used, as an example of a RRA method, exploring the visual perceptions of landscape changes with 'pair-wise' photographs, sought to determine how 'knowledge' of LD processes, can be compared and studied among different social groups. The agreements among social groups regarding the way in which they perceive some landscapes and processes of LD, can act as a binding elements to reach a consensus as to what would be the best course of action for SWC.

[1] These methods are fully explained in the next two Chapters.

[2] Examples of the publication of some of the data collected is that by García Pérez, J. D., Charlton, C., and Martín Ruiz (1995). Other data made available to respondents in the villages of study has been the IBERLIM report with some of the most relevant conclusions translated into Spanish.

Chapter Seven

Explanation of socioeconomic processes of land degradation by land users

This Chapter, based on fieldwork in Guadalajara Province, examines the factors involved in land users' decision making with respect to SWC conservation. Blaikie and Brookfield (1987) identified land users' decision making processes as warranting further research. The awareness and perceptions of land users about degradation, erosion and conservation is part of the rationale affecting their decisions on land use practices, and must be considered relevant to policy formulation. Land users' perceptions are addressed in this Chapter through the results of a field enquiry based on several interviews with each land user. These were structured around respondents' perceptions of a series of 'factors' and 'effects' relating to land use and land degradation in the areas of study. The examination of land users' perceptions is extended in the next Chapter through the use of 'pair-wise' photographs as a focus for response and discussion.

The data used in the case study was gathered during 10 months of field research in 1993-1994. The main aims of the initial interviews for the collection of these data were testing respondents' attitude and disposition to part with information, and building up mutual trust for the elaboration of a list of causes and effects of LD. This list of causes and effects was used in a more exhaustive second stage of the enquiry about land users' perceptions of landscape changes resulting in respondents being interviewed several times. The time spent with each respondent varied widely. Those respondents helping to construct the final list of questions were interviewed for longer than the others. Questions in the initial and successive stages of the enquiry aimed at problematising land users' predicaments in two main interrelated ways: one, by probing into their working agricultural practices using concrete examples of the effects these had on nature, and two, by debating the socioeconomic, environmental, and political effects of reforestation.

An important reasoning in this Chapter is that it falls to governments, and in this case to the Autonomous Government of Castilla-la-Mancha, to break barriers of distrust and help to establish long lasting planning and operational local institutions.

A study of the factors involved in decision making for conservation by land users is important for three main reasons. Firstly, a dialectical approach to discussion helps to break down barriers of distrust between land users and researchers. This contains the seeds from which a participatory strategy could grow. Secondly, the methodology and field methods of data gathering constitute the basis upon which to construct improved planning strategies. Thirdly, based on the two points above, it provides guidelines for effecting a participatory strategy for policy formulation, implementation and operations.

The first section of the Chapter examines what methodological and field work considerations should be taken into account when embarking in a data gathering exercise with the objective of building mutual trust and promoting participation. The second part is a description of the issues confronted in the construction of the list of questions[1] involving land users. In the third part the data and the outcome of their participation is analyzed.

i. Methodological and field work considerations

The answers expected were, in many cases specific or concrete in the sense that explanations often raised further questions in the minds of respondents or the researcher. The method of data collection can be divided into three phases: Firstly, the probing or initial interviews, secondly, the construction of the list of 'factors' of LD and their 'effects', and thirdly, data gathering, using a finalised list of questions and interviews based on 'factors' accounting for LD and their 'effects' on the land. These three phases were not discrete but there was some overlapping between them. This is the reason for more than three activities being specified in Table 19a below. From Table 19a, the first two activities mainly fall within the first phase of probing during initial interviews. These overlap with some aspects of the third and fourth, while the third to fifth, as a group, mainly fall within the construction of the list of questions. Tables 19a and 19b help to visualize the stages and main

[1] In order to simplify things the list encompassing 'factors of LD' and their 'effects on the landscape', will be referred to as 'the list'.

details of the initial attempts to collect data. These are subsequently explained and discussed in greater detail through the text of this Chapter.

Initial interviews in Retiendas			
Activities	Objectives	Results	Constraints
Gradual introduction to other villagers by a respected member of their community	Establish credentials	Corroboration of genuine intentions of researcher and research	Little time available by 'respected' member for introductions
Explanation of IBERLIM project	Establish credentials	Building rapport	Initial distrust, precautions
Trial of first list of questions	Obtain basic information of socio-economic structure of households	Realisation of little differentiation within the villages	Probing into economic circumstances generated suspicion
Trial of second list of questions	To obtain data on socioeconomic & climatic events which were perceived as erosive	Realisation of the graduality of LD processes, even in such rapidly eroding landscapes	Probing into personal details to detect dates of special weather events generated suspicion

Table 19a: Sequential explanation of data collection

Taking into account that LD is a long term process, the basic aim of the initial enquiry was to search for information which put these processes into a historical perspective. Research methods for qualitative data gathering were used in the enquiry. Quantitative data gathering was not considered feasible nor necessary, especially, as argued by Devereux & Hoddinott, when the focus is on changes through time (Ibid: 36). Government officials were also questioned about their experience and perceptions of SWC projects and relationships with rural communities.

The data collection is an example of a method which could be used to help to break barriers of distrust between land users, and Government or 'external/official' agencies in general. An important point Government officials and academic researchers alike should bear in mind when doing field work is that emphasised by Devereux and Hoddinott (1992), that "fieldwork is much more than a data-gathering exercise" because it implies probing into personal relationships and lifestyles (p.3).

Showing genuine interest in people's problems, or as Francis puts it "establishing a role" is difficult yet important because it affects the nature and quality of data collected (in Devereux & Hoddinott, Ibid: 87). A common pitfall for officials is, according to Gil, their general tendency to give instructions instead of solving problems through debate and personal guidance (Ibid: 19). Giving instructions rather than listening does not contribute to a climate of mutual trust to generate reliable data, nor participation.

The method of data gathering used in the enquiry is an exercise in finding out what land users consider beneficial and feasible for their community. The initial stages of the enquiry used RRA methods. The objective of the application of RRA methods was to achieve good working relations with respondents, to generate reliable data based on dialectical exchanges. The use of formal interviews, using structured questionnaires, would not have engaged the interests of respondents as much as through the process of interviewing through discussion and open ended interviewing. The practical use of this method in field research is its ability to turn from 'abstract' question/answer interviewing method to open ended exchanges. Taking part in the construction of the 'list' (of 'factors' of LD and their 'effects') encouraged the participation of respondents in the collection and analysis of data, a process which can be considered of progression from RRA to PRA.

Building up mutual trust can be achieved by encouraging respondents' participation from the start. The participatory way in which the list of questions for interviews was constructed contributed to building up rapport. Gaining respondent's interest and trust can be achieved by showing concern about their problems. Discussions about land use history and land users' problems helped to achieve mutual trust and raise interest.

The main difficulties with the enquiry were firstly, acquiring the necessary set of skills to approach people 'properly', in their 'idiosyncratic' manner, and secondly to convince them of the value of their information. The first was gradually achieved by motivating and easing their curiosity. In Spanish culture to be openly inquisitive, on the part of the researcher or the respondent, may be regarded as bad manners. This, depending on the circumstances, could result in evasive or distorted answers or a strained working relationship between the researcher and the respondent[2]. Earlier observations of this sort helped to build up trust by letting the people approached ask the questions first, usually about the reasons for the researcher's interest in their particular place or in them as individuals. This lead to a relaxed climate of exchange, avoiding mechanical question and answer rigidity. The second difficulty was to convince respondents that their opinions, knowledge of working practices and perceptions of landscape changes, were relevant and important to the explanation of LD processes.

Another difficulty during field work was to persuade land users to accompany the researcher to the field/s to consider processes of LD in relation to the history of land use. Respondents were often insistent in referring to a particular area or field so they could be more accurate in their answer. This shows their knowledge and awareness of important micro conditions. There were, however, some practical constraints in matching their interest in referring to particular fields with visiting and discussing them in 'situ'. Expectations that respondents would be more willing to discuss their perceptions of LD processes in particular fields they worked, proved unfruitful except in a handful of cases. Six respondents acceded to visit the field for one interview each only, four in Puebla de Valles, one in La Mierla and one in Retiendas. During these field visits the process of gully formation and the measures they took to control it were explained in relation to their working practices.

During initial interviews it was realized the great reverence respondents held for 'scientific knowledge' using complex measuring equipment. This can be assumed to be the result of the dissemination of technocratic ideological values by the better educated dominant

[2] A Spanish popular saying such as *al que mucho quiere saber, poco se le dá a entender*, (he who wants to know a lot will be given to understand little), shows how important it is to start a good working relationship with respondents from the very start.

social classes in Spain. During initial interviews it was observed that respondents were more interested in an explanation of the physical measuring techniques used by the IBERLIM researchers than the socioeconomic aspects of the project, or in giving their own explanations. It proved less helpful to start the discussions with a direct reference to the core objectives of the enquiry (i.e. their perceptions of landscape changes and socioeconomic processes relating to LD), than to explain the physical measurements being carried out by the IBERLIM team.

Referring to the IBERLIM experimental sites provided a 'status boosting' or credential for the interviews about the socioeconomic processes. Discussing IBERLIM experiments helped to gain the initial interest of respondents, and this approach was eventually adopted as a standard format for each introductory interview. Gradually these explanations, discussion of physical measurements and some of the initial results, were changed to a focus on the importance of respondents' detailed vernacular knowledge of the area and processes. The open ended style of the enquiry helped to break the danger of distorted data through 'ventriloquism', when respondents think they may benefit from appearing in agreement with what the researcher may want to hear, especially if this is an official, or is perceived as one. In this case respondents may tailor their information to extract conditions that might be more advantageous to them, rather than expressing their real opinions. Trying to appear in agreement with officials to obtain advantages, is an behaviour similar to that of academics who have been hiding the use of RRA methods for years so as not to discredit themselves in the eyes of a scientific community that places great store on using 'reliable' structured formal questionnaires and interviews.

The reference to IBERLIM work, however, was only used in the introductory stages of interviewing. The persistent reference to this could have had the opposite effect to that intended, devaluing their knowledge rather than complementing it. Although respondents often know that they know a fair deal more about the resulting processes of their working practices than most outsiders, they may hide this. The omission of this type of information can cause distortions in the data gathered. This knowledge is often deliberately 'hidden', to avoid appearing ignorant in the eyes of those with 'superior scientific knowledge', and if benefits are perceived, to profit from ingratiation with outsiders. Trying to hide perceived ignorance or trying to profit from ingratiation, pertains to the powers of decision making of the State from which, they may imagine, benefits can be derived by compliance rather than dissent. This notion may be related to psychological studies on ingratiation. As interviewing progressed some initial tendencies of 'ventriloquism' (repeating what respondents hear if they perceive ingratiation would be advantageous for them) were abandoned and their own opinions and explanations of socioeconomic processes were proffered.

ii. Rapid rural appraisal and building up mutual trust

Establishing rapport from the very start is crucial for reliable data gathering and to ensure that further interviews are possible. The researcher's involvement with university study and its objectives, the use that was to be made of the information, the absence of links with the Spanish Administration etc., was always explained to every new respondent before the first interview started. However, during the interview respondents often seemed to forget this, and asked whether the interviewer was working for the Agrarian Extension Office or other Government organization. It was not until the second or third interviews, when the respondent may have had time to 'investigate' the veracity of the interviewer's credentials, that initial distrust was translated into help. Those who had been interviewed before and others who could certify the researcher's association with university study and the IBERLIM project, reassured them that information was not for covert agrarian extension purposes such as reforestation.

The "entry" of the researcher into the community, and the way s/he is received is extremely important for building up essential rapport with potential respondents (Devereux & Hoddinott, Ibid: 88). The credentials of the person who may be introducing the researcher into the community is also important. The author was introduced to the four case study villages in different ways, which had implications for the conduct and efficacy of field research. In Retiendas and Puebla de Valles the author was introduced by well known and respected members of the communities. This was an advantage in establishing rapport. A short visit made to Retiendas by the researcher a few months before embarking in field work, produced an opportunity to establish credentials with two key informants who introduced him to other people in the village. The author, other members of the IBERLIM study group, and these two informants had been involved in arranging the sites for the installation of erosion measuring plots. In Puebla de Valles introduction was through a local resident geography graduate known to the author through one of his former lecturers.

The first village where data was collected for the enquiry was Retiendas. The first person interviewed afterwards introduced the researcher into their community. At the end of the interview he was asked to continue to answer questions at a future date, to introduce the researcher into his community, and to comment on the contents of the list of questions asked. He acceded to these but could not arrange a definite date for the next interview. Respondents were told that interviews were informal and would consist of two or three sessions in different days. Arranging dates for following interviews with respondents would have cut the time involved in interviews considerably. This, however, proved complex and unworkable. It was more realistic to make respondents understand that they would be requested to discuss issues further at a later date and make loose arrangements for the second and third interviews. 'The same day next week at roughly the same time' was seldom remembered, but what respondents remembered was that they committed themselves to answer questions for two more sessions. Once they committed themselves to this, their promise was always fulfilled.

The result of not being able to arrange definite dates, was an *ad oc* approach of visits to the village which was time consuming. Waiting for some one to turn up, however, was not a total waste of time. Conversation with people who did not accede to be interviewed or with those who already finished theirs, was about village life and their working practices, or about the work of the researcher. This type of 'disjointed' but relaxed interviewing often provided valuable data and most important, served to build rapport.

However, it was in Retiendas that the greatest difficulties were experienced. The reasons for this were twofold: firstly the list of questions was at that stage still in the process of being constructed, and sometimes generated suspicion and misunderstandings. Secondly, the author was at that stage unfamiliar with the idiosyncrasies of the local culture, such as probing into personal social or economic details, which not important *per se*, but initially thought to be important to ascertain the contributing explanations to LD.

The first list of questions was constructed to gain basic information on the social and economic structure of the household of respondents. It was assumed that a mixture of questions of working practices coupled to the circumstances of the household during specific periods would produce more accurate information of processes of LD. Trying to ascertain the economic and social details of the household to establish differentiation patterns or intensification of production for any other reason, was regarded with suspicion because it probed too closely into their economic livelihoods.

Some questions about the social and economic composition of individual households were modified and eventually discarded, because respondents indicated that they regarded them as highly suspicious, compromising or un-necessary. Government officials for whom this type of data is crucial, should bear in mind that the information concerned is, according to Devereux & Hoddinott, "sensitive [meaning that]... it can be used in a manner contrary to the interests or wishes of the informant" (p.124). This type of data should only be gathered after achieving good rapport with respondents, and only if strictly necessary.

Modifications to the content of the interviews were the result of some respondents' explanation that, in their opinion, questions about household composition and its agricultural economic activities did not seem to match the objective of the enquiry - perceptions of erosion processes. Respondents who did not mind these questions played a crucial part, at a later stage during field research, in visiting some fields to explain the erosion processes these have experienced under their cultivation. Questions about the household composition were sometime perceived as closed to data gathering for an assessment of an impending reforestation plan or tax evaluation.

Attempts.to ascertain patterns of differentiation by examining the socioeconomic evolution of households, such as those postulated by Chayanov's theories (1966), or for example in Harriss (1982), or those proposed in Ellis (1988), were soon abandoned when it was realized that the social and economic structure of the village is fairly homogeneous. The realisation that the socioeconomic structure of the villages is fairly homogeneous made the construction of a probability sampling method unnecessary. Casley and Lury (1981), explain that ...many groups are sufficiently homogeneous in some respects for limited enquiries to work satisfactorily (p.69). A common requirement, however, was that respondents, at present or in the past, must have worked the land, either as agriculturalists or pastoralists.

Differentiation processes may uncover cyclical patterns of household wealth and poverty according to the availability and "...application of non-wage family labour to the family household farm" as developed by Chayanov's theory of peasant economy (Harrison, in Harriss, 1982: 248). The differentiation processes typical of capitalist agricultural development were not evident within the villages of study but rather between these and other villages in areas already operating under a capitalist mode of production in the more fertile valleys of the Henares river. Some village differentiation processes, following Chayanov's cyclical theory based on the premise of surge and decline in economic activity of the unit of production, the household, because of the age composition of the workforce within the family, became evident indirectly during some interviews, and were elaborated upon by informants. In this case households were differentiated because of the internal dynamism of its workforce rather than because of the relations of production with other households. The greater poverty of the household, because of the advanced age and/or diminished numbers of its workforce, resulted in the decline of economic activity rather than a surge and intensification. The surge in economic activity of the household could have happened at the highest point of productive ages and the highest number of its members. This type of differentiation, however, was cyclical and only in two cases peasants were only partially estranged from the means of production, land. According to corroborated accounts in the villages of Puebla de Valles and La Mierla, these peasants in the 1940s became goat pastoralists with considerably reduced access to land of their own for agricultural production. Differentiation among villagers, often the cause of intensification of production by poorer peasants elsewhere, therefore, was not the cause of LD in the villages of study.

Expectations that processes of differentiation could lead to an explanation of LD processes resulted in initial attempts to gather data to ascertain which economic activities (pastoralism, wheat production, etc.), were the most responsible for degradation. Attempts to obtain information linking socioeconomic, climatic, rainfall, location and time-based events, initially thought could provide some answers clarifying the processes of LD, were fruitless and also provoked suspicion. Respondents found it difficult to remember singular erosive events nor even the year of events which caused particular damage to their crops. Questions probing their personal life, such as the date of their marriage or when their children were born, which could help to pinpoint the exact year of a especially disruptive weather event were regarded with suspicion. It would be possible then to check local records from the weather station of El Vado and compare these with the information given by land users in relation to specific field sites.

A productive part of this initial pilot enquiry in Retiendas was a detailed explanation of respondents' working practices in combination with a series of 'factors' and 'effects' on the condition of land. When questions about their working practices started to generate repetitive answers, these questions were discarded and the 'factors' and 'effects' were used for the construction of a final list. The final version of the list of factors and effects was based on some of the questions which had been tried initially. This final version, first used in Retiendas, was later on used in Puebla de Valles, La Mierla and to a lesser extent in Palancares. The sequential explanation of data collection for this part of the interviewing process is synthesised in Table 19b below.

The approach taken in La Mierla was more time consuming because the author was unknown there and rapport had to be constructed without a personal introduction. In this village the author, mentioning names of other people in Retiendas and Puebla de Valles who were already helping with the interviews, introduced himself and requested their help. Experience gained in addressing people properly and quickly

Further interviews in Retiendas and the other three villages			
Activities	Objectives	Results	Constraints
Construction of a list of 'causal factors' of LD & their 'effects' in relation to land users' working practices	To test new list of 'factors' & 'effects' & encourage respondents participation in the research	Build further rapport. Collect data smoothly. Perceived change from distrust to genuine interest	Establish credentials in Puebla de Valles. Build rapport. First trial of list of factors & effects. Annotation difficulties
First set of interviews using list of 'causal factors' and their 'effects'	To obtain data of gradual/ progressive processes of LD & to encourage participation in the research	Data collection & interviewing. Involvement of a 'research partner' in Puebla de Valles	Difficulty in annotation with one interviewer only. Anecdotic & factual information discussed further to obtain better reasoning
Second and third sets of interviews in the three villages of study	To obtain data. Analysis of data from Puebla de Valles	Preliminary results from Puebla de Valles indicating suitability of method. Writing up article with research partner	Difficulty in annotation with one interviewer only in Retiendas & La Mierla

Table 19b: Sequential explanation of data collection

grasping the meaning of respondents' comments helped to avoid distrust in La Mierla. Palancares was the last village in which work proceeded and a similar approach to that of La Mierla was adopted.

This first part of the research provided a framework upon which to build a final list of questions of the 'causal factors' and their 'effects' on the landscape. The objectives of the enquiry and the use that was going to be made of information was explained, assuring respondents that such information was confidential and names of individuals would not be mentioned. A critical problem of data gathering was that related to the distrust and lack of enthusiasm of rural communities. Explaining the reason for the type of questions being asked, as da Corta and Venkateshwarlu experienced during field work in India (in Devereux & Hoddinott, 1992: 106), helps to dispel initial distrust and makes the enquiry and further work more acceptable to the respondents. During the enquiry it was emphasised that there were no right or wrong answers to questions: all the respondents' knowledge and opinions were important.

Opinions or comments by the researcher or other people who may be listening during interviewing were sometimes totally ignored or alternatively, developed into a contentious argument. Listening and waiting for other people to finish an explanation or statement is not common practice in Spanish culture. Discussions are often 'won' on the energy or verbal skill of the contender, rather than on the convincing logic of the argument. In these cases it was important not to take sides but to explain that what was valuable was their opinions, rather than to search for a 'true' answer.

Two different cases can be cited which are illustrative of these situations. The first is related to one respondent in Puebla de Valles who adamantly defended his argument that ploughing the fields along the contour lines caused more erosion than when ploughing was across the horizontal axis[3]. This was vehemently rejected by all others listening, resulting in heated discussion and eventually, the end of interviewing for that day. In these circumstances, however, it was extremely productive to listen to the arguments and explanations this suggestion generated when discussed by small groups.

A second case was in La Mierla where a respondent repeatedly referred to the deceitful form in which the expropriation of village land for reforestation was effected. This antagonised other villagers who were members of the *municipio* at the time when expropriation was effected. Some of these issues, because of the time lapse, are no longer discussed, but are still well remembered, and if brought to light they can become contentious. In these circumstances it would

[3] This possibility could be interesting for exploration by physical geographers. Ploughing along the contour lines, described to greater detail below, although not bringing expanding clay to the surface, may still have had similar effects to those of building terraces for reforestation, especially if water bridges the crest of the ridge. Another interesting area for further research by physical geographers in that related to the actions of frost and thaw, perceived as important in the process of LD by land users, as discussed in Chapter Four above.

have been necessary to conduct interviews individually or in groups. The reason for that would be that although respondents may still be in disagreement, accusations would have not cause offence to other respondents and disruption to the interviewing process. The sometimes accusatory and conflictive disposition of that particular respondent, however, was counterbalanced by the respect he enjoyed among other villagers because of his charisma. This, coupled with his willingness to participate in interviews and discuss issues meant that in the end he proved beneficial to the interviewing process.

Interviews which started with this particular respondent were often a point of attraction for others. After noticing that an interview had started, usually in the central square of the village (the *plaza*), others were drawn into what became a group interview rather than an individual one. In this way it was often the case that the same person was present twice for the same type of questions, once when interviewed and the second time as an observer of the interviews being carried with the other respondents. In these cases the respondents who had been through the same interview twice would add or make, what he thought, were more accurate statements to his original explanations.

iii. From rapid rural appraisal to participatory rural appraisal

The first stages of the research were an exercise in building up mutual trust, the construction of the final version of the list of questions based on the 'causal factors' and their 'effects', and accomplishing the initial involvement of respondents in the research process. This was achieved by the involvement of respondents in the construction of the final list of 'factors' and their 'effects'. The cooperative spirit could easily be used for future participation in the planning and implementation of a SWC project, although this would be subject to constraints, not so much of time since PRA methods are faster than conventional ones, but subject to the ability of officials to put this methods into operation.

At the end of each interview, with the list of 'factors' and 'effects' originating from the first enquiry, their opinion was requested. They were requested to put themselves into the hypothetical role of the researcher and, keeping the objective of the enquiry in mind (their opinion of the socioeconomic factors accounting for LD), to advise on what kind of questions they would have asked, and which ones in the list they would have not used.

The reasons for this request were always explained to them beforehand. These involved a short and concise explanation, that to have the correct answers, which they knew better than anybody else, the researcher had to know the questions first. It was obvious that people knowing the answers would also know the right questions. Their participation was essential for the results to be accurate. Their reaction was still one of surprise, puzzlement and finally cooperation. Surprise because interviews are often about asking questions rather than asking for advice on what kind of questions should be asked. Some respondents initially said that their experience in this respect was limited, and were therefore puzzled, but when prompted with specific examples they soon were able to provide an opinion. Lastly, although understating the importance of their advice, their interest in the progress of interviewing increased.

Three main things were achieved with this method. Firstly their advice gave rise to modifications in the content of the list of initial questions and in the final list of 'factors' and 'effects' used in the second part of the research. The second achievement was that their participation contributed to the creation of a climate of mutual trust. The third achievement that might be recorded here is the writing of an article (García Pérez et al., 1995), with the direct participation of a villager (Martín Ruíz, P.) in the designing, collection and analysis of data. This article, examining the case of Puebla de Valles, can itself be regarded as an example of change from RRA to PRA methods in its involvement of local people in all its stages including analysis of data and the writing up and publication of the findings. An illustration of these changes is shown in Table 18. The changes illustrated under 'ideal objectives' and 'long term outcomes' in Table 18 are especially relevant to this case.

A total of thirty four people were interviewed several times. The numbers for each village is that shown in Table 20. In the early stages of the enquiry the secrecy of their information was put into doubt because making notes during interviews made confidentiality less credible. One respondent in Retiendas requested to see what was being written before agreeing to continue with the interview. Once he verified the annotations made and examined the rest of the questions which were to be made, he agreed to proceed. In this particular case it was agreed that the interview would be cut short, and restarted a few days after. For reasons unknown to the researcher, the second and third interviews with that particular respondent were carried out in an extremely cooperative attitude.

	Helping to construct list of questions	Interviewed
Retiendas	2	11
Puebla de Valles	3	12
La Mierla	0	4
Palancares	0	2

Table 20: Number of people interviewed

Using a tape recorder was for this reason discarded. After the first trial interviews, it was realised that informants parted more easily with information when they were not 'threatened' by the paper and pen of the researcher. The possibility of establishing good rapport with informants was in danger and note taking during the interview was reduced to a minimum. Information was noted down in paper during interviews only when strictly necessary, otherwise it was memorised and recorded shortly after finishing. In such settings conventional questionnaire techniques may prove counterproductive.

Some of the interviews had to be discarded because it was patently obvious that misleading information was purposely given. In one case in Retiendas the wife of a respondent, in returning home, bluntly objected to the interview confronting both respondent and researcher and demanding an explanation. After explanations of the objectives were given by both respondent and researcher, the interview resumed. The regular interruptions of the wife made the situation uncomfortable enough to cut the interview short with the hope of continuing another day. Although the respondent continued to be extremely congenial, he gave a series of elusive reasons when returning to the topic of land use and working methods indicating little interest in continuing as a regular respondent. In these cases expressions of disappointment or confrontation which could have antagonised other respondents in the village were always avoided.

When the wrong answer was patently given, or when apparent contradictions were not willingly clarified, it was suggested that some of the questions must have been misunderstood or badly formulated. If even after questions were reformulated, answers were given in a casual and careless manner which indicated no interest in continuing, the interview was cut short and the data later on discarded. One respondent in La Mierla when answering questions about reforestation, during what would have been his third and last interview, because of the political and economic problematisation the list of questions required, may have felt he was going to be confronted with past issues linked to expropriation. He refused to make any comments on the subject. Even after explaining that the questions would not have anything to do with expropriation, but with the effects of reforestation on LD and the economy of the village, his answers were short, did not make sense, and were given in an anxious manner. The interview was cut short and that part of his data was discarded. His attitude thereafter, even when meeting in the village square, changed from what initially had been amicable, to elusive. It would have taken some effort to reassure this respondent of the intentions and objectives of the research, if needed.

Once rapport was established in the villages and the list of questions was finally constructed, interviewing took place using a final list of the 'factors' and 'effects' on the landscape identified by land users.

iv. The method of data collection

The second part of the research, by making use of local residents' detailed knowledge of the area, aimed to ascertain their perceptions of land use history and the processes of LD. Their perceptions were ascertained by using the list of 'factors' and 'effects', with the aim of problematising their working practices and the effects these had on the landscape.

The problematisation of land users predicaments means the further exploration of issues by discussion, following up leads provided by them to achieve greater detail or different ways of interpretation between different respondents. For example when discussing the *shape and size of the fields* (a causal factor listed in Table 21), respondents may have indicated that the long strips they owned were a problem for ploughing. The researcher may have accepted this explanation and proceed to the next question, or otherwise pursue this explanation through a problematisation of their predicament (subdivision of plots), by asking why the inheritance system was not effected in a way to avoid such subdivision. Explanation was followed by asking for further clarifications. In this case the last question closing the section in this example, on *shape and size of the fields*, was to ask if there were any cases in the village in which inheritors arranged to divide land in a way which minimised division. The main difficulty in doing this, respondents emphasised, was to find the number of plots which were regarded of the same value to be shared among inheritors. The easiest way usually was to divide them all in equal parts to be shared among them. Further exploration about the sentimental or perceived value, and the productive or market value of the land, could have been attempted if research was specifically geared to collect data of this type.

Land users problems were especially debated in relation to the approach taken by the State regarding reforestation, their economic circumstances in relation to other areas of agrarian production, and the industrialisation process experienced in Spain. The aims of this part of the Chapter are to provide further evidence, to the one in sections above, that the research approach constitutes a sound way to involve land users in policy making as well as a way of gathering important data for the explanation of processes.

Lack of 'dramatic' or 'special' events which could be identified or remembered accurately proved that the gathering of precise time-related data for long drawn-out processes, such as those involved in the social and economic processes of LD, may be of little value. The collection of time bound data was limited to less accurate but more meaningful events such as the history of sequential changes in agricultural practices or intensification of production. Best results were obtained when referring to changes in long term repetitive practices or conditions, such as the cyclical fallow-production periods, or the crop changes practised in the production period, or those of the fallow period of pastoralism, wood collection, and preparation of the field for renewed production. These, and changes such as the greater levels of runoff observed at the beginning of the century, the reduction in the number of animals during the Civil War (1936-1939), or matorral burning to encourage the growth of grasses for pasture, provided more valuable information than events in specific years that they found difficult to remember.

The pervasive character of these long-term repetitive events shows that the best way to understand them is through exchanges with land users, in which the factors responsible for LD can be sequentially related and explained. The 'causal factors' and their 'effects' were used as a framework in search of further information about the physical (accurately place based), socioeconomic and political processes of LD. The aim was to carry out some of the interviews in some of the fields the respondents worked regularly. This, as already discussed above and will again be mentioned later, was only achieved to a very small extent.

Misunderstandings about their grievances or simply suggesting that LD can be attributed to their ignorance may damage the prospect of genuine interest in providing information. Their explanations of the processes of LD involving justifications and above all exoneration from what too often has been irritating accusations of 'irresponsively' destroying their environment, must be discussed with sensitivity, by jointly and reflectively discussing their predicaments. Jointly in this case means interactions with researchers or officials. Land users' reflections and observations about the effects of their working practices on nature must have occurred all during their working lives. The development of rill erosion and progression into gully erosion are noticed by land users' acute observation of their surrounding environment. Their 'failure' to avert degradation and erosion is the result of the pressure to produce in order to be able to survive a marginal economic existence, and not because of failure to notice the damage inflicted to their land or 'irresponsibility'. Equally, measures specifically geared to conserve soil and water were not utilized because this would have been an extremely difficult task to achieve in relation to the little extra production returns which they could have obtained.

It was often the case that the meaning of the word 'erosion' had to be explained when introducing the subject of the enquiry. Respondents did not view soil loss (erosion) on the cultivated slopes as a major problem. The main problem they perceived was not that soil was lost, but that the seeds were carried to the bottom of the field by the rain. As a result production for that year was then greatly reduced.

In the second stage rapport had to be maintained. During interviews respondents made comments and reflected on the themes introduced from the list of 'factors' and 'effects', but no clear-cut answers were sought. Comments that were contradictory or were not even directly related to the list were not discarded, since they also have value in the final analysis. The list of 'factors' and 'effects' is that recorded in Table 21 below. The system of combination of 'factors' and 'effects' provides the opportunity of registering these observations, raising consciousness about their own situation as well as acting as a means to improve understanding with officials.

Causal 'factors' are those reasons or elements which were identified as responsible for inducing or motivating LD and/or erosion. The 'effects' of these factors were those which produced and visual impact on the landscape, or an impression on the respondents' perception which they could identify as detrimental for the condition of the land. These 'factors' and 'effects' were presented to land users in terms they would understand. Five points were explored in the enquiry in relation to these 'factors' and 'effects' above, to broaden the information given and to test if any special measures were taken to reverse the erosion process. These points were;

(a) how the problem of erosion was evident
(b) what measures were taken to control it
(c) what measures could have been taken
(d) in which way erosion problems were solved
(e) what were the signs that the problem was solved

CAUSAL FACTORS OF EROSION - DEGRADATION	EFFECTS ON THE LANDSCAPE
Demographic pressure	*Increased surface runoff*
Competitive markets	*Changes in vegetation*
Ideal land use practices	*Formation of gullies*
Forms of cultivation	
Hill cultivation	
Shape and size of the fields	
Excessive carrying capacity	
Deficient pastoralist management	
Reforestation	

Table 21: Landscape effects and causal factors featured in the field research

The combination of 'factors' and 'effects' was used as a framework from which issues of erosion and LD were discussed in open ended interviews. Points 'a' to 'e', in combination with the 'factors' and their 'effects', acted as an overall structure which facilitated land users engaging in a dialectical discussion about their perceptions.

These points were introduced when it was appropriate during the enquiry and at the end of a respondent's explanation. These, and the list of 'factos' and their 'effects' are the author's concepts and were not spoken of in exactly these terms during interviews. If an explanation on how the problem of erosion was evident (point 'a') had already been given in relation to the *shape and size of the fields*, that point would not be tried again when enquiring about *hill cultivation*. These two 'causal factors', *shape and size of the fields* and *hill cultivation* have similar 'effects' on erosion. Point 'a', however, would be re-introduced in relation to *deficient pastoralist management* because the 'effects' were obviously different.

Factors such as *demographic pressure*, *competitive markets*, and *excessive carrying capacity* were closely related to intensification of production. The 'factor' *demographic pressure* was introduced because of explanations for the reasons of LD given during initial interviews pointed out to the need to increase production to be able to feed an increased family. *Demographic pressure* was introduced in terms of 'population growth'. For instance, could a growing population in the villagers have had a detrimental effect on vegetation or increased runoff because of the need to produce more food? Was the need for the increased production of food due to the growth of the family? Or, was the need for increased production the result of the relative disadvantage of their products to others produced more cheaply? This reasoning took the interviewing sequence towards economic activity and incomes, an issue to be approached tactfully.

Variations in household income, difficult and problematic as they had been to ascertain in the initial phases of interviewing, were still crucial to the explanation of changes in land use practices and intensification of production. This was approached in an impersonal form, by enquiring about the general trend of economic activity in the village, rather than probing the economic situation of respondent's own household. Discussing the competition from other producers in more productive areas gave answers which avoided discussing the finances of their own households. *Competitive markets* were explained, for example, in terms of villagers' agricultural products being relatively more expensive than those produced by in the more fertile areas of the valley of Henares. Another illustration used was the penetration into rural markets of mass-produced agricultural implements and goods such as oil, wine, clothing and footwear, which were formerly important parts of villages' production and exchange activities.

Other 'causal factors' were more related to production practices than to intensification. The 'causal factor' *ideal land use practices*, such as pastoralism, with goats or sheep, separately or in the same herd, or the cultivation of wheat, rye, or oats in rotation with nitrogen fixing plants, such as cheek peas or lentils were explored. Would an improved combination of alternatives in land use give better economic results? These issues were introduced by reflecting and debating if a change in the combination of alternatives such as wheat production, pastoralism or forest use, could have improved their economic situation and cause less land damage.

These questions lead to issues of the techniques and inputs available to them, their *forms of cultivation*. These referred to agricultural methods such as the type of implements, seeds, manure, fertilizers, pesticides, ploughing in the direction of the slope etc., which could have had an effect on the condition of soil and the landscape. *Hill* *cultivation* was explored in relation to the reasons for ploughing such unsuitable areas for cereal production and the alternatives they thought could have been at their disposal not to use them. The *shape and size of the fields* was discussed in terms of family inheritance arrangements that might have been made to avoid subdivision, as well as the desirability of land consolidation.

Extensive pastoralism and especially the effects of goats on vegetation was discussed according to the possible *excessive carrying capacity* and pressure on resources. *Deficient pastoralist management* was a continuation of the debate on whether the same number of animals could have been managed better so their effects could be minimized. The effects of *reforestation* by the Government and their own use of forests needed little explanation. The discussion of forestry use, especially when related to reforestation, as explained above, were contentious and gave rise to passionate discussion and explanations. A short explanation of the combination between 'factors' and 'effects', rather than the results, is given below. The results of each combination are discussed in greater detail at a latter stage.

The 'causal factors' were introduced and discussed one by one in relation to the possible 'effects' they had on the landscape. Some of the combinations between 'factors' and 'effects' did not match each other as well as others. For instance it was found, and expected, that the *shape and size of the fields* had little effect on *changes in vegetation* but great effects on the *increasing surface runoff* and the *formation of gullies*. In comparison to the *shape and size of the fields*, the effects of *deficient pastoralist management* were perceived as having greater responsibility for changes in vegetation than for increased surface runoff or the formation of gullies. However, it was acknowledged that the passing of animals also disturbed the soil and contributed to increased runoff.

A list of guiding questions was used to help the way in which the causal factors should be introduced to respondents. This list is shown in Table 22 below.

v. Analysis and results of the data

It became increasingly evident during initial data gathering that the validity of *excessive demographic pressure*, as a 'causal factor' for an explanation of processes, was questionable for this particular study. Respondents frequently suggested that, one way of providing more food for the family was by intensifying production as for instance by cultivating cereals on steeper slopes. The start of each interview required an introduction to the first question, 'people in the village suggested that one of the reasons why steep land was brought into production was because of the need to produce more wheat to feed the increasing population in the village. This statement was then followed up by the question, was a growing number of people in the village [*excessive demographic pressure*] a factor for intensification of production and damage to the land?.

> 'When there are more mouths to feed you need to grow more wheat', 'it was a desperate situation', 'the family had to be fed', 'we needed more land to be able to grow more wheat to feed the family', were their most frequent answers.

However, as it has been shown in Table 4, population increases have been gradual in all four villages except in Puebla de Valles which experienced a 30 percent increase between 1940 and 1950. When respondents in Puebla de Valles were presented with the figures of Table 4 and then reflected upon the slow population increase through time, they explained that the sharp increase between 1940 and 1950 could be explained more by the unstable conditions and/or unreliable data at the time of the Civil War and following years, than by real increases. However they still argued that they needed to produce more in order to be able to survive. If this was pursued further they concluded that it was not only direct food production which was important, but all the array of productive activities to secure an income which had to be increased. The general agreement in all the villages was that because the number of people in their village did not expand and neither did food consumption, the need for increasing production must have been due to other reasons. The hypothesis that land could have lost fertility gradually, was explicitly rejected. Respondents remembered a steady pattern of successful production output and failures due to climatic conditions. One of the eldest peasants in Retiendas (in his late 90s), however, remarked that when it snowed more, up to the 1940s, production was greater than after the 1940s, when the weather turned dryer and more frosty in the winter, hampering production severely.

CAUSAL FACTORS OF EROSION - DEGRADATION	INDICATION OF THE FORM OF WARDING USED IN INTERVIEWS
Demographic pressure	* Can you give me some reasons for the need to cultivate the slopes? * Was a growing number of people in the village result in intensification and damage of land?
Competitive markets	* Did you have to abandon the production of some crops because there was no demand for them? * What did you do when the prices of your products were higher than those produced somewhere else?
Ideal land use practices	* Would an improved combination of alternatives in land use, such as pastoralism-agriculture, give better economic results? * Would not a greater number of sheep and a reduction in goats be more profitable for you and better for the land? * Can you think of any less damaging practices to your land?
Forms of cultivation	* What techniques of cultivation did you use? E.gs. machinery, tools, seeds, fertilisers, manure, pesticides, forms of ploughing? * Which of these had a greater effect on the the condition of soil and the landscape?
Hill cultivation	* Were there any forms of cultivation in sloppy land least damaging to the soil/field? * Were there any alternatives available to you to avoid the cultivation these areas?
Shape/size of the fields	* Did you plough in the direction of the slope or horizontally? * Have the fields you inherited been split between you and your brothers and sisters? * Did you make any arrangements with them to avoid subdivision? * Did you exchange fields to consolidate land?
Excessive carrying capacity	* Was there enough pasture for the herd? * What was the effect of their hoofs on the soil? * What was the effect of goats on the vegetation?
Deficient pastoralism	* Could the same number of animals being managed better to avoid damage to land & vegetation? * Would a separation of herds into goats and sheep improve management?
Reforestation	* Were there any other alternatives to controls soil erosion to reforestation? * What are the effects of reforestation on the soil and water?

Table 22: Wording to guide questioning during interviews

Excessive demographic pressure, in discussion with local residents, acted more as a catalyst to other 'causal factors' than as an explanation of the socioeconomic and political processes of LD. However, the use of this 'factor', induced respondents to focus on intensification of production - an overall cause with direct effects on the condition of land.

The *competitive market* was the 'causal factor' which respondents identified most readily with as the most important reason for intensification of production, and in turn LD. Respondents explained that products which traditionally have been providing income for the family economy gradually lost market importance.

> 'It became cheaper to buy already made leather harnesses than to make them ourselves', 'agricultural hand implements could be bought cheaper from itinerant sellers than from the local blacksmith in La Mierla',

were explanations which illustrated the growing disadvantage of their economies. Charcoal and wine production, as the many abandoned large clay wine containers in the area prove, were important productive activities and sources of income for the household at the turn of the century.

The eventual incorporation of the subsistence economy of these villages into the rapidly expanding competitive capitalist agrarian market resulted in changes in working practices and the need for intensification of production. It was concluded by most respondents that some of their products previously sold in Guadalajara market, declined in importance and that other products could not compete in price with those from industrial production or more fertile areas. The production of these had to be abandoned and production was intensified in those products which still offered them a comparative advantage in the increasingly capitalist market, such as wheat production. One respondent in La Mierla explained the decline of some of the products:

> 'One of my last sources of regular income in the late 1950s, was to sell wood fuel in the Guadalajara market once a week... two other people from the village and myself collected *jara* (*Cistus ladanifer*) while we were out with the sheep, brought it to the village, stored it to dry, chopped it into small pieces for wood stoves, tied it into bundles and carried it to Guadalajara city (a distance of approximately 25 kilometres)... We started our trip very early in the morning... with the

> mules loaded we had to walk there... and if the mules were tired because they had been working in the fields recently or were expected to work the day after, we had to walk back as well... Because of the increase in the use of butane gas for cooking in the early 1960s, it became more difficult to sell the wood and prices started to drop dramatically... The last time I went to Guadalajara I could not sell a single bundle of wood, and because I didn't want to bring it back with me to the village, late in the day I tried to give it away, but no one wanted it... One of the persons I approached made fun of me... it was the last straw, I felt ashamed of myself, our poverty and our backwardness. I came back to the village and never tried to sell wood again'.

The decreasing value of specific products was discussed with respondents in terms of their awareness of changes in demand, trade and production that occurred in their economies. Respondents, referring to their forefather's accounts, explained that charcoal became less important during the last century and wine production, lost to *phylloxera* attacks, never recovered. These products had been two important sources of income and consumption in these villages.

> 'There are a few places where we think our forefathers made charcoal. These places... still show the black/scorched soil if we dig a little...'

were explanations given by respondents in Retiendas and Puebla de Valles. The exact situation of places was never sought in the research because the important thing was to confirm that in effect charcoal had been an important economic activity in the villages. Demand for charcoal diminished, as explained above, by the eventual replacement of coke coal in the iron smelting industry in Spain. Respondents were aware that charcoal had been made to sell for industrial use '..in the north of the country'.

The wine produced in Puebla de Valles and La Mierla was sold and consumed in the household. Retiendas produced little wine and Palancares none.

> 'We used to sell some of our wine to the people in Retiendas',

people in Puebla de Valles explained. After the *phylloxera* attacks none of these villages replanted the vines and wine was bought from other places. Such is the strength of habit in Spanish culture to drink a glass of wine with the meal that even at times of extreme food scarcity, such as after the Civil War, people could not do without wine. What made the decline of some products in the villages worse for their economy, was that the scarcity and higher prices of these products did not make the demand for them to disappear. To acquire products such as wine, production of other items had to be intensified or other sources of income, such as working for wages in the construction of reservoirs, had to be found.

> 'When we came back to the village [after the Civil War ended] many of our houses had been severely damaged' ...'we did not have animals [as sources of food or working animals] so most of the time we had to make do with the odd rabbit we shot. Because I did not have any money, for a while I was impatient that the few hens I began with would start laying eggs, so I could exchange three of four for half litre of wine to have with my meal... I could not eat without wine... and I still cannot',

explained a respondent in his late 70s in La Mierla.

Working for wages was an irregular source of income until work in the construction of dams started in the El Vado dam or in reforestation in Puebla de Valles, but not many people from La Mierla worked there. Most of the labour employed in the construction of El Vado dam were from the more near villages of Puebla de Valles, Retiendas and Valdesotos, this last village placed immediately down stream from the dam.

As the incipient capitalist agrarian system developed in the areas of greater production potential in the lower altitude valley of the Henares, peasants were therefore compelled to make use of more expensive externally derived inputs which they were hardly able to afford. Overall, the subsistence economy lost ground to the capitalist economy and became more marginal. The differentiation between subsistence and capitalist agricultural economies generated 'adjustments', including attempts to intensify production and when this proved inadequate, migration to the industrial areas of Madrid ensued.

> 'I was the first one to migrate from my village shortly after the Civil War ended... at that time only a few people migrated from the villages, there was no work in the cities either, but I was lucky to find work in mining, for a short while, and eventually in construction in the Basque country',

a respondent from Retiendas explained. Wages earned outside the village were extremely important for the functioning of some households. In later years other respondents explained how their savings were used to improve the living conditions of the household in their village.

Household wood fuel, or meat and wool from mixed *matorral*/forest/agricultural land, also started to lose market importance at the beginning of the century and continued to do so during their lifetime. They explained that as a consequence of the decline of these products and in order to compensate for the loss in revenue, cereal output had to be increased by working the more marginal areas of land, including the cultivation of the steeper slopes with hoes. As it will be illustrated below, working the steep slopes in that way was a sign of desperate need.

The decline in the value of the goods produced in these villages coincides with what Bordiu Barreda (1985) also identified as reasons for the decline of the subsistence economy in Guadalajara. She explains that clothing, food, construction materials, utensils or tools which had been obtained within the household, the village or the immediate area, could not compete (p.172) in terms of perceived quality and labour costs with products of the capitalist system, including inputs such as Chilean nitrate or chemical fertilizers, insecticides, tools, and machinery.

Discussing issues related to the demise of some of their products in the market put some issues, such as the respondents' relationship with the State and other producers, not only into an economic context, but also into a political one. If the participation of land users in policy elaboration and project implementation is what is sought, reflecting on their position in relation to the past political structure helps to identify the implications of their involvement in the present one. The use of the *competitive market* as a 'factor' in the enquiry, generated important historical information which would help State agencies understand, for example, reticent land user's attitudes to accept proposals if they are perceived as risky.

Intensification of wheat production was the result of a need to substitute for the market loss of other products, for household consumption and exchange, and to provide for Governmental requisition of grain surpluses. The policy of wheat requisition affected small producers most. All wheat producers were allowed to keep an amount for their own consumption and the rest had to be sold to the Servicio Nacional del Trigo (SNT), the Government agency in charge of wheat requisition. Barciela López and García González (1981), explain that wheat production from 1939 to the 1950s was extremely profitable for large producers with political and black market connections. Small producers, without these connections, were tightly controlled by the SNT. They were often forced to sell wheat they needed for household consumption, or in case of crop failure, to buy on the black market the quota they were supposed to sell to the SNT at a lower requisition price (p.86-87). These authors also explain that, as a result of the insecure circumstances of marketing wheat many producers (in Spain) abandoned production, causing shortages, high prices, and the continuation of black market practices operated by those with social and political connections. Government measures to control the prices and production of wheat, and regulate the provision of bread through rationing in the post-Civil War period, gave rise to black market prices of between 250 to 700 percent higher than those paid by compulsory Government purchases.

Respondents explained that in their area wheat production was just enough to fulfil SNT quotas and for household consumption. Systematic black market operations in the area, either to sell, or to buy to fulfil their quota, were denied but some respondents admitted small quantities of surplus wheat were sold in the black market. Limited options for diversification and because bread is an important staple food, were two important reasons for the continuation of wheat production until the 1950s by small producers such as those interviewed. In 1951 state policy changed. Instead of low requisition prices being paid by the Government and high black market prices, higher prices were paid and the black market gradually disappeared. The period between 1951 and 1957 is described by Barciela López and García González (Ibid) as the golden era for wheat producers, except those in marginal areas of rainfed agriculture. Most respondents denied having sold any wheat during the years of requisition. Only a few in the Village of Puebla de Valles, not openly but rather enigmatically, admitted that this sometimes occurred in their village.

> 'We knew it wasn't right to sell wheat in the black market... some mediators were getting rich in this

business, but it was very risky... I would have sold some [wheat] if I had enough to sell... but production was to make bread for the family'. I shared some of my wheat with one brother and a sister living in Guadalajara (city)... it was very difficult and risky to get it to them without the authorities noticing... if they did the cheapest way was to bribe them... this was very common... sometimes they demanded part of the 'catch' for their own families... there were very difficult times of food shortages...'

These explanations by respondents coincide with most of the accounts related to Spanish post-Civil War food shortages and the corrupted system of rations and the black market. Barciela López and García González (Ibid) explain that although the prices of wheat stabilized in the late 1950s, increased productivity in irrigated land, the use of fertilizers, seeds, machinery and insecticides, compensated modern producers for real lower prices (p.88). Producers in the areas of study could only compete with capitalist wheat producers by intensifying production and, as explained by the authors above for Spain in general (p.89), were finally forced to abandon production and migrate to the cities. This may have initially caused a fair amount of LD until encroaching vegetation recolonised these areas.

One of the forms of intensifying cereal production was the use of the more marginal land on the steeper slopes. This, according to respondents' accounts, resulted in visible *changes in the vegetation* cover. In the fields of higher gradient, if it rained heavily after planting, all the seed were washed down the slope with very little production at the top and most of it at the bottom. The land in these areas soon became exhausted and was then further damaged by goats feeding on the tender shoots of the *matorral* slowly recolonising it. As a result of the slow recolonisation process, these areas always appeared bear of vegetation and the fallow cycles were longer. Respondents readily agreed with the detrimental effects of cultivation in these areas.

The steepest areas were often hoed in the preparation for planting. This sometimes gave rise to jokes among respondents during interviews, as some of them, in Puebla de Valles, had used ropes to ensure they would not fall to a nearby gully. This land was mostly used by the poorest in this village. Plantation of crops in these areas had been less common in La Mierla and Retiendas. In these villages these were mainly used for pastoral purposes. All respondents agree that working these areas was causing erosion and the formation of gullies.

Discussing the *formation of gullies*, respondents emphasized that the big ones had always been there. There was not much concern about these except when one was slowly advancing into one of their fields. The problem of erosion became more apparent from the increase in sediment accumulated at the bottom of the slope and by the appearance of rills in the fields. One of the respondents explained the process of gully formation by his working practice in a field his wife inherited shortly after they married, in the mid 1940s. The field has two incipient recolonised gullies of about 15 meters in length by 2 meters width at the bottom, becoming narrower at the top.

> 'This field had only occasionally been used for wheat in the past... it had been mainly used for pastoralism before... since I started to plant wheat regularly the problem of rill erosion became much worse quickly. I tried to stop the problem by piling stones on the rills, but this wasn't very effective... I also tried to construct an earth barrier (described as less than a foot in hight) along the top to stop water coming into the field from the foot path, (at the top of the field) but it didn't work very well. My greatest problem, when the rill became wider was that the mules (used for ploughing) were frightened and would not cross or get near it. Production became less and less and the little there was, was eaten by the sparrows... I finally abandoned it as it became unworkable'.

Evidence that the formation of rills and sedimentation at the bottom of the field was decreasing was noticed after the fields were left fallow and became colonized by vegetation.

Respondents understand their own *land use practices*, not only in relation to production, but also in relation to their social, economic, political and technological contexts. Suggestions that their *land use practices* may not have been ideal, and might have caused damage to the soil, produced self-critical, but not apologetic explanations. Common answers were that:

> 'these practices were the ones we had... and were providing the greatest economic benefit'.

Suggestions that possible changes in their *land use practices*, from wheat production to forest or *matorral* use for extensive, regulated, and sustainable pastoralism, could have caused less degradation, were rejected.

> 'Production had to be balanced because we needed food...' 'To change our production we would have to have more land, with the land we had'. 'With our land so divided, it was difficult to improve production more'. 'We knew well when to change from one crop to another when the soil was becoming infertile... or what crops to plant in particular fields... some fields are no good for wheat,

but are good for rye, oats, lentils or chick peas'.

Their system of mixed production with an emphasis on wheat production, they argued, provided greater security. Many answers were related to the production of wheat.

> 'We needed to produce bread'

(meaning wheat) was often emphasised in a manner which indicated they were stating the obvious. Bread, the same as wine in Spain, is an indispensable part of any cooked meal[4].

The steeper slopes, already stripped of trees by charcoal makers, were cleared of *matorral*, burned, ploughed, or hoed if the gradient was too steep for draught animals, and then sown the year after. These were cultivated for two or three years until yield declined and then they were abandoned to recover naturally for another three or four years. It was generally agreed that the practice of bringing more marginal land into production had a detrimental effect on the vegetation and was responsible for *increased runoff* and the *formation of gullies*. The increase in erosion levels was evident with the greater amount of sediment collected at the bottom of the slope. No measures were taken to reduce it in the steepest fields, and when questioning indicated that there must have been a way to check or solve the problem, they unanimously emphasized that practically nothing could have been achieved if attempted short of stopping production. Two respondents in Retiendas emphasised this by visiting the fields, during an interview, located in the upper part of the slope above the entrance of their house.

> 'Since the cultivation of these fields stopped we don't have more water and mud coming into the house... when the fields were left fallow for one or more years there was

[4] The same as it may be 'odd' to have bread with no butter on it in the British culture, it is unthinkable to have a cooked meal without bread in Spain. These are such strong cultural habits that the absence of one of this 'essential' ingredients may cause severe phycological discomfort.

no flooding'. 'The fields were not ours but we could not ask the owners to stop cultivating them... it was not their fault that we were flooded'.

They explain that *hill cultivation* became more necessary at times of economic difficulty and this coincided with increasing demand for wheat after the Civil War.

Clearing *matorral* areas was part of the integrated use of land and working of fallow and production sequences. Fallow land was used for pasture, and the collection of *Cistus* for household fuel. *Cistus* was not cut at the base but pulled up. Although this was harder work than cutting it, the regrowth of the plant is ensured from the roots left in the ground. Respondents when questioned in relation to point 'c' in the list of measures which could have been taken to reduce erosion, explained that this could be considered as a measure of erosion control to assist the regeneration of vegetation. However, their objectivé was production rather than erosion control for its own sake. When the bigger *Cistus* were taken from the field to the courtyards of houses to be dried for household fuel, the smaller vegetation was burned in the field to encourage the growth of grasses for their animals and as preparation for ploughing one or two years after. Most respondents agree that burning increased erosion but only for a very short period of time.

> 'All areas were burned... those where cereals were planted were burned just before ploughing. 'The *Cistus* were not as big as they are today... we needed them for cooking'. 'Fire was not as dangerous as it may be today because there was very little to burn'. These were the kind of answers given in relation to the practice of burning. 'I live in constant fear in the summer now. When young people from the city come and spend their holiday in the village, they do barbecues... They don't understand that the direction and strength of the wind makes fire very dangerous... If the reforested area catches on fire, as it did only a few years ago, and the wind is in the direction of the village, we may suffocate or even burn to death',

a respondent emphasised in La Mierla.

> 'The only things which burned before were the small *matorral*, mostly thyme but also small *Cistus* and dried grasses...' 'There was not fear of loosing control over the fire because it was very slow... it would often stop and we had to restart it again'. We often burned when we were out with the animals... they were used to it and they weren't frightened'.

The objective of burning was always to encourage the growth of grasses. Grasses germinated quickly and compensated for the missing *Cistus*. Two respondents in Palancares, referring to areas of higher altitude, emphasised that the best way to control erosion in their area would be through the plantation of grasses which could also be used as pasture.

At the end of six or seven years of fallow the sequence was started again. The fallow sequences were longer in Palancares, where with colder climate than the other areas of study, mostly goats, rye and oats, and to a much smaller degree wheat, were cultivated. Land users in Palancares had the same cultivation method as in the other villages in the lower altitude areas. They also used *Cistus* vegetation for household fuel and burned the remaining vegetation before ploughing and planting crops. *Cistus* is still burned in open fires in all the villages in the winter, not out of necessity but to increase their savings and probably for cultural reasons, mostly for warmth, but at the same time also for cooking. In most villages *Cistus* is still collected and let to dry for cooking and warmth. Respondents see the effect of pulling the *Cistus* today as inconsequential for erosion. Some respondents commented that it may even be beneficial to thin the older *Cistus* plants out so new and more vigorous ones can grow.

Respondents were asked if pulling and burning the *Cistus* and other *matorral*, and the long fallow periods for soil to recover some of its fertility, or *hill cultivation*, could have been changed to avoid land damage and retain fertility. They pointed out that the main restriction was the small quantity of manure their animals could produce and the high price of fertilizers. They emphasized that, with their scant resources, there were no measures they could have taken to slow the rapid loss of fertility of their land.

The effects they identified with the limitations of their *forms of cultivation* were worse *surface runoff* and overland flow, because of low infiltration. This, it was explained, resulted in the *formation of small gullies*.

> 'Because of the small strength of the animals [in comparison with that of tractors], the surface was barely scratched... especially if it was stony'. 'Tractors can turn the soil deeper, up to 40 or 50 centimetres... then the soil is able to absorb a lot of the rain, which is good for the crops...' 'The water does not run on the

top now, it is absorbed...',

they explained.

Although they were able to boost fertility by cultivating leguminous plants, such as chick pea and lentils, the degradation-regeneration was cyclical and of long fallow periods. They tended to explain their *forms of cultivation* by making a comparison with the modern methods utilized today. The shallow depth of the furrows was determined by the limited strength of the mules and meant, according to their judgement, that the soil had less infiltration capacity than now with the use of modern machinery which is able to penetrate and turn the soil much deeper. The effects of their *forms of cultivation* were not made in comparison with other possible practices because of the limitations they had, mainly, in acquiring greater animal or mechanical power to turn the soil deeper.

> 'After the Civil War we didn't have many animals, and those we had were old and the weakest'. 'We often had to make do with what we had... we even had to harness a cow and a mule together [for ploughing], not an easy thing to do, since initially they are frightened of each other...' 'Harnessing a mule and a cow was not very common, but we often harnessed a mule and an ass'. 'Because there were not enough animals, we lent each other one animal to pair with another, but this resulted in these being overworked and excessively tired'. 'One pair had to work the land of two houses [households], and this was too much for the animals'. 'Some of the animals we could buy, a respondent in La Mierla explained, came from the South of Spain, they were in a terrible condition, very weak and old...'

Eventually land users were able to recover to the level of animal stock they had before the Civil War.

Apart from the cultivation of leguminous plants which they identified as of value to enrich the soil, the improvement they could achieve with this, they argued, was limited. The greatest limitation was in the relatively small amount of manure produced by their herds.

> 'Since it was never enough, we always had to choose carefully where to put the manure'. 'Manure was always utilised in the fields where wheat was planted, but was never enough.' 'We used to rotate the fields where manure was utilised... some fields went without any for a few years'.

When asked if the use of manure could affect the levels of erosion, their answers were that when the crop is strong and more dense there is less risk of erosion. They tried to retain the fertility of the soil for as long as they could, but in their opinion, there were no other special precautions they could have taken in a systematic form to reduce erosion or avoid exhaustion.

Access to modern machinery to compete with larger modern producers was limited because of the low accumulation capacity of the subsistence economy. Productivity increased when hand operated threshers, iron ploughs and small tractors started to be used in the area of study in the late 1950s. However, they were never able to fully compete with larger producers in more fertile producers outside the study area.

More fertile land in the villages was planted with wheat in the first and second years and less fertile land was planted with oats or rye. When fertility was thought to be greatly diminished in land initially planted with wheat in the first year, oats or rye were planted in the second and third years. When land was finally exhausted it was left fallow but still kept in use for pasture. Respondents pointed out that this *form of cultivation* resulted in sequential changes in the landscape, *increased surface runoff* during cultivation, the exhaustion of land and, and the continuance of *surface runoff* in the succeeding years. They observed that *surface runoff* decreased as the fallow period progressed with the recolonisation of vegetation. There were no easy measures they could have taken to reduce runoff other than to stop cultivation.

Respondents emphasize that since *Cistus* has been replaced by butane gas for cooking and *hill cultivation* abandoned, the landscape has changed to one permanently *covered with vegetation* and reduced *surface runoff*. *Cistus* is not used as extensively now as it was before, when they were cultivating most of the land and all the cooking was done with wood. In Retiendas a few respondents explained that since the construction of check dams and a concrete channel on the gully floor in the *Barranco del Pueblo*, and reforestation in the *Arroyo del Pueblo* (see figure 10) the foundations of houses nearest the *Barranco*, are in no danger of being eroded.

The time taken for reinvasion by *matorral* was conditioned by two main elements: firstly, the extent to which it was used as food for goats and sheep, which retarded growth by feeding on the tender shoots, and secondly, by its use as household fuel. Respondents explain that on the one hand, the herds contributed to the level of erosion by disturbing the fragile soil with their hoofs, while on the other they fertilized it with their droppings and provided manure for agricultural production. They explain that the problem of erosion caused by animals was most evident in places they used for passing. Animals grazing in areas of high gradient tended to used the easier places, often along the contour lines. If ascending or descending across the horizontal axis, animals tend to use the small gullies where surface water drains, because of the absence of natural steps in them. Passing animals can worsen the fragile conditions of these areas. No other measures were taken to solve this problem other than to try to direct the herd and avoid using the same passing place all the time.

The grazing of sheep and goats was perceived to have a great negative effect on the vegetation. The activity of goats was especially singled-out as devastating to *matorral* and tree growth. Letting goats graze on young shoots from trees which had been cut down was strongly criticised but at the same time accepted as unavoidable. When asked if that practice should be considered *deficient pastoral management*, respondents argued it was almost unavoidable because of the scarcity of pasture for the animals.

Goats were important to the household economy and a form of integrated environmental resource use because they could feed on vegetation unpalatable to sheep. Respondents explained that sheep were kept in greater numbers because of the greater returns they provided. Goats were the main providers of milk for household consumption and complimentary to sheep in the mixed herd. The number of animals of each household was confined by their time limitations to tend the herd and the availability of pasture. The large numbers of goats in comparison to sheep in Palancares indicates a shortage of grasses for sheep to feed on. The reverse composition of herd in the other three villages indicates the greater existence of grasses palatable to sheep in these areas.

Although goats are blamed for much of the damage done to vegetation, when discussing this further, respondents agreed that what was deficient was the management of the herd and not the actions or existence of these animals. Respondents in Puebla de Valles and La Mierla explained that the difficulties arose in managing goats when they were herded together with sheep. Sheep can be allowed to graze in areas of tree growth much before goats because they are not able to feed from high new shoots of trees nor do they may find them palatable. The tree areas respondents from these two villages put as examples were those of the common land of 'La Capitana' in Puebla de Valles, and the 'Dehesa del Pueblo' in La Mierla (see figure 11), where the cutting of trees was organised in areas, and animals excluded from them afterwards.

Organizational measures undertaken in the past to reduce the effects of excessive pastoralism were used as examples by some respondents in Puebla de Valles and La Mierla, of *efficient pastoralist management*. For example, the temporary exclusion of animals from grazing the 'La Capitana' area in Puebla de Valles (180 Has of partly natural forest on communal municipal land, and partly on private land), during the two months of acorn production each year was a long lasting, respected and successful village arrangement. During this time acorns were collected to feed the animals at times of pasture shortage or severe weather conditions in the winter. Acorns gave them extra forage security and the area was managed in a sustainable manner.

Apart from the management of these two areas of natural forest, when different pastoral options for other areas were explored in relation to the composition of the herd, however, respondents in all the villages emphasised that not all tress were cut down in a single area but a few or single trees in many areas. This reduced the possibilities of excluding the herd from entering areas where recently cut single trees were in the process of regeneration. Dividing the herd into goats and sheep and just excluding goats for a longer period of time, because of single trees have been cut in many areas was impractical. Respondents also emphasised the positive aspect of the mixed herd which is able to make use of all the vegetation available, keeping it in a balanced stage of development.

Areas of tree regeneration from which the herd was temporarily excluded became abundant in grasses. Because of the greater numbers of sheep in the mixed herd, pastoralists did not wait until the area was safe for the entrance of goats. Their early entrance in these areas caused damage to tree growth. For these reasons goats, and to a lesser extent sheep, were singled out as responsible for damages and *changes in vegetation* cover.

Respondents estimate that the *carrying capacity*, in terms of animal to land ratios had been exceeded, yet, as with cereal production, it was justified because of the need of diversification and to have more animals for economic survival. The parameters to ascertain *carrying capacity* used by respondents were the same as those used by peasants in the case presented by Livingstone in Kenya - the number of animals they needed for survival (as discussed in pages 20 and 21 above). They explained that another strong reason which determined stocking levels was their ability to tend the animals. Time spent on this by each household shepherd (usually children missing school when it was their turn with the herd) was reduced by grouping the animals of several households into a herd of about 200 to 300 animals. Each herd owner would have to spend a day working as a shepherd for every 10 animals he or she had in the herd. More animals meant having less time for agriculture or horticulture, less diversification and more risk of economic failure.

The degradation in the condition of trees of Dehesa del Pueblo in La Mierla (see figure 11) was commented upon in regrettable tones by respondents. They explain that this area degraded rapidly when the previous careful management (for example the exclusion of animals grazing in places where trees were recently cut and sprouting) broke down in the 1960s. The breakdown in arrangements for pastoral management, due to migration, in the Dehesa del Pueblo in the 1950s was parallel to the abandonment of land and outmigration. The very few people left in La Mierla at the end of the 1960s used the area for pastoralism without observing previous arrangements and restrictions, resulting in its rapid degradation. Respondents agree that the observed *changes in vegetation* of the Dehesa were the rapid demise of trees until the mid 1970s, followed by its abandonment and the gradual increase in *matorral*. The change from this once carefully managed and valuable pastoral area was seen as unfortunate for sentimental reasons and also because it represents the loss of valuable natural trees for the village.

Apart from these exclusion measures which reduced the negative effects the animals had on the vegetation, no other measures were taken which respondents considered could have controlled pastoralism efficiently. Respondents agree that carrying capacity was exceeded but that herd management, in relation to the collection of acorns and exclusion restrictions, was the best they could afford.

The imposition of extremely restrictive measures by Government, such as total exclusion of livestock during *reforestation*, and for many years afterwards, is strongly criticised and still resented. The reforestation of Loma del Mego in 1948 in Puebla de Valles (see figure 9) took place in an area which traditionally had been used for pasture and cereal production. Moreover, the *reforestation* of this area is not perceived as having been carried out with the objective of reducing erosion, as claimed by the Government. Some respondents from this village, La Mierla and Palancares argue that the main objective behind the expropriation of their land was its appropriation by the State for wood production. Some respondents in Retiendas agree with the suggestion that this was one of the aims of Government but saw the decision by other villages to reject the option of a consortium arrangement with the reforestation agency as a mistake. Respondents in La Mierla feel that promises not to reforest near the built up area of the village were not kept. As explained above when referring to the management of fire, they are distressed that in the possible occurrence of a forest fire it may spread to houses. Most respondents feel that Government expectations for them to carry out their own reforestation for the reduction of erosion was unrealistic and deceitful.

> 'They knew we could not afford to reforest such a vast area... Insisting on its reforestation was an excuse to expropriate our land',

was an opinion typical of all those interviewed in La Mierla.

Respondents in Puebla de Valles perceived the gradual decrease in *runoff* in the main stream (Arroyo del Lugar) running by the village, as a result of the *reforestation* of Loma del Mego. Since then the flow of water in the stream decreased gradually and considerably becoming more regular and carrying less sediments. In Retiendas the reforestation of GU 3034 and GU 3029 (see figure 10) was perceived by respondents there as having similar effects. The effects of reforestation in La Mierla are looked upon by respondents in Retiendas with indifference. The main view is that many of the worse areas of erosion cannot be corrected by plantations or any other means. They agree that the best option would have been to leave them undisturbed.

The imposition of *reforestation* and the agricultural and grazing prohibitions that went with it were resented in all four villages. According to Winpenny (1991), government regulations implying command and control over abuses against the environment, such as that of grazing animals in recently reforested areas, require a firm political will and the active interest of the people. In contrast, the situation described for the case studies, was not conductive to land users cooperation but to the opposite. Many respondents commented that they often thought of provoking a fire in revenge for what they perceived was an unjust imposition. Respondents argued that expropriation caused their further impoverishment. The knock-on effects were eventual land abandonment and rural desertion. Many officials, although recognising past governmental mistakes, still attribute some of the causes behind forest fires purely to the irresponsible, backward character and ignorance of the rural population.

In the villages studied, and in most of Spain, the reforested area is perceived as something which has been unfairly removed from local control, and as Winpenny (Ibid) also emphasizes, have become something which people are less willing to care about. The means by which they could have stopped the reforestation were minimal in a political climate of Government intolerance and autocratic methods. Land users, however, recurred to sabotage during plantation work. During interviews it was indicated that many villagers who worked in the plantation of Loma del Mego, intentionally damaged the roots of trees or planted them in such a way that they would fail.

The *shape and size of the fields* was seen as a principal contributing factor for erosion and *gully formation*. The inheritance system, dividing land into equal parts for the inheritors, gave rise to a great subdivision of fields into long strips in the direction of the slope. A system of primogeniture practised in other parts of Spain, avoiding subdivision, was unacceptable in their culture. Subdivision into long strips gave equal access to fields, through paths or roads for easy entry of animals and implements, to all inheritors.

Decisions to plough in the direction of the slope was explained as the result of the *shape and size of the fields*. The long and thin 'vertical' shapes of holdings meant that tillage along the contour lines was difficult and not practised. Peasants were well aware that ploughing in the direction of the slope was one of the main causes of erosion and the formation of gullies. However, for the majority of respondents the reason for not ploughing along the contours was a practical one. To have followed the contours would have presented greater inconveniences because of the number of turns the draught animals would have to make as they reached each end of the short horizontal axis of the field. This would also have meant that a considerable area of land along the limits of each field remained uncultivated. A compromise was to plough in a diagonal form. The result of that was that water from the furrows of the two bordering fields joined *increasing surface runoff* in a single flow of greater volume, causing accelerated erosion and the *formation of gullies* on the adjacent field boundaries.

During the enquiry respondents showed great knowledge of rill and small gully development in places where they worked the land.

> 'Water always follows the same course... it starts with a little channel and it soon becomes a small gully'. 'If there are weaknesses in the soil the water infiltrates and creates great tunnels [piping]... these were dangerous for us and for the animals... I had to rescue some of my sheep when they fell into these holes', a respondent in Puebla de Valles explained. 'The most difficult channels to control are these where the amount of water is greater... When water runs from a large flat place such as that above our village, it is very difficult to put any remedy to the channels' explained another respondent in the same village.

When the formation of small gullies started to interfere with the passing of draught animals the problem was mitigated by piling up stones and *Cistus* at the head of the gully. Although the formation of gullies was perceived as of great damage to fields, these measures were intended to facilitate the passing of animals rather than as a form of erosion containment. Runoff eventually carried the materials down the slope and one or two years afterwards the same work had to be repeated again. The only form of erosion containment they thought could be successful was land abandonment or reforestation.

Conclusion

This Chapter presents a method of fieldwork producing vital knowledge to help in understanding the socioeconomic processes of LD. This knowledge and the form of its acquisition can be important for planners and communities affected by planning. The method of acquiring this knowledge can improve the working relationship between land users and planners and foster participation. Showing interest in land users' perceptions, as specialists in soil degradation and erosion in their own right, is an important key to obtain reliable data upon which the parties involved in planning can rely. The method must be regarded not only as a reliable way of collecting valuable information for practical use in planning, but also as a way of defusing long standing social and political tensions between planners and affected populations.

Exchanges between members of a planning team or researchers for academic work, assuming it to be multidisciplinary, and land users, must be regarded as one of mutual betterment and constant renovation. Outsiders, as part of their data gathering work, will learn to sit and listen to land users. In conjunction with land users, they will also discover ways of explaining LD processes or producing data for the elaboration of a bottom-up policy, which is not only mutually acceptable, but is also socially, environmentally and politically defendable

The form of exchange, through semi-structured interviews, can provide the basis for a solution to the problems of LD through problematisation and agreement. This is a form of creating knowledge at the most important point, that of the intersection between researchers and land users. One of the main advantages of this form of generating knowledge is that it can help to break down barriers of distrust and eliminate prejudice against land users' perceptions, actions and expectations. Sitting and listening is not only a strategy for data gathering but also an essential means of breaking down barriers of distrust and encouraging participation. In this way, both respondents' and interviewers' knowledge can be harmonised rather than be treated with scepticism.

The field research shows that the initial stages are extremely important for respondents and interviewers alike. The progress made from initial interviews to the gradual involvement of respondents in the construction of the list of questions, to the greater involvement of one respondent in data gathering, analysis and writing up, demonstrates that the fieldwork method can produce reliable participatory and explanatory results.

Land users' explanations of the processes of LD are not only closely related to their working practices and visual perceptions of the landscape, but also to the analysis of their political and economic situation. The reasons given for the intensification of production and the effects this had on the condition of the land, were often related to their need for survival. Explanations, however, were never discrete, provided in isolation from other factors, but showed that the processes of LD are complex, or in Blaikie's words, highly conjunctural.

Formal interviewing would, in this particular case, have missed most of the explanations given by land users. Their form of explanation is global in content, it seldom follows a linear path because, it can be argued, neither the processes of LD are linear or discrete but conjunctural. The linear path followed by structured interviews, gathering 'facts' and counting them, if of any use, may be possible after the key questions and even some of the answers provided in this chapter are known. The list of 'factors' and 'effects', however, could have been more efficiently used if more interviews could be held in the fields where respondents work. This may produced more clear explanations than some of those provided in the 'abstract' conditions away from the fields. Land users who acceded to carry the interviews in the fields, identified and pointed out to particular areas of rills or gullies which they knew, using them as illustrations of their explanations.

This Chapter has shown that the reasons for land users' land use strategies are a logical outcome of their circumstances and changing conditions in the sphere of production and exchange, and not to be explained by irrationality, conservatism or irresponsibility. As simple as this may appear many 'outsiders' ignore these basic principles and choose to allege irrationality, when in reality their own conservative ideology and attitude to change itself demonstrates their irrationality and irresponsibility. The reasons for the 'irrational' views of land users' irrationality are complex but ideology and prejudice are strong determinants in their establishment and endurance.

One of the forms of land use most castigated by foresters is pastoralism with goats. Explanations given by land users for the need for goats in their economy, the form in which the herd was managed and the damage caused, and the least damaging ways in which it could be managed, show a detailed knowledge of the problem. The problem of the use of goats or the explanation of their detrimental action in the vegetation, cannot be approached in isolation but in relation to the socioeconomic circumstances in which they are managed. Finding out the form in which the herd is managed provides an explanation of the causes and processes of LD. Working on the improved management of goats so their action is beneficial, rather than detrimental to the vegetation and the condition of land can only be achieved after understanding the predicaments and aspirations of land users through participatory field work research. The example of goats in this conclusion can be applied to other explanations of the working practices given by land users in the text above.

The next Chapter, among other things, will explore the differences as well as areas of important consensus in the visual perceptions of danger of erosion among land users, members of ecologist pressure groups, urban dwellers and agrarian technicians. The study of perceptions provide a platform from which to build and adapt in each particular planning case. It also explores the consistency between the perceptions of danger of erosion and those portrayed in policy. This will help to analyze if the pervasive force of ideology and the bureaucratic inertia of planning, distort the reality of consensus in these perceptions of danger of erosion.

Chapter Eight

Visual perceptions of land degradation and erosion - the use of pair-wise photographs

In this Chapter the method of 'pair-wise' photographs is used to examine the visual perceptions and opinions of danger of erosion among social groups. Visual perceptions of danger of erosion can prompt action by individuals or groups which affect the decision making process of SWC. The method is also presented as a form of facilitating exchange and the promotion of participation in planning of groups affected by reforestation as a form of SWC. This Chapter explains the construction of the pair-wise method of landscape photographs and presents the results of data collected.

The method was used in conjunction with interviews with representatives of four key 'social groups', each considered likely to have a commitment to the changing condition of landscape in the field area. Because landscapes are perceived and construed according to the points of view reflecting the cultural values of the viewer Blaikie (1995), it is important to ascertain the views of the social groups with a greatest interest in land and its condition. The groups were: local land users, government officials, ecologists involved in conservation, and week-end tourists from urban localities regularly visiting the area of study. The data investigates these groups' visual perceptions of danger of erosion in different landscapes, and be able to provide a more "politically aware understanding of the plurality of [their] points" (Blaikie, ibid). The Chapter seeks to demonstrate the advantage of the use of such methods in planning to encourage participation in project design and implementation.

This field work method of visual landscape perceptions of danger of erosion is closely related to studies in geography and anthropology. It is proposed as an attempt, following Johnston's (1993) argument (as explained in Chapter One, in page 41), to counterbalance the tendency to depend on empiricist-positivist models of prediction, as well as, it could be added, that of assessment. It is hoped that the method will help geographers, as Johnston proposes, in trying to bridge the gap between theory and political praxis so they can influence policy.

The use of pair-wise photographs for the study of perceptions of the condition of land provides the researcher, be it for academic work or for development planning and policy making, with some of the necessary insights for understanding and also in itself promotes participation. The use of this method emerged as a complementary method to that of the enquiry about 'causal factors' and 'their effects' covered in the previous Chapter. One of the constraints during field work through the method examined in the previous Chapter, was to persuade most land users to accompany the author to their fields to consider processes of LD in relation to the history of land use.

Since the problem was to persuade land users to visit field settings, a partial solution was to bring the field to them, in photographic form. The adoption of the pair-wise method compensated for some of these constraints. It also it provided valuable additional information about landscape perceptions from three other important social groups, apart from land users, namely urban people, agrarian technicians and ecologists.

i. The construction of the pair-wise test

The use of landscape studies in Spain, and elsewhere, has been limited largely to the identification of preferences for some landscape units over other units. Studies such as those by Ródenas, et al (1975), explored people's landscape visual preferences of dams, or Ruiz (1989), cattle raisers' preferences of landscape units. In both studies pairs of photographs were presented to respondents and as in many studies the question asked was related to their aesthetic preference - which of the two pictures do you like most?

The adaptation of this pair-wise method to discern how different social groups envisage the state of the landscape, differs from those above in that it is not aesthetic preferences but their opinion of the conditions accounting for erosion as represented in each pair of photographs. In this study the question asked was - in which of the two pictures do you think there is more danger of erosion?

During field work eleven different landscapes representative of the area of study were identified and colour pictures were taken. These landscapes are listed in columns 1 to 11 in Table 23 below. Pictures were paired in a matrix form in which all combined. Referring to Table 23, picture A1 combined with A2, and B2 with A3 and so on. When all pictures from landscape unit 1, small gullies, were paired with one from each of the other landscape units, landscape 2, (cultivated fields) was paired with one of each of the rest - B2 with B3 and C2 with B4, and so on until the last pairing J10 with J11 was reached.

Landscape units	A	B	C	D	E	F	G	H	I	J
1. (Small gullies)	*	*	*	*	*	*	*	*	*	*
2. (Cultivated fields)	*	*	*	*	*	*	*	*	*	*
3. (Big gullies)	*	*	*	*	*	*	*	*	*	*
4. (Trodden land)	*	*	*	*	*	*	*	*	*	*
5. (Olive groves)	*	*	*	*	*	*	*	*	*	*
6. (Poplar plantations)	*	*	*	*	*	*	*	*	*	*
7. (Natural forest)	*	*	*	*	*	*	*	*	*	*
8. (Pine forest)	*	*	*	*	*	*	*	*	*	*
9. (Pasture)	*	*	*	*	*	*	*	*	*	*
10. (Matorral)	*	*	*	*	*	*	*	*	*	*
11. (Sporadic brooks)	*	*	*	*	*	*	*	*	*	*

Table 23: Pair-wise combination matrix

The identification of these different landscape units can be considered related to participant observation methods. Unless the researcher is well accustomed to the landscape and forms of land use, ascertaining the landscape units demands careful observation and knowledge of its vegetation in relation to LD processes. During the field work for this thesis, the identification of the most representative landscapes of the area was greatly facilitated by the discussions held with respondents during data collection for the previous Chapter. It was realised then that respondents attached great importance to the visual assessment of the condition of land according to its use and vegetation cover.

The main criteria used in the identification of landscape units was that linking land use and vegetation cover. The density of the vegetation varied from what was considered to be scant to dense, according to the condition of each landscape. For example, what was considered to be scant vegetation cover in 'sporadic brooks', was different from scant vegetation under pasture. The picture of the scantiest vegetation in 'pasture' shows greater vegetation cover than the picture of 'sporadic brooks'. This example between these two landscape units, however, is to illustrate the greatest difference which can exist between two extremes rather than the norm for most of the rest of the other units. In other landscape units the degree of cover in those pictures with the scantiest vegetation is similar. In the case of pictures showing denser vegetation conditions, the difference in choice when respondents have to make a decision, may be provided by the type of vegetation.

Gullies were chosen because they are a prominent landscape element in the area. The difference between 'big gullies' and 'small gullies' is in their size and the level of vegetation cover. In 'big gullies', although vegetation may be in the process of recolonisation, the walls show greater areas of bare soil than in 'small gullies'. 'Sporadic brooks' are the areas of gully floors, also distinctive parts of the landscape in the area. The names given to the other landscape units closely describe their vegetation and land use condition.

'Trodden land' landscapes were those identified by the action of the frequent passing of grazing animals. Most of the pictures chosen for this type of landscape show stepped levels along the contour lines created by the passing of animals with short grass vegetation cover, or areas in which *matorral* has been kept short by their grazing. Areas with little vegetation cover which were frequently used by passing animals were also selected for this landscape unit. The difference between 'trodden land' and 'pasture' is that in the later the prominent feature is grass, as the type of vegetation cover, rather than *matorral* or grass areas degraded by the passing of animals.

The pictures were paired according to their photographic composition, such as distance, foreground and background. A few basic rules to avoid misinterpretation in visual perceptions were followed. All photographs were of a horizontal kind (equally so some pairs <u>could</u> have been oriented vertically), and were matched according to the portion of sky shown, foreground, background, distance from the objective and land inclination. The pairs were mounted side by side on stiff black paper in a plastic photographic album. Some of these pairs are reproduced in a reduced form (see Plates 4-21 in the pages below). The original photographs are 6 by 4 inches.

(Small gully) Pair 1 (Arable land)

Plate 4 Plate 5

(Trodden land) Pair 12 (Arable land)

Plate 6 Plate 7

(Arable land) Pair 17 (Pasture land)

Plate 8 Plate 9

(*Matorral*) <u>Pair 18</u> (Arable land)

Plate 10 Plate 11

(Big gully) <u>Pair 24</u> (Pine reforested)

Plate 12 Plate 13

(Olive grove) <u>Pair 37</u> (Pine reforested)

Plate 14 Plate 15

(Natural forest) <u>Pair 46</u> (Pine reforested)

Plate 16 Plate 17

(Natural forest) <u>Pair 48</u> (*Matorral*)

Plate 18 Plate 19

(*Matorral*) <u>Pair 51</u> (Pine reforested)

Plate 20 Plate 21

A form was handed to each one of the 160 respondents interviewed. In this form firstly they were asked to record their personal details such as, age, gender, level of education, profession, hobbies and interests, town of residence, size of the group interviewed, and if they were first, second or third generation of town dwellers, or they were living in a rural area. They were given the choice of four social groups to register in their personal details as land users, technicians, ecologists, and urban dwellers. Besides these details, secondly, they also used the form to record their perceptions of the pairs of photos, by means of a two vertical sets of boxes, one of which was ticked, depending on whether the respondent selected the right or left picture as suggesting the greater danger of erosion.

Interviewees were shown the pairs of photos quite rapidly, to ensure an 'immediate' response. The pages of the photo album were flicked over after 15 seconds intervals. Groups of respondents varied from a single individual to a maximum of four. Each individual in the group recorded in his/her form the responses independently in the boxes provided for each pair of photos. Sometimes, not to waste the opportunity to interview a larger number of respondents in one encounter, two groups of four were shown the pictures. This, however, required their understanding and agreement that the interview would take nearly twice as long. In this case one pair of photographs had to be shown to one group of four first, and to the other group after. At the end of this part of the interview, two groups of 7 and 4 especially important pairs of photographs were shown again. Respondents were then asked to give their reasons for the election of the right or left picture for the seven particular pairs. The pairs shown for the second time are those in Table 24, also shown in the above. These pairs were reselected because they represented one or more clear landscape features important in the erosion process. For example pair 1 with a small gully in one picture and arable land in the other (Plates 4 and 5), was chosen because these pictures were considered to be representative of the erosion process, from land use to the formation of gullies. Pair 18 showing *matorral* and arable land (Plates 10 and 11) represents another phase in land use, from production to abandonment. Pair 24 represents the scale of degradation in a big gully (Plate 12) and the attempt to reverse this by reforestation (Plate 13). Pairs 37 and 46, olive trees (Plate 14) and natural forest (Plate 15), represent a form of land use, in some cases in the process of abandonment, which when combined with pine forest on the other picture in the two pairs, suggest their possible replacement for the protection of land. Pair 48 represent changes in land use from natural forest (Plate 18) to *matorral* (Plate 19) which could be brought about by deforestation and overgrazing. Pair 51 show a condition which represent a change in protection of land (as most foresters would visualized) from *matorral* (Plate 20) to pine forest (Plate 21).

Pair No.	Left	Right
1	Small gully	Arable land
18	*Matorral*	"
24	Big gully	Pine forest
37	Olive trees	"
46	Natural forest	"
48	"	*Matorral*
51	*Matorral*	Pine forest

Table 24: Second show of pairs to ascertain reasons of their selection

Respondents were asked to write a few words indicating the reason for their original choice. Some consultation between respondents who were unsure of their literacy capacity or form of expression of their reasons of choice, did at this stage take place. If this case was when interviewing one respondent only, the offer to write the reasons in the interview form for them was made. Some respondents welcomed this and the interview was generally finished in this way. The question asked was "according to your original choice of the pairs I will show you again, write a short sentence explaining the reasons for your choice". Respondents wrote their explanations in a part of the survey form containing the numbers of the pairs followed up by two blank lines for the text. Asking respondents to write answers themselves may have generated differences in the quality of their responses, especially in cases of respondents with low literacy levels or old age. An attempt to minimize the distortion this may have produced was attempted by interviewing elderly respondents and those who having shown initial interest were reluctant to resume the interview, indicating literacy problems. In these cases, respondents were interviewed individually and they were holding the photograph album and flicking the pages themselves, while annotations in the form were made by the author.

In a third show of pairs, those in Table 25 (Plates shown in pages 283 to 285), respondents were asked to record in the box provided in the form (as shown in Table 25), which was the most likely reason accounting for erosion: type of soil, slope, vegetation, or land use? Pair 12 was selected because it represents two different types of land use, trodden land by pastoralism (Plate 6) and arable land for the production of cereal (Plate 7), both still in practice. Pair 17 also represents two forms of existing forms of land use, arable land (Plate 8) and pasture (Plate 9). Pairs 37 and 51, described above, were shown for the third time. The reason for their reselection was to check the consistency of the answers, by comparing these with those reasons given in the second test. The question asked was "according to your original choice of these pairs, which of the four suggested principal reasons would contribute more to erosion?". The pairs were shown and respondents could choose and mark one of these reasons in the box in Table 25.

When they tried to give a reason for their original choice some respondents changed their mind, but even after reflecting other still did not change. Increasing the time for reflection is an important factor in choosing pictures which may not change the final decision but may add an element of tediousness to be avoided. Seventeen percent of respondents crossed it out and chose the other picture instead. The chance to examine the pair of photos in more detail was the main reason given for this change of mind.

Pair No.	Type of soil	Slope	Veg.	Land use
12				
17				
37				
51				

Table 25: Suggested principal reason for the choice (third show of pairs)

Six interviews were held as pilot tests. At the end of each of these six pilot interviews with pairs of photos, respondents were asked for their opinion about the interview. This gave rise to the replacement of three pictures which could not be clearly interpreted. Some of the interviews had to be discarded because it was patently obvious that misleading information was purposely given. Out of the 160 interviews, this only happened twice with two individual respondents, one with a single respondent and other as part of a group of four. As in earlier interviews when this happened, it was suggested that the objective of the interview must have been misunderstood or badly formulated. If after reformulation, at the end of the first run of pictures, answers were given in a casual and careless manner which indicated no interest in continuing, the interview was cut short and/or the data later discarded. This did not reduce the size of the effective sample because other person was interviewed in replacement.

The choice of social groups interviewed was based on two main factors, firstly, their direct or indirect knowledge of the geographical area or the subject, the danger of erosion, and secondly their 'interest' in the condition of the rural landscape - each with different interests, priorities, experience and perceptions of land condition (including erosion potential) and conservation. These groups were land users, technicians, ecologists and urban dwellers. Most individuals in the groups could have been reclassified into many other groups, according to class, if using a Marxist perspective taking into account their position in relation to the means of production, or in relation to their position in the decision making process, if a Weberian perspective would have been adopted. These classifications would have detracted from the debate on how to promote the participation of affected populations, be these land users, but also urban dwellers and ecologists, or in the words of influential decision makers in reforestation, promoting the 'interest' of the 'urban sector' in supporting official plans (as discussed in page 102). Some individuals would fit in one or more of these social groups, although when controversy arose it was left to their discretion to decide. As a remarkable example of this, one respondent whose main source of income was derived from agrarian activity, a land user, thought himself primarily as belonging to an ecologist group and registered as such.

Forty persons per group were interviewed. Land users were the most readily available and identifiable. Many of those who were previously interviewed using the 'causal factors' and their 'effects' analyzed in the preceding Chapter were also interviewed using the pair-wise photographs. Government officials such as foresters or agricultural technicians working in the area was another easily identifiable and readily available group working in the Provincial Delegation of Agriculture of Guadalajara. A large proportion of the group of ecologists know and work in the area regularly, carrying out plantation work in Palancares (as examined in section ii of Chapter Five). A smaller number of these visited the area but have not worked in the plantation of natural trees there. The urban group were mostly campers who visited the area several times a year. These were those who most likely have been borne in the city and their first place of residence was there. They were well accustomed to the landscape and some, in conversation, demonstrated a detailed knowledge of its important features.

ii. Analysis of the pair-wise test

Before the quantifiable results of the pairwise test are evaluated, other important results from the exchanges it generated during interviews must be examined. A common occurrence during interviews with land users was their interest in knowing where particular pictures were from. Respondents, by closely examining the vegetation or type of soil represented in the picture, often made guesses as to its whereabouts. Some valuable comments were that an explanation of the source of each picture should be provided so they could ascertain the conditions better. The provision of information with a detailed location of the pictures required in this type of information, although possible, would make the interview more tedious because of the time it would take. It would be impractical with other groups whose detailed knowledge of the geography and microecological conditions is not so accurate. Even trying to map the location of the pictures, 110 in total, some of them in a close vicinity, some dispersed, and overall collected in the much larger three villages in the lower altitude areas of study, would not have been a valuable exercise. The inaccuracy of the location of the photos, if a smaller scale map was produced, or to achieve accuracy with a larger scale map the number of maps and references this would have required would have made this impractical and only of relative added importance. A valuable finding for the study is the realization of the importance land users attached to different landscape conditions and their knowledge of microconditions of the area. The type of vegetation in the pictures was often commented on during interviews and accurately identified. This confirmed that a few of the most relevant features in the pictures, and factors of erosion, such as land use, vegetation, soil type, could be clearly identified.

The data was entered into a spread sheet (Quattro pro) computer programme and analyzed. The data was coded as 0 (zero) for the selection of a picture on the left of the pair or 1 (one) for a right selection. Each landscape unit accumulates points according to the times it has been selected by each individual respondent. The formula is adjusted according to the left or right position of the pictures of each landscape unit on the pair. The formula, adopted from Ruiz (1993?), is:

$$P=(Nl-l1-l2...-ln+r1+r2...rn)*100/(nl+nr)$$

$\underline{P}$ represents the points for each landscape unit and each individual. $\underline{Nl}$ are the number of photographs in which the particular landscape unit is represented in the left; $\underline{l1...ln}$ are the points that the respondent gives to the pictures on the left in the pair (0 if it has been selected); $\underline{r1...rn}$ are the points that the respondent gives to the pictures on the right of the pair (1 if it is selected); $\underline{nl}$ and $\underline{nr}$ are the corresponding points given to the pictures if they are placed on the left or the right of the pair. The result is the transformation of selection or rejections in the form of 1s or 0s, into values which fluctuate between 0 and 100.

The outcome from interviews with officials was that whereas previous exchanges, some stemming from requests for access to documentation regarding reforestation policy and techniques in the area, had been considered and answered rather guardedly, however, politely. During and after the pair-wise interviews this changed to more open and outspoken exchanges. One of the main concerns of this group of respondents, especially foresters, was their difficulty in judging the picture as it was presented. Some, referring to reforested degraded areas, pointed out that the case would not be the same, in say twenty years time, when the conifers would have had time to stabilize the land. They argued that the danger of erosion was potentially reduced as time passed, probably a valid point if time is to be taken into account, but not a relevant one for the data sought in this type of exercise. They often had to be reminded that what they were judging was the present situation and not a hypothetical one, in which for instance any of the areas could suffer a forest fire and degrade further, or on the contrary, be greatly recovered and stabilized. A defensive attitude when referring to conifer plantations indicated the extent to which this policy has been criticized. Foresters, however, never pointed out to the possibility of danger decreasing with time in the case of *matorral* confirming their 'defensive' position. Considering the longer term as well as the apparent current level of risk, would have required a different type of assessment which would retain vegetation only as the main factor affecting erosion and discarding land use. Landscapes such as cultivated fields, trodden land, poplar plantations or even *matorral*, because of their more cyclical character would have to be eliminated from the text. It would have been less accurate to judge danger of erosion, for example in trodden land in the future, because this is subject to many changes in land use, itself dependent on pastoralist policy, market demand etc., for products such as wool and meat.

Comments by the ecologist and urban groups, when referring to conifer plantations, show a more politicised and outspoken attitude. Ecologists' comments were in direct opposition to those of foresters. As with foresters, individuals in the ecologist group often had to be reminded that what they were judging was the picture as it was presented to them and not the plausible greater benefits of matorral or natural forests if substituting conifer plantations. It is difficult to say the extent to which respondents answered according to the picture as it was presented to them, or whether foreseeable changes in land use and conditions had an influence in their choice. This risk was tried to be minimised by explaining to respondents at the start of the test and when their reasons for the choices of particular pictures were requested that what they were judging was the actual condition in the photograph. This could be especially applicable to arable land, pine forest or trodden land experiencing regular changes in land use or grazing pressure and conditions.

The perceptions of danger of erosion are analyzed in relation to the person.l data collected from individuals arranged into different groups. This has been done according to the original four social groups interviewed, and across groups in relation to gender, age and level of education. The data of the four social groups interviewed has also been analyzed in relation to the reasons given for the choice of the pictures shown a second and third time.

The evaluation of the data of the four social groups show two main levels of perceived danger for the eleven landscapes (see figure 18 in the next page), those above the 45 level mark and those below it (as shown in figure 19[1]). Big gullies were an expected choice among them. The points of difference between trodden land and big gullies are relatively small. It can be assumed that because of the larger and steeper areas without vegetation in the walls of big gullies the sediment yield and soil loss from these is greater than in trodden land. However, because the pictures of trodden land present an 'active' and even perhaps progressing erosive process due to its constant use, they could be considered in nearly as great danger of erosion as big gullies. This can be seen as an indication that the question, "in which of the two pictures do you think there is more danger of erosion?", was for these two cases, understood by respondents, and not confused, for instance, with the accumulation of sediment on gully floors.

As discussed above, the question, in which of the two pictures do you think there is greater danger of erosion?, may have not been as clear in the minds of some respondents when referring to pictures denoting regular changes in land use, such as arable land, or the state of its cover, such as in pine forest. Some pictures of arable land showed recently ploughed areas and others fallow land (see Plates 5, 7, and 8 for an example of different conditions of the same landscape unit). Under recently ploughed land these areas would most likely lose more soil than trodden land; however, overall they have less points in the scale of danger, as shown in figures 18 and 19. This may indicate three or more ways of reasoning behind respondents' answers: firstly; as some respondents during interviews pointed out, recently ploughed land could be regarded as less dangerous because a few weeks after the picture was taken the planted crop would be protecting it, or

[1] The bars in graph 2 are the averages of the bars in graph 1.

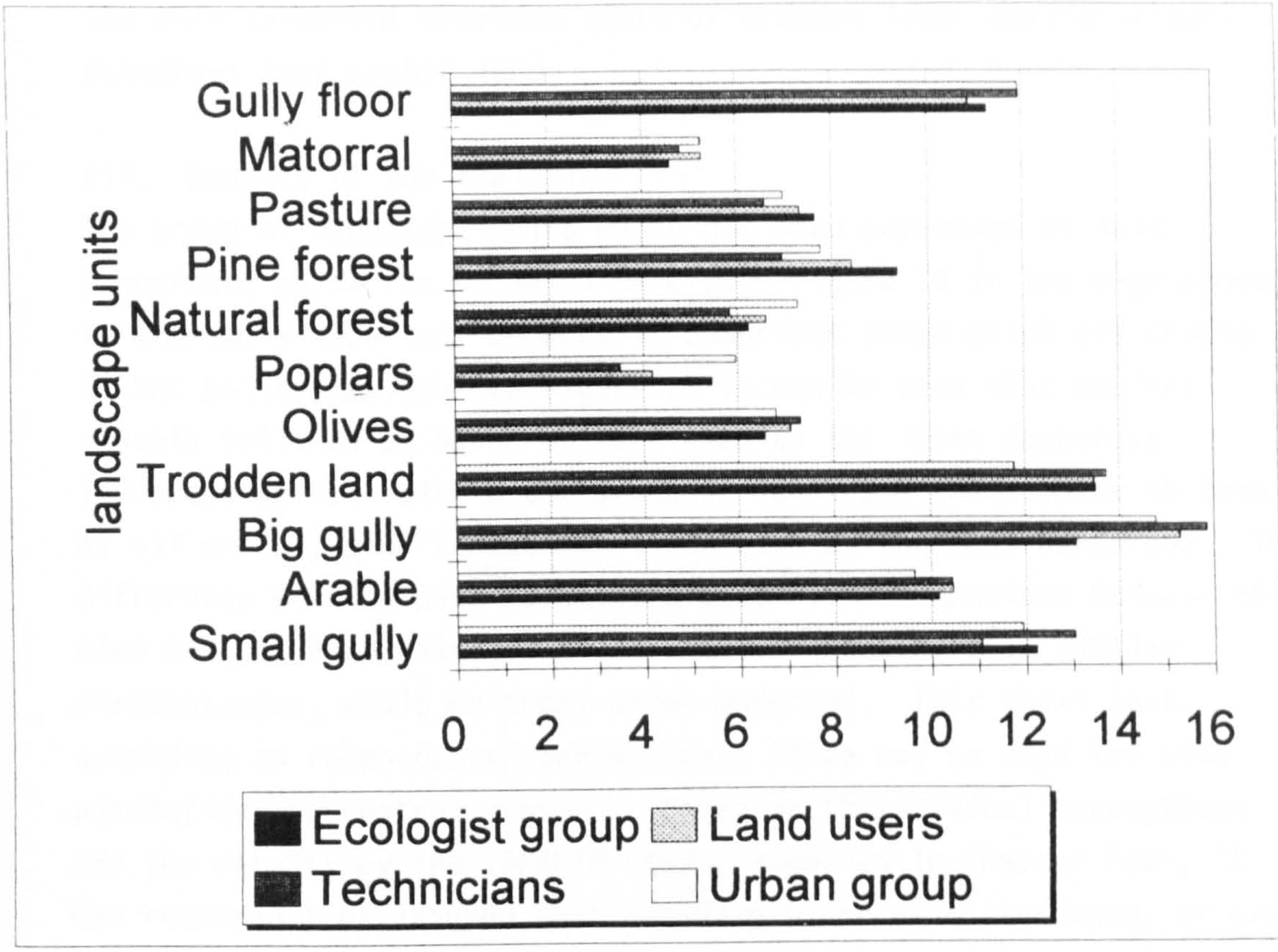

Figure 18: Percentage points by all social groups to all landscape units

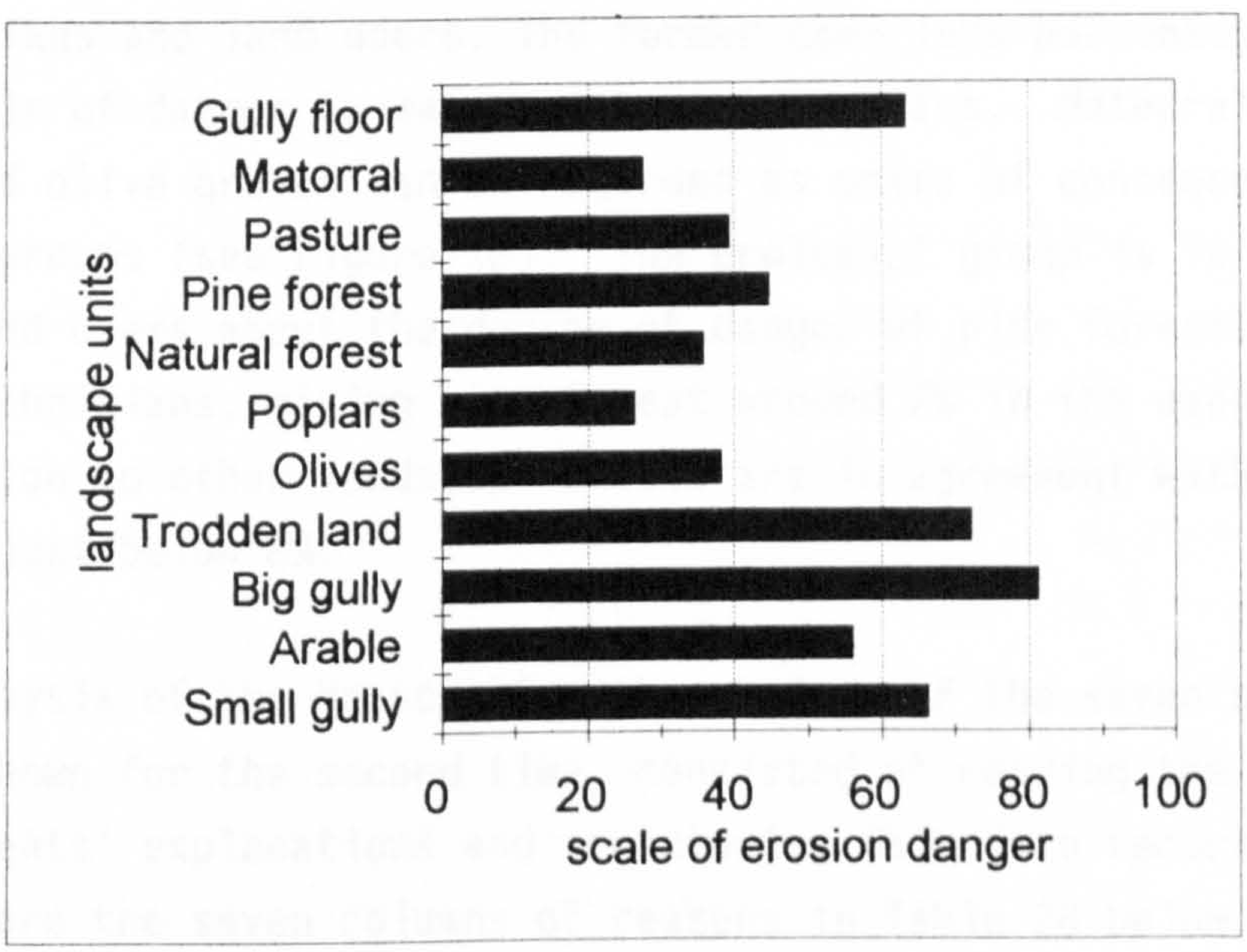

Figure 19: Average of percentages by all groups

secondly; increased infiltration because of ploughing would reduce overland flow. The third way of reasoning could have been linked to the more permanent degraded state of trodden land, making it more dangerous than arable land.

iii. Results of the analysis

The group of landscape units which has been perceived as less dangerous, below the 45 level mark (see figure 19 in the page above), is extremely important because it comprises those which are crucial to SWC policy making. In figure 19 it can be seen that poplars closely followed by *matorral* were seen as the least dangerous landscape units. Within the group of landscape units below 45 level by all groups, pine forest was identified as the most dangerous. The difference between pine forest and *matorral* is important because if pine had not been planted, these areas, like others in similar circumstances, would be today under *matorral*. This shows that, according to respondents' perceptions, there was no need for pine plantations to control erosion. Based on these visual perceptions and the results by the IBERLIM study, examined in Chapter Four, it can reasonably be assumed that avoiding *matorral* disturbance, or even better, improving its condition could have given better results.

The responses of the ecologist group and the urban group (figure 18) can be contrasted with the overall trend (figure 19), and with technicians and land users. The former gave less percentage points in the scale of danger to *matorral* than to poplars. *Matorral*, arable land and olive groves can be regarded as units of consensus among all social groups (see figure 18). The ecologist group is in agreement with land users about the degree of danger of pine forest, both above 8%. Technicians, giving pine forest around 7% in the danger level in comparison to other landscape units, are in agreement with the urban group, just below 8%.

The analysis of the reasons for the choices of the seven selected pairs shown for the second time, consisted of reading the respondents' explanations and registering them into recurrent groups. These were the seven columns of reasons in Table 26 below. The reasons in these columns were the most constantly repeated, with the exception of those under 'other', which being so few were not, for this type of exercise, worth registering in detail. Adding them up and then finding their percentage reveals that the overall reason given for danger of erosion by all four groups is the lack of vegetation cover (41.25 %)[2], followed by slope (24.37 %), soil type (11.08 %), terraces (9.48 %), dryness (1.96 %), land use (8.03 %), and other (3.83 %). Looking at Plate 5 (page 283) and Table 26, arable land is perceived as slightly more dangerous than a small gully (Plate 4) which has been recolonized by vegetation.

The two main reasons given for the choice of Plate 5 (see pair 1 in Table 26) are the condition/lack of vegetation (44 respondents), and land use, wheat production (29 respondents). The most frequently cited reason of danger given for the picture of small gully (Plate 4) is its slope. A few respondents took into close consideration the upper part of the picture, with four respondents assuming the terraced condition of the small gully walls being due to the construction of reforestation terraces.

Looking at pair number 18 (Plates 10 and 11) and Table 26, it can be seen that lack of vegetation, land use, and the slope are considered to be the main reasons for erosion in the arable land represented in Plate 11 (page 284). Two respondents from the technicians group pointed out that the absence of terraces was the main cause of erosion in this picture (see Table 26). For the picture on Plate 10, the type of vegetation, *Cistus ladanifer matorral*, is perceived by these two respondents and others from all the groups, as the main cause of erosion.

The pictures for the pair number 24 were taken on land belonging to Retiendas. The left one classified as a 'big gully' (i.e. the main focus of the picture) is taken in the area left un-reforested between the Barranco del Pueblo and El Vado Road (see figure 10, page 135). Plate 13 (page 284) classified as 'pine forest' is of the nearby area reforested in 1956 (GU 3034, in figure 10), near the Arroyo de Valdelabadia. The comparison of these two pictures is important because it is an example of the perceptions of the results of reforestation by the four social groups interviewed. The two pictures recorded a similar degree of danger, 76 for the big gully

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[2] These percentages have been rounded up to the nearest decimal digit to avoid long figures difficult to fit into Table 26.

Pair	Plate Nos.	Resp. Nos.	Columns of reasons for choices						
			Veg.	Slope	Soil type	Terra-ces	Dry	Land use	Other
Pair 1	4	74	10	38	9	4	2	5	6
	5	86	44	2	6	-	2	29	3
Pair 18	10	21	9	4	3	* 2	-	3	2
	11	139	49	25	10	-	6	42	5
Pair 24	12	76	34	27	8	* 1	-	-	6
	13	84	26	31	5	4	1	7	10
Pair 37	14	50	22	8	1	*10	5	4	-
	15	110	26	22	18	41	-	-	3
Pair 46	16	32	15	7	7	-	3	-	-
	17	128	92	19	13	4	-	-	-
Pair 48	18	117	47	50	16	-	3	-	1
	19	43	24	6	12	-	-	-	1
Pair 51	20	62	31	16	5	* 8	-	-	2
	21	98	33	18	11	32	-	-	4
Totals			462	273	124	86(*20)	22	90	43
Approx. %			41.25	24.37	11.08	9.48	1.96	8.03	3.83
Plates in the second column are shown in pages 283-285									

Table 26: Reasons for choice of pictures (number of respondents)

and 84 for the pine forest (see Table 26a[3]). Most people choosing Plate 12 as more dangerous thought that the absence of vegetation and the slope were the main reasons for erosion. One respondent, from the technicians group, thought the absence of terracing was the main reason (see Table 26). This contrasts with another four respondents, two ecologists and two land users (see Table 26), who thought

[3] The data shown in Table 26 is split into sections (smaller tables) relating to each one of the pairs of photographs analyzed in greater detail in the text. Each of these tables will be numbered as 'Table 26a' etc.

terracing on Plate 13 (done with animal traction rather than with bulldozers as in the area of La Mierla), was the main reason for erosion. In this picture the sparse vegetation and the slope are the reasons given for danger of erosion.

Pair	Plate Nos.	Resp. Nos.	Columns of reasons for choices						
			Veg.	Slope	Soil type	Terra- ces	Dry	Land use	Other
Pair 24	12	76	34	27	8	* 1	-	-	6
	13	84	26	31	5	4	1	7	10

Table 26a: Reasons for choice of pair 24

The results of pair 37, an abandoned olive grove (Plate 14) and a pine forest area (Plate 15), are unequivocal. The great majority of respondents chose the second as more dangerous (see Table 26a). The main reason for this is the bare ground caused by the construction of terraces (in this case constructed with bulldozers). This pair of photos generated a certain amount of controversy in some interviews. As it can be seen in Table 26b, ten respondents thought the conditions of the olive grove (Plate 14) could be improved by the construction of terraces (the reasons they give for danger of erosion are absence of terraces). This is in contrast with the choice by 41 respondents ascribing the construction of terraces as the reason for their choice of the pine forest area (Plate 15). Other reasons given for the choice of this plate were the sparseness and nature of the vegetation, the slope and the type and condition of the soil. The degraded condition of the vegetation on the olive grove was also seen as an important factor accounting for erosion danger.

Pair	Plate Nos.	Resp. Nos.	Columns of reasons for choices						
			Veg.	Slope	Soil type	Terra- ces	Dry	Land use	Other
Pair 37	14	50	22	8	1	*10	5	4	-
	15	110	26	22	18	41	-	-	3

Table 26b: Reasons for choice of pair 37

Pair 46 show a natural forest in Plate 16 and a pine forest in Plate

17. In this pair the choice of the picture on the right as more dangerous for erosion is still more striking than in the last pair. One hundred and twenty eight respondents perceived the situation of mature pine forest (more than 35 years old) represented in Plate 17 as more dangerous than the natural forest (*Quercus ilex*) in Plate 16. Lack of vegetation under the mature pine forest, in comparison with that in the other plate, which shows a ground layer of grasses, *Cistus*, *thymus* and other *matorral*, was the reason for the danger suggested by most respondents. The slope and the terraces (constructed with animal traction) are other reasons given for the choice of this picture (see Table 26c).

Pair	Plate Nos.	Resp. Nos.	Columns of reasons for choices						
			Veg.	Slope	Soil type	Terra- ces	Dry	Land use	Other
Pair 46	16	32	15	7	7	-	3	-	-
	17	128	92	19	13	4	-	-	-

Table 26c: Reasons for choice of pair 46

Pair 48 classified as natural forest (Plate 18) presenting a degraded forest condition of *Quercus ilex*, and as *matorral* of mainly *Cistus ladanifer* on the right of the pair (Plate 19), shows that most respondents thought natural forest to be more dangerous. The slope was perceived as the greatest factor contributing to erosion in the picture of natural forest (see Table 26d). Although in reality the gradient in the two cases is very similar, the angle from which the pictures are taken are slightly different (compare Plates 18 and 19). The gradient in the picture of natural forest, tilting to the left, gives the false impression that it is greater than that in the other picture of *matorral*, tilting towards the camera. If the assumption that the perceptions of gradient is distorted, because of the different angles of the pictures, is accurate, this may have made the overall result somewhat misleading. However, this does not distort the overall result greatly because the other nine pictures of natural forest combinations with the rest of the landscape units compensate for it. The sparse and degraded condition of the vegetation was another reason for the choice of both pictures in pair 48 (see Table 26d).

Pair	Plate Nos.	Resp. Nos.	Columns of reasons for choices						
			Veg.	Slope	Soil type	Terra-ces	Dry	Land use	Other
Pair 48	18	117	47	50	16	-	3	-	1
	19	43	24	6	12	-	-	-	1

Table 26d: Reasons for choice of pair 48

Pair 51, classified as *matorral* and pine forest (Plates 20 and 21), is an important one because the first represents an area which foresters would like to see reforested by the construction of terraces, as in the case of olive grove in pair 37 (Plate 14). Eight respondents (mostly foresters) thought the condition of danger in the picture of *matorral* could be reduced by constructing terraces (see Table 26e). This, however, is offset by the number of respondents (32) who assigned to the construction of terraces (constructed with bulldozers) the main reason for danger of erosion in the other picture of pine forest (Plate 21).

Pair	Plate Nos.	Resp. Nos.	Columns of reasons for choices						
			Veg.	Slope	Soil type	Terra-ces	Dry	Land use	Other
Pair 51	20	62	31	16	5	* 8	-	-	2
	21	98	33	18	11	32	-	-	4

Table 26e: Reasons for choice of pair 51

The sparsity and kind of vegetation and the slope on both pictures are chosen as important reasons. Eleven respondents pointed to the loose condition of the soil in the pine forest picture as a reason for their choice. The objective of the third show of pictures was to ascertain the reasons for the choice of pairs 12 and 17 (shown in Plates 6-9 in page 283) and to verify the level of accuracy in respondents' written answers of reasons for the choice of pictures in pairs 37 and 51 (therefore these last two pairs were shown to respondents for the third time). Table 27 shows that the result of comparing the respondents' written answers with those ticked in boxes (shown in Table 25, page 288), is that they coincide in the great majority of cases. Those under 'other choice' in Table 27 gave other reasons than those in Table 26 in the second show of pictures. Those under 'different' were clearly giving contradictory answers, as for example, choosing vegetation in their written explanation during the second show of pictures and slope in the boxes they ticked in the third show of pictures, in Table 25 (page 288).

Pairs	Coinciding	Different	Other choice
37	138	14	8
51	141	13	6

Table 27: Check on the consistency of answers

The analysis of the reasons given for the choice of the right or left pictures in pairs 12 and 17 using Table 25 (provided to respondents in interviews), is represented in graphic form in figure 20 (in the next page). This figure shows that for the picture on the right in pair 12 (Plate 7, arable land), land use was selected by more than 50 respondents as the main reason for their choice. This is followed by the degree of importance given to the slope in the other picture of trodden land. The type and/or condition of soil in the picture of trodden land is seen as more dangerous than that in arable land.

Analyzing the results of different social groups provides further understanding of their perceptions, which can be of paramount importance in planning. Figures 21 to 24 show the result of the reasons for the choice of pictures by each social group. The ecologist group and technicians agree on the importance of land use in the picture of arable land (Plate 7) in relation to the other three choices presented to them but do not coincide on the degree of danger. Twenty three technicians perceived land use to be the reason for danger of erosion (figure 23) in comparison with 14 of the ecologist group (figure 21). The urban group agree with land users about the importance of the slope on the picture of trodden land (Plate 6). Five land users identified land use (recognised by them as caused by the passing of grazing animals) in this picture as an important reason for their choice of danger of erosion (see Plate 6). Figures 25 to 29 show the results of the analysis of pair 17, arable land and pasture land (see Plates 8 and 9). Eighty six respondents

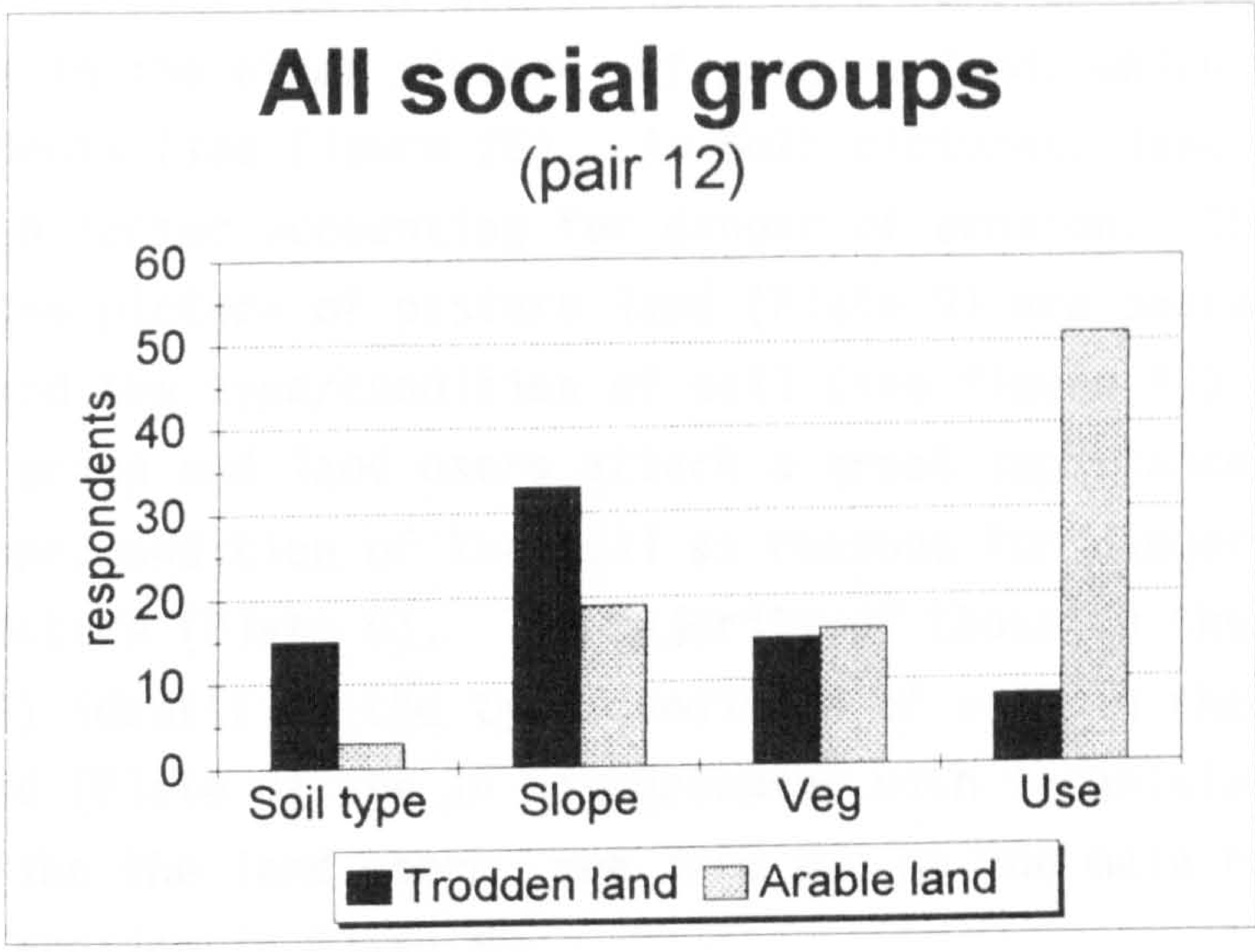

Figure 20: Analysis of choice by all groups for pictures in pair 12

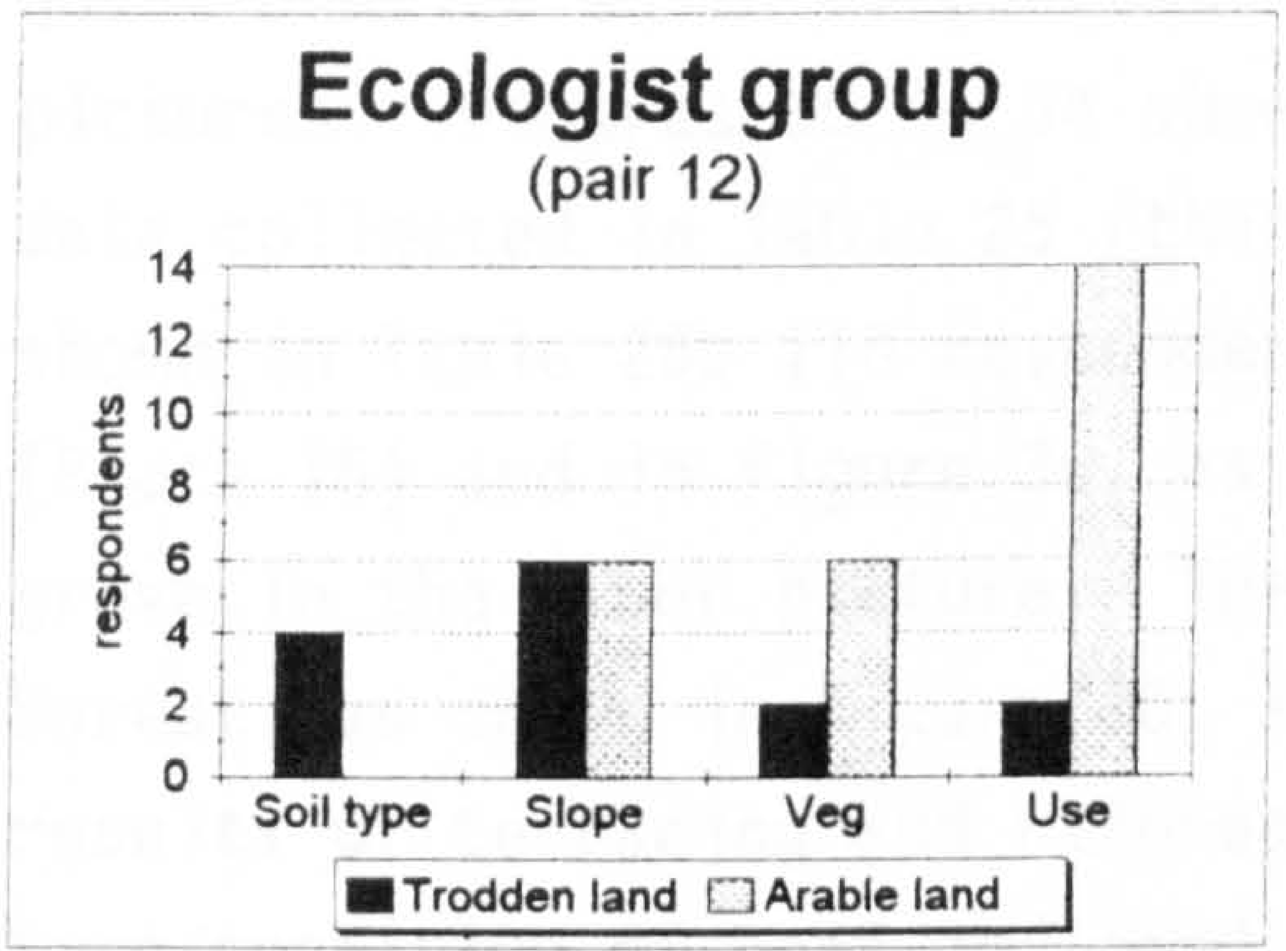

Figure 21: Analysis of choice by ecologists

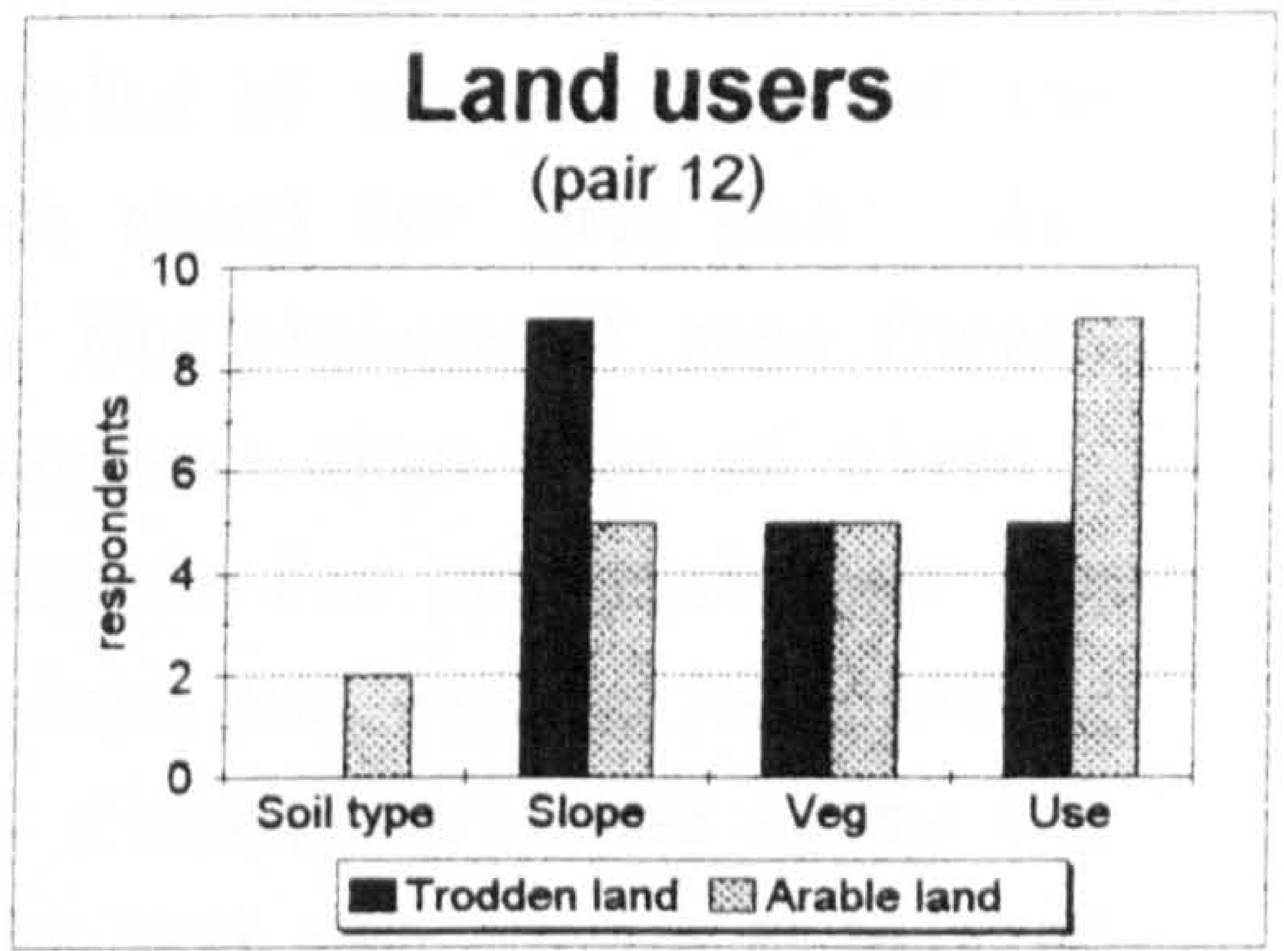

Figure 22: Analysis of choice by land users

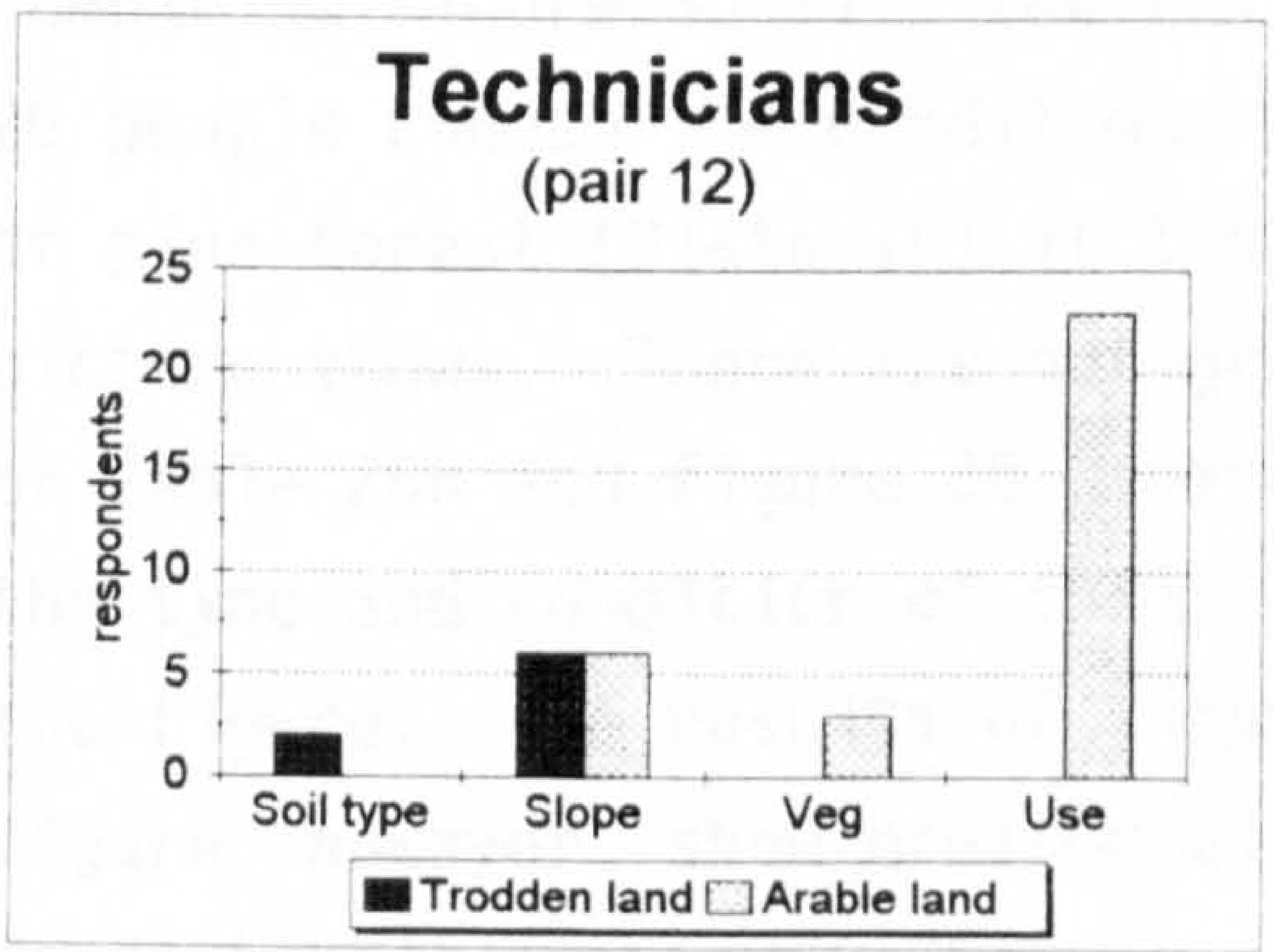

Figure 23: Analysis of choice by technicians

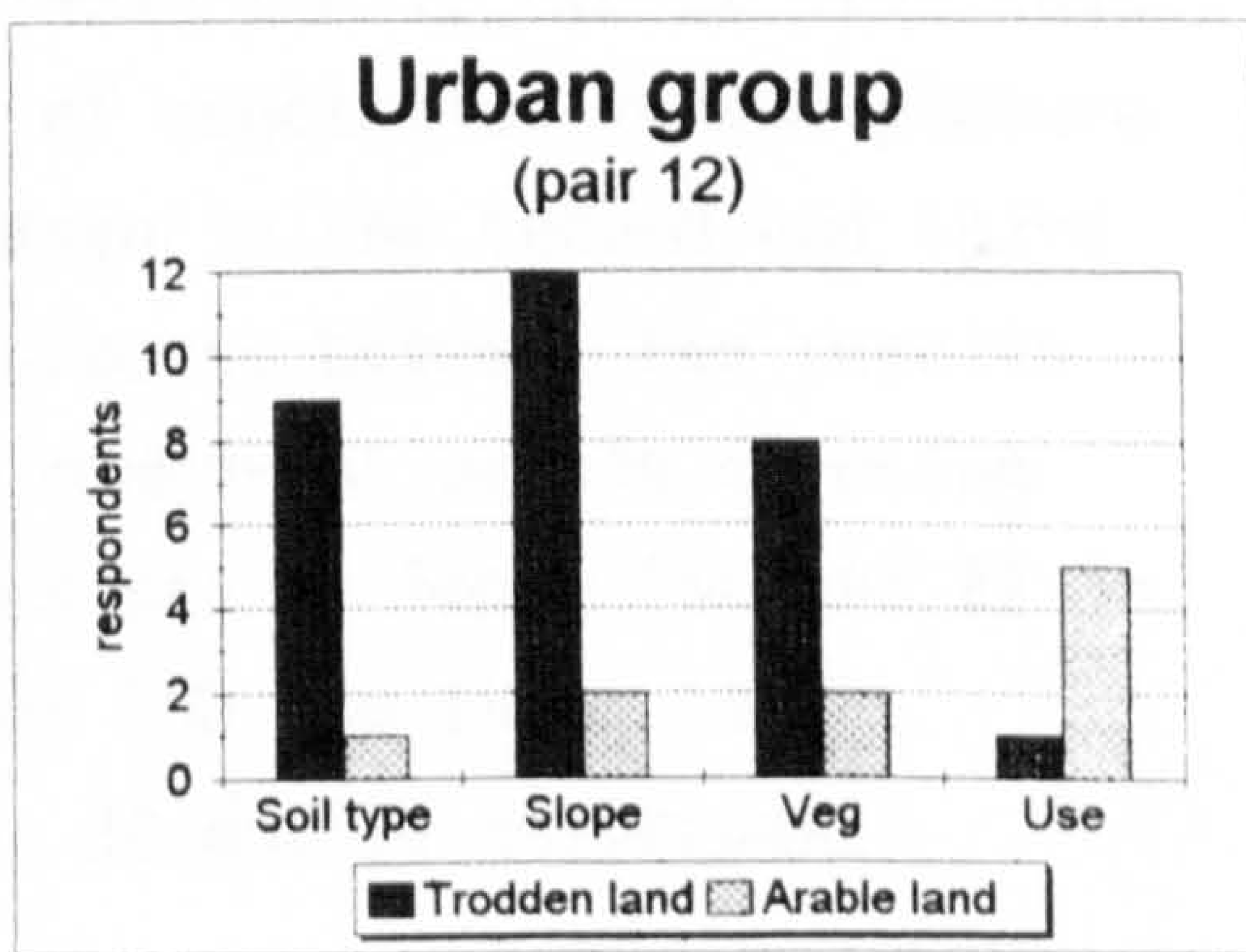

Figure 24: Analysis of choice by the urban group

thought the conditions of arable land were more dangerous for erosion than those in the other picture, of pasture land, which was chosen by 74 respondents (see figure 25). In both pictures, land use is chosen as the main factor accounting for danger of erosion. The reasons given in the picture of pasture land (Plate 9) are shared between land use and the type/condition of soil (see figure 25). The ecologist group and land users attach a great importance to land use and the type/condition of the soil as reasons for danger of erosion in this picture (Plate 9). The majority of those in the urban group (figure 29) identified the type/condition of soil in the picture of arable land (Plate 8) are in disagreement with technicians (figure 28), who like the land users, see land use as the main reason for the danger of erosion in Plate 8.

The reasons for the choice in pair 37 have already been analyzed in Table 26b using data from the written answer section in the questionnaire which respondents filled in the second show of pictures. Figures 30 to 34 show the results of the analysis of the data collected in Table 25 (third picture show) for this pair. As shown in Table 26b 110 respondents chose the picture of pine forest (Plate 15) and in figure 30, as more dangerous than that of olive grove in the other picture. The main reasons for the choice of pine forest, as shown in figure 30, are the slope and vegetation (both results of terracing and reforestation), closely followed up by the type/condition of soil and land use (this last one also a result of reforestation). For the other picture of olive grove, the slope and vegetation were chosen as the main reasons.

Comparing figure 30 with the results of Table 26b it can be seen that 26 people choose the conditions and type of vegetation in the picture of pine forest (Plate 15) as the main reason in the second and third picture shows. There are not great differences between the results of Table 26b and figure 30 regarding the number of people choosing the type and condition of soil, 18 respondents in Table 26b and 22 in the figure. The results of slope in Table 26b and those in the figure, however, show greater divergence, 22 and 39 respondents respectively.

This divergence can be interpreted as the result of the different answers which the questionnaire written answers and those using Table

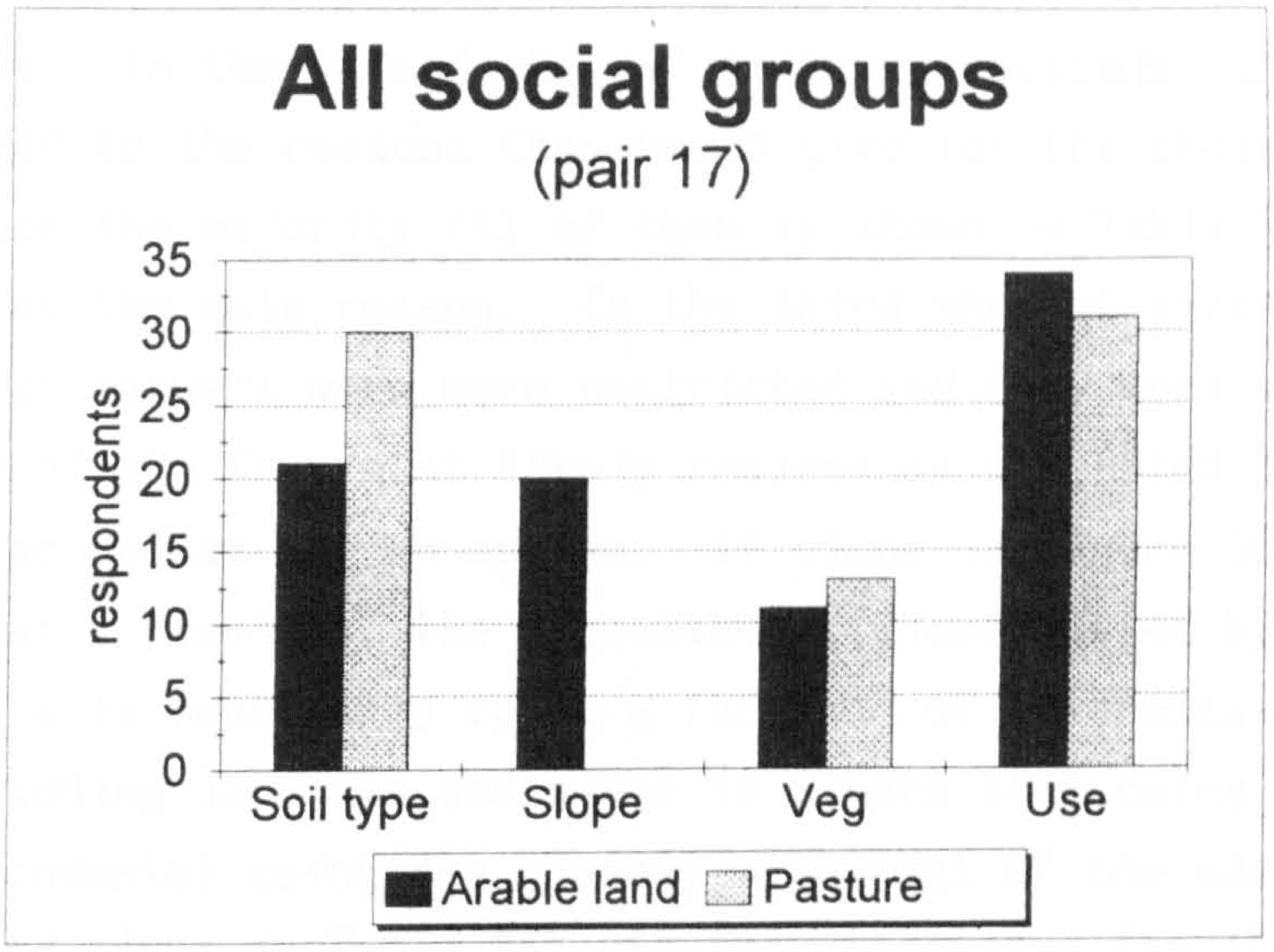

Figure 25: Analysis of choice by all groups for pictures in pair 17

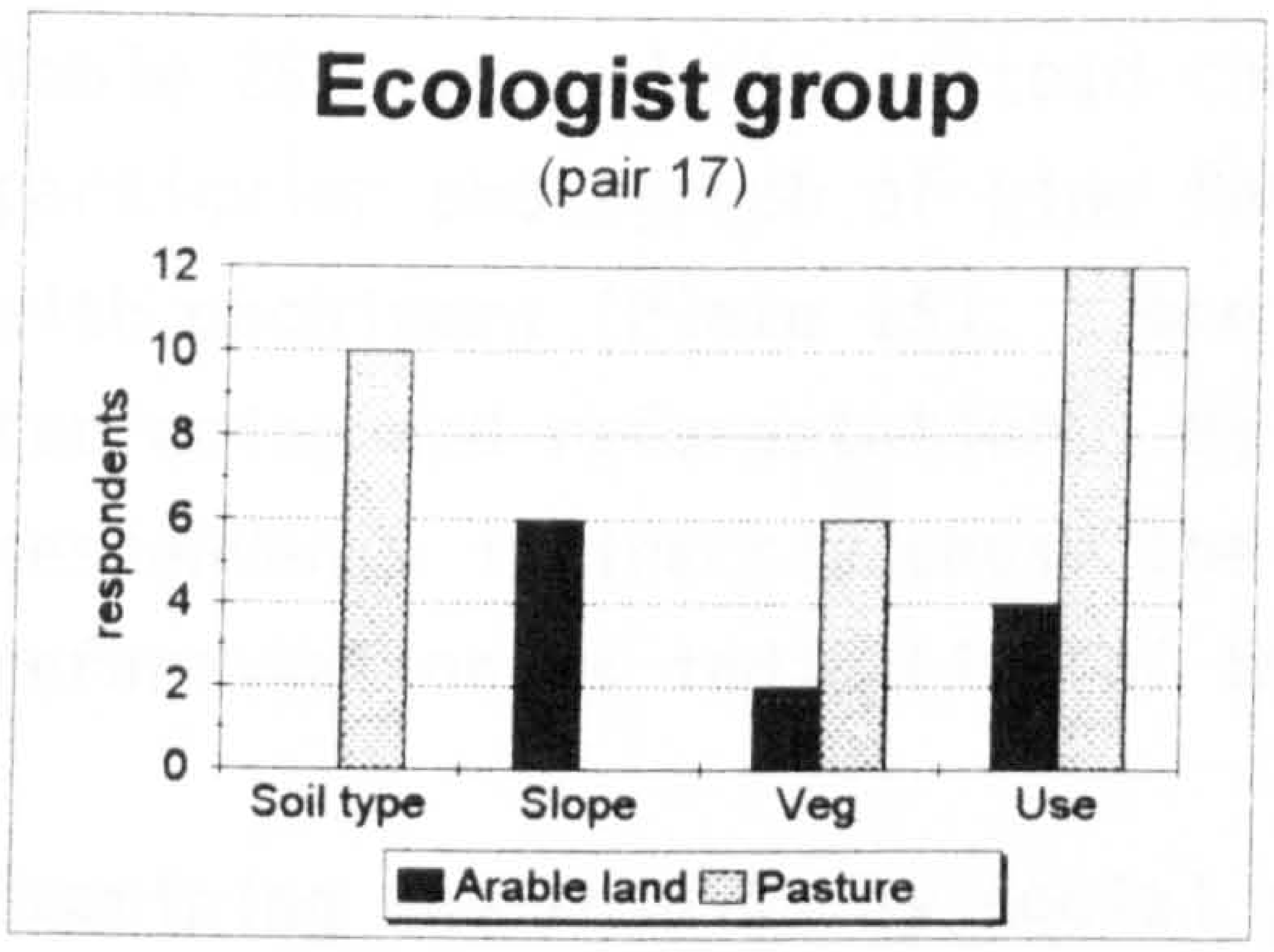

Figure 26: Analysis of choice by ecologists

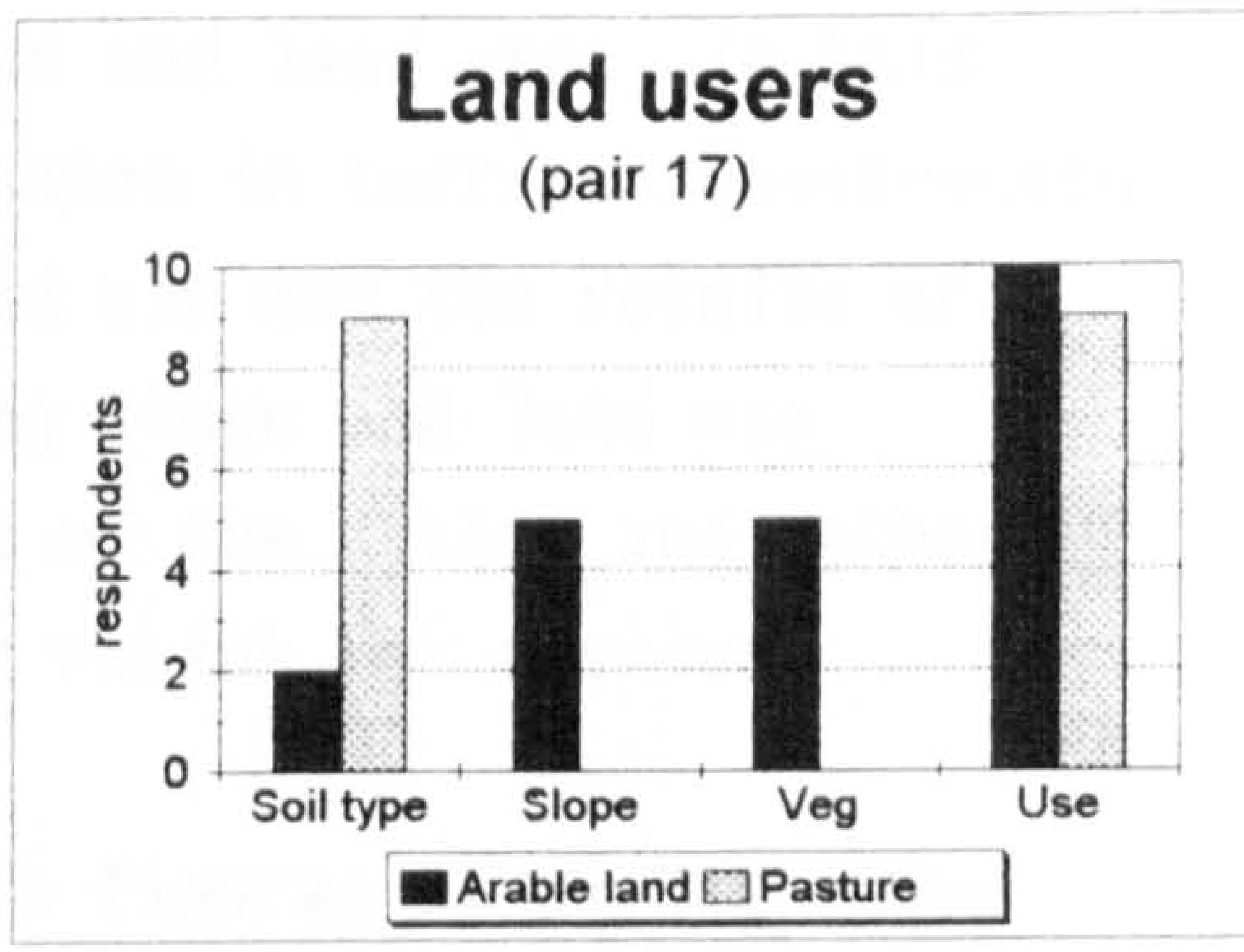

Figure 27: Analysis of choice by land users

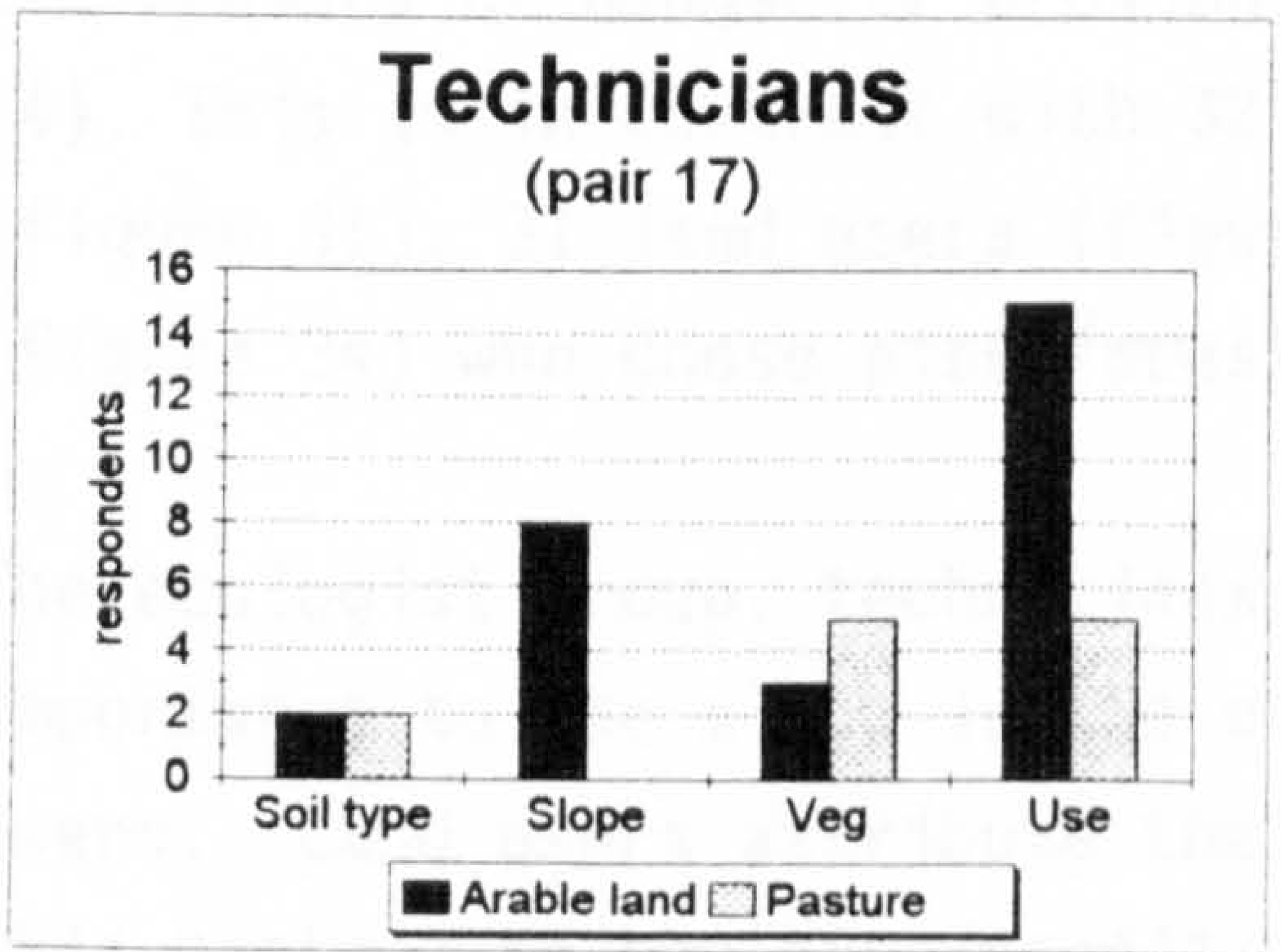

Figure 28: Analysis of choice by technicians

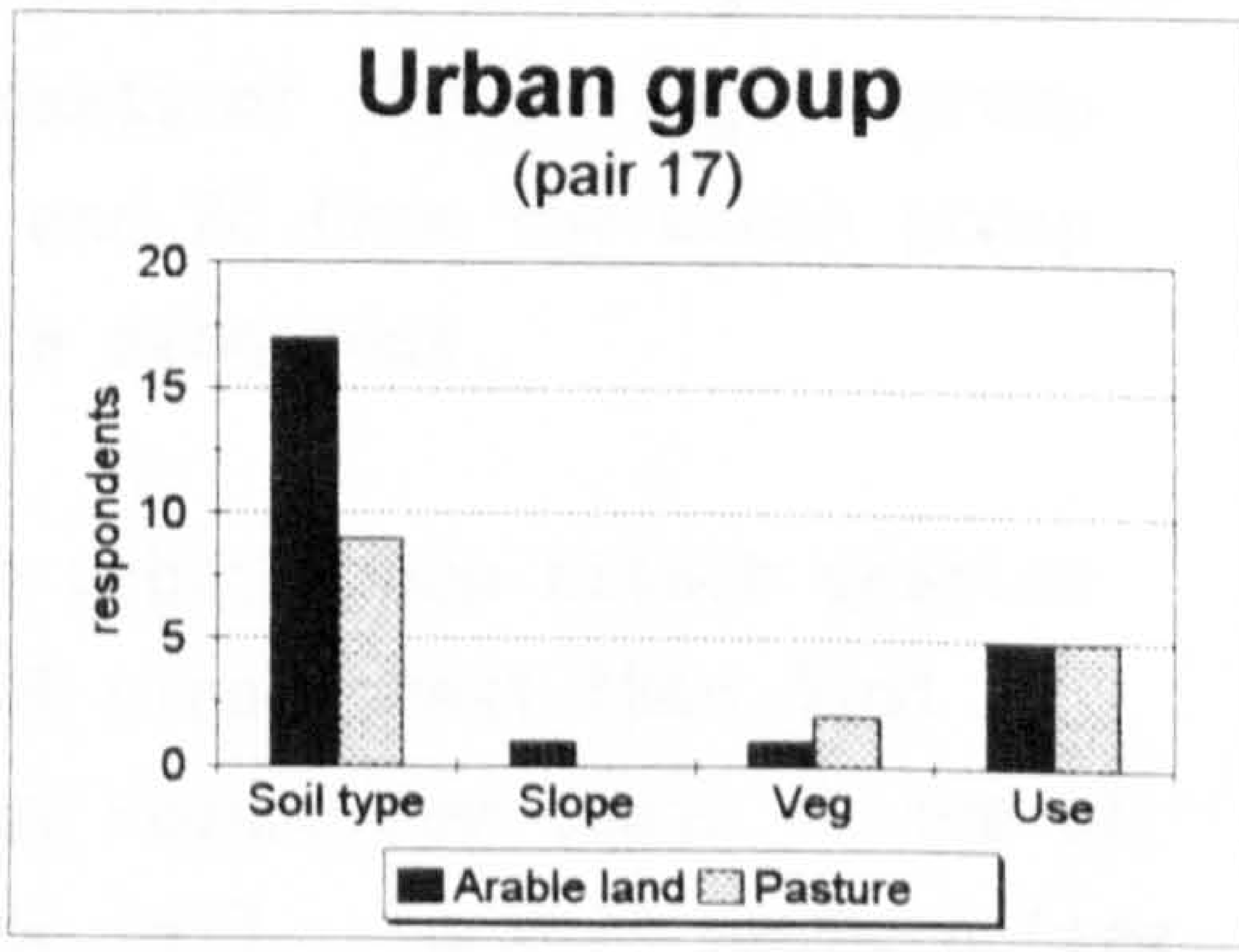

Figure 29: Analysis of choice by the urban group

25 sought rather than as inconsistencies in respondents' perceptions and replies. In the second show of pictures respondents were unrestricted to the reasons they could give for the choice of photo. In this case the majority (41 of them as shown in Table 26b) chose terracing as the main reason. In the third show of pictures respondents' answers were more restricted and they were asked to choose one of the four most likely reasons as presented in Table 25, where terracing was not an option. If slope in figure 30 is envisaged as a result of the increased gradient caused by terracing, and land use is considered to be a function of reforestation, the result of adding land use and slope in figure 30 (coming to a total of 61 respondents) coincides closely with that of the addition of terraces and slope in Table 26b (63 respondents). The shifting of reasons, from terraces in Table 26b to land use and slope in figure 30, is a significant one. In Table 26b respondents directly chose terracing in the second show of pictures. In the third show of pictures, again because of the absence of terracing as an option in Table 25, respondents instead chose slope and land use. In this particular photograph of pine forest planted in terraces constructed with machinery (Plate 15), slope and land use are the results of terracing and reforestation. By choosing slope and land use respondents indirectly chose the effects of the action and method of reforestation as indicative of the major reason for erosion.

Examining the results by social group (in figures 31 to 34) shows that the technicians are divided: 21 chose the picture of pine forest as more dangerous and its slope as the main reason, while the other 19 chose the slope, the condition of the vegetation, and land use as the reasons of danger of erosion in the picture of olive grove (Plate 14). This is in contrast with 32 respondents of the ecologist group (figure 31), 31 land users (figure 32), and 26 from the urban group (figure 34) who chose pine forest as more dangerous.

The ecologist group, technicians and the urban group attach greater importance to the slope in the picture of pine forest than land users. Land users attribute the greatest reason for their choice of this picture to the type/condition of the soil. In this picture (see Plate 15) the soil is particularly noticeable in its bright colour. It can speculated that even its loose condition may be discerned, a factor which may have called the attention of the 'trained' eye of

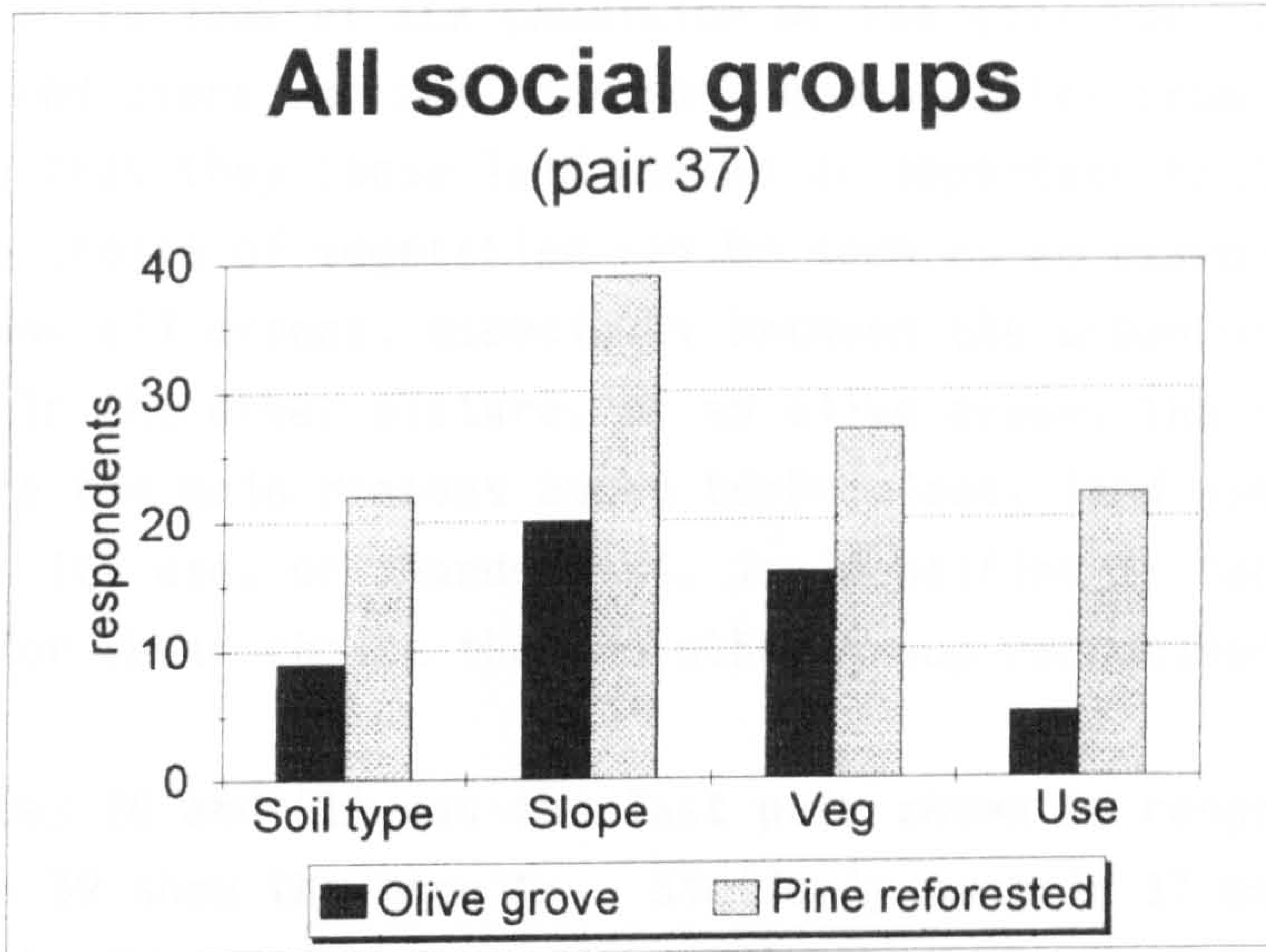

Figure 30: Analysis of choice by all groups for pictures in pair 37

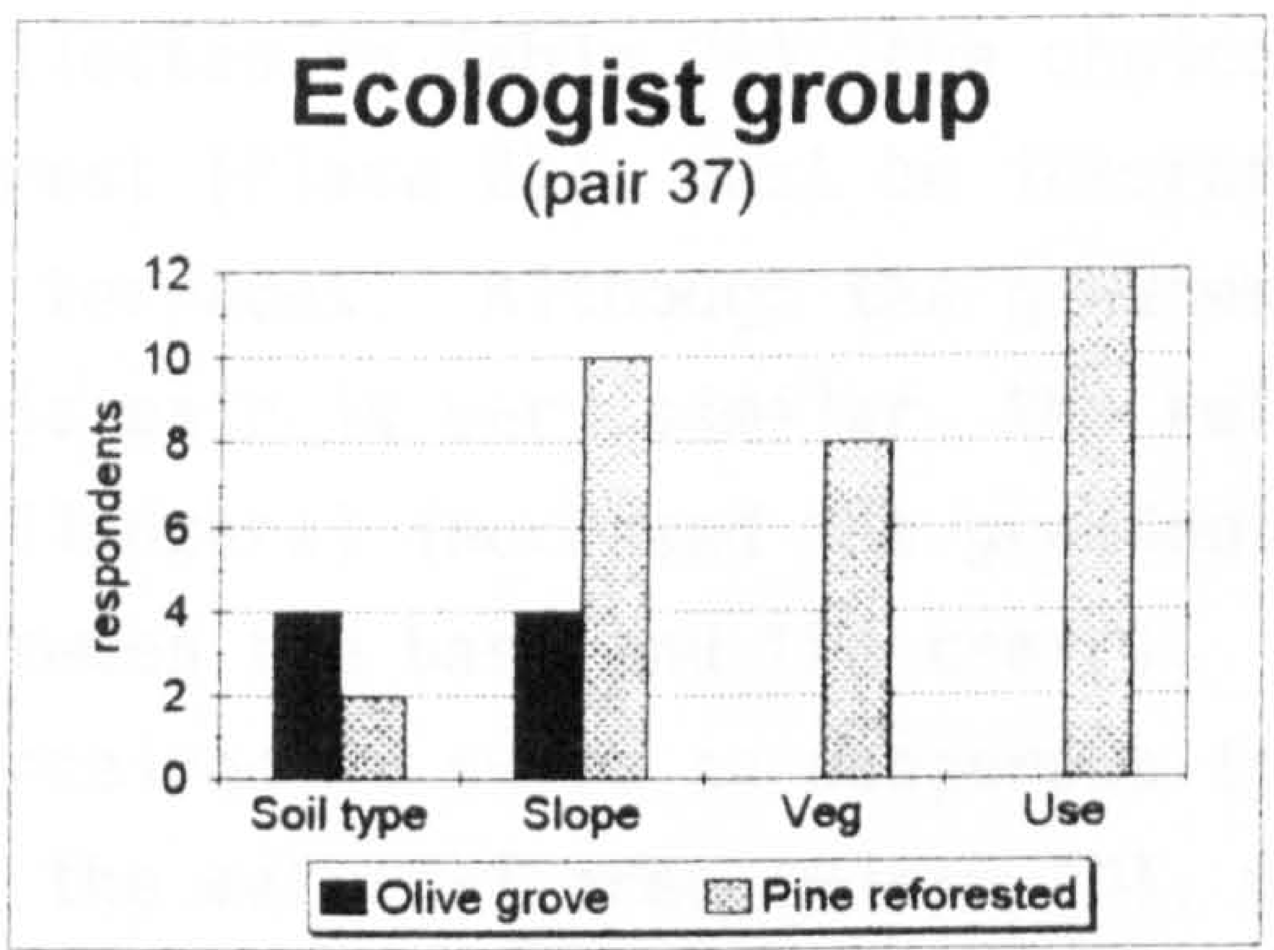

Figure 31: Analysis of choice by ecologists

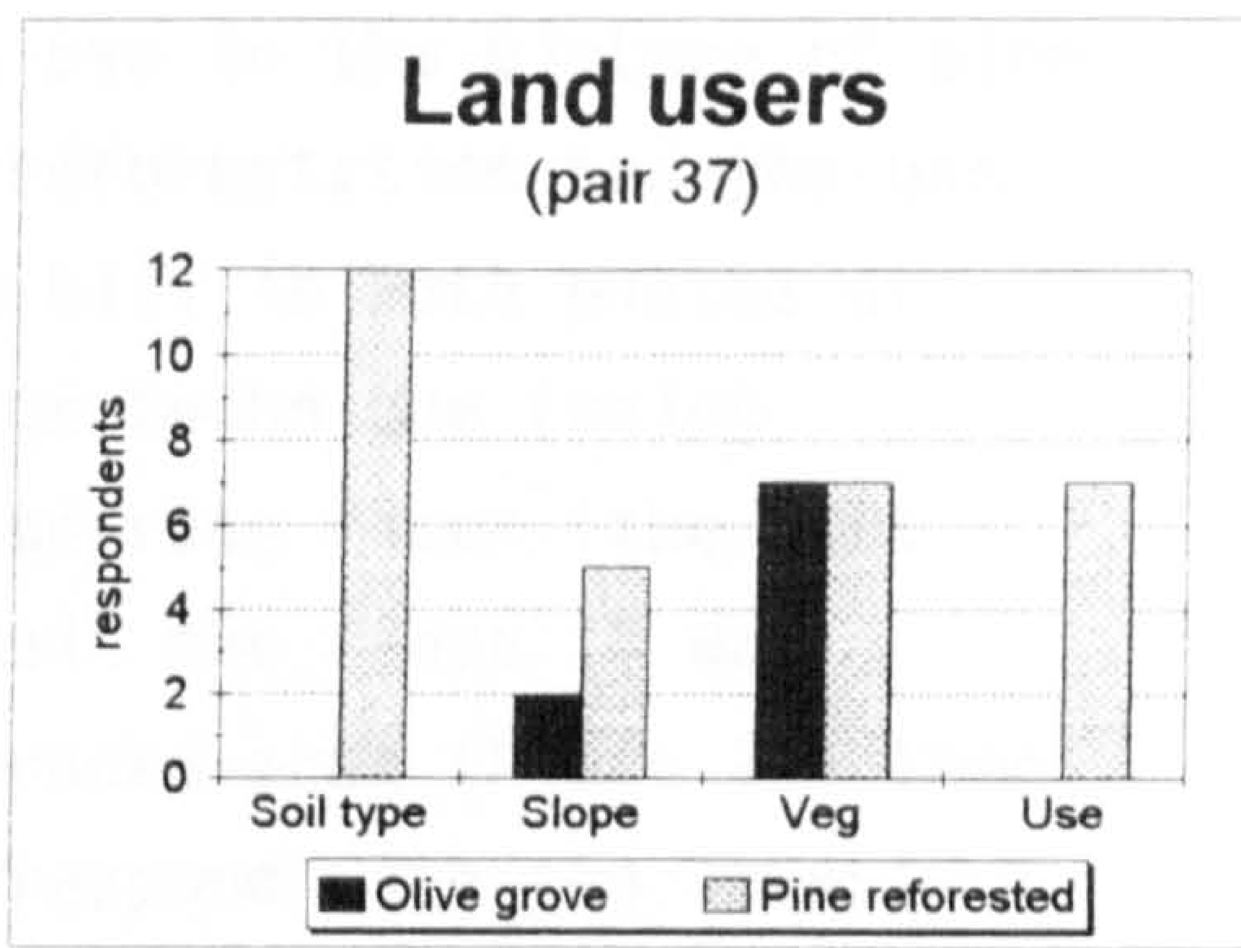

Figure 32: Analysis of choice by land users

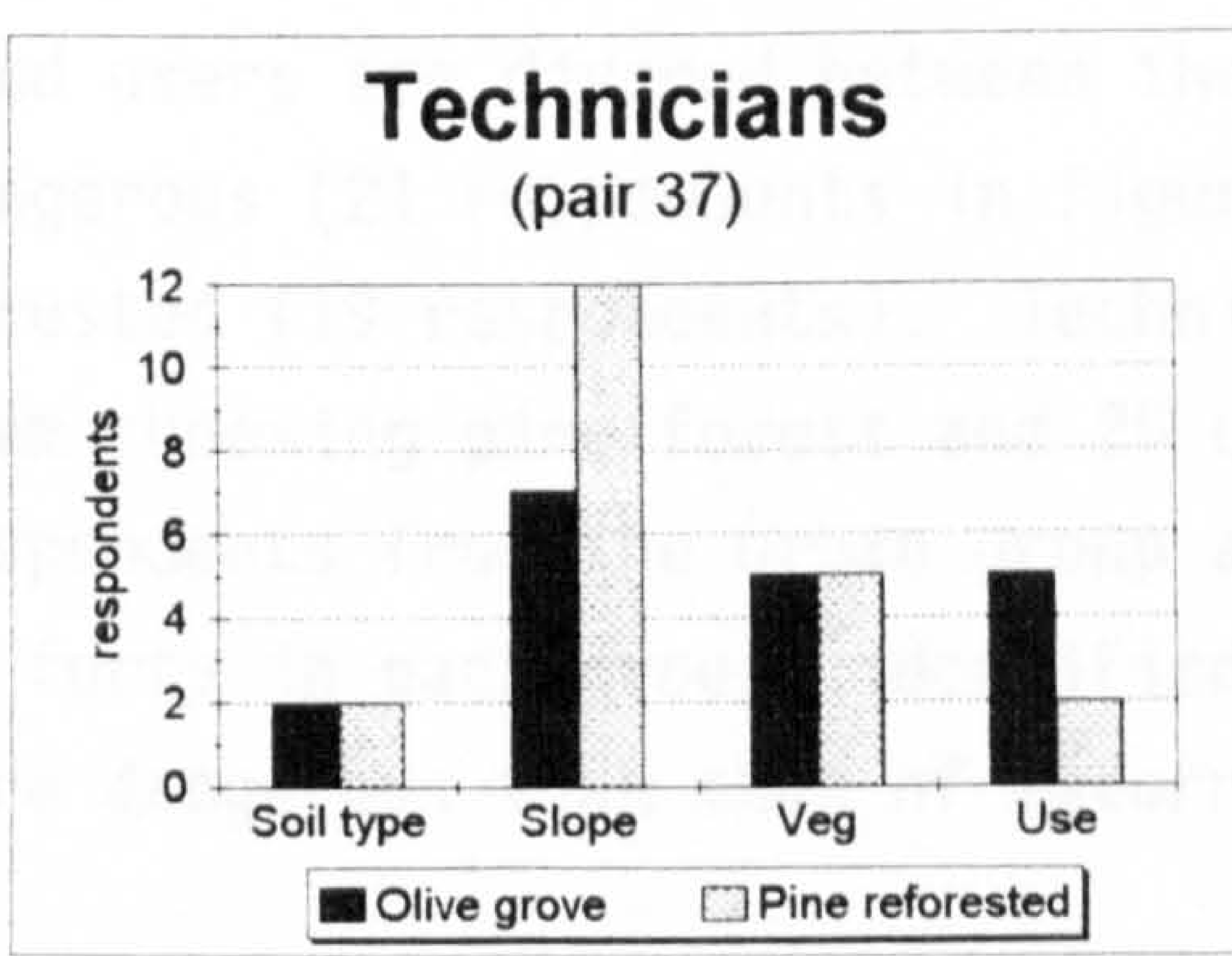

Figure 33: Analysis of choice by technicians

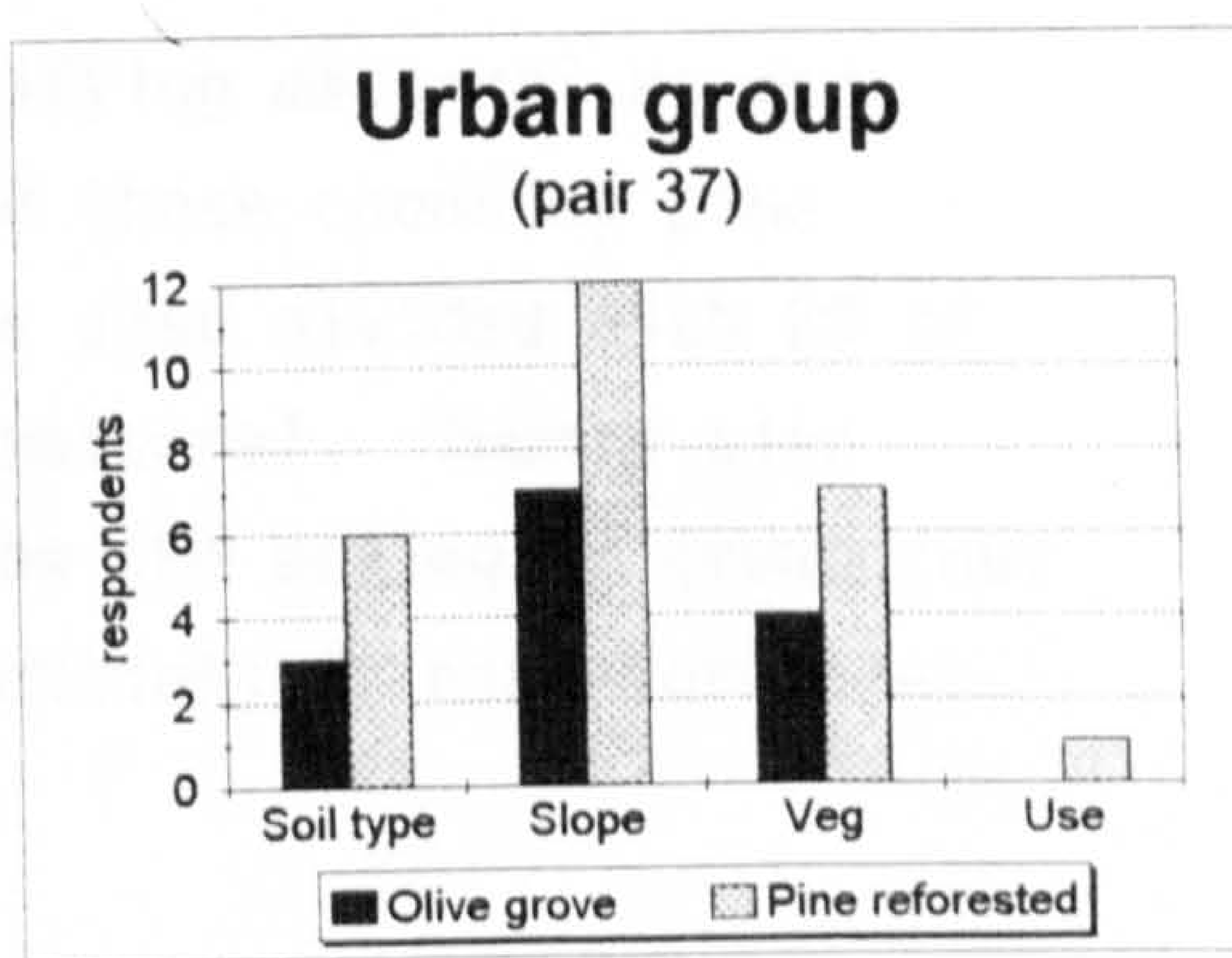

Figure 34: Analysis of choice by the urban group

land users used to look at the condition of the soil for example when ploughing. Land users and the ecologist group differ from the other two groups in that they chose land use as an important factor of erosion. The choice of vegetation can be seen as an example of consensus among all groups, especially between the urban group and land users. In the other picture, of an olive grove, the slope and vegetation are the main reasons among technicians, land users and the urban group. Its use, or abandonment, is identified by technicians as a reason for their choice that no other group recognised.

Pair 51 (Plates 20 and 21) was the last pair shown to respondents. Figures 35 to 39 show the results. Similarly to pair 37 more respondents chose pine forest as in greater danger of erosion (compare the results of pair 37 with those of pair 51 in Table 26). In pair 51, 98 respondents chose pine forest as more dangerous than the picture of *matorral*, 62 respondents (see Table 26e). Looking at figure 35 (the results of the data from the third show of pictures collected in Table 25), the choice of land use in the picture of pine forest (Plate 21), must be interpreted as reforestation and the use of terraces. Although the gradient of the hill in both plates of this pair is very similar, the reforestation technique (using bulldozers) increased the gradient in the terrace riser (the part between the base and the crest). As a result the slope it was perceived as twice as dangerous in the terraced area (Plate 21) than in the *matorral* area (Plate 20), which correspond with the IBERLIM assessment of the situation. The pine vegetation cover (22 respondents in figure 35), is seen as providing worse protection than *matorral* (31 respondents).

Land users are divided between these identifying *matorral* as more dangerous (21 respondents in figure 37) and those choosing pine forested (19 respondents). Technicians are also divided with 20 of them choosing pine forest and 20 choosing *matorral*. Twenty nine respondents from the urban group and 30 from the ecologist group (out of forty in each group) identified the conditions of pine forest as more dangerous than that of *matorral*.

There are striking differences between the ecologist group and the other three groups in their choices (compare figure 36 with the other three). However, when these choices are analyzed as functions of

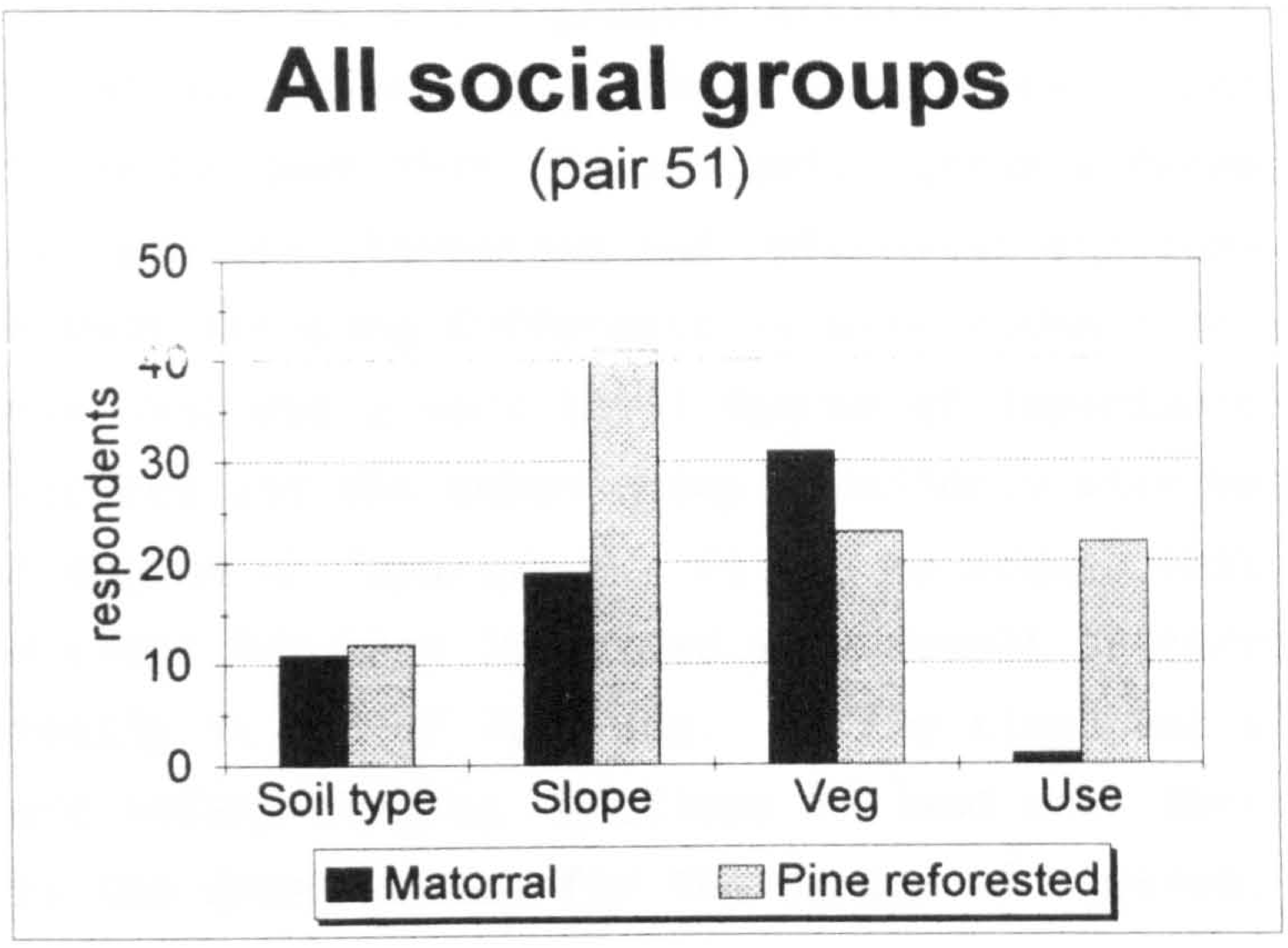

Figure 35: Analysis of choice by all groups for pictures in pair 51

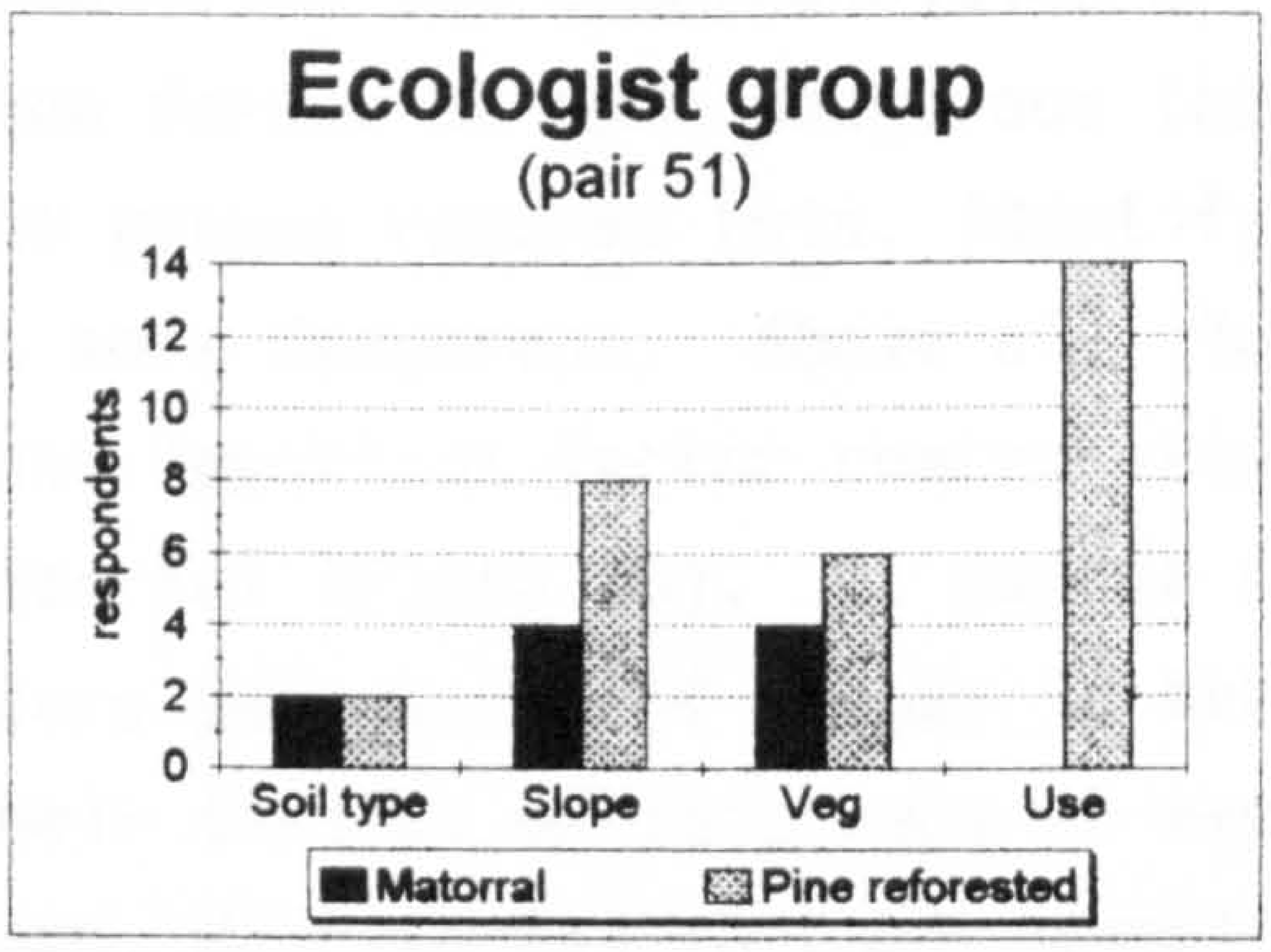

Figure 36: Analysis of choice by ecologists

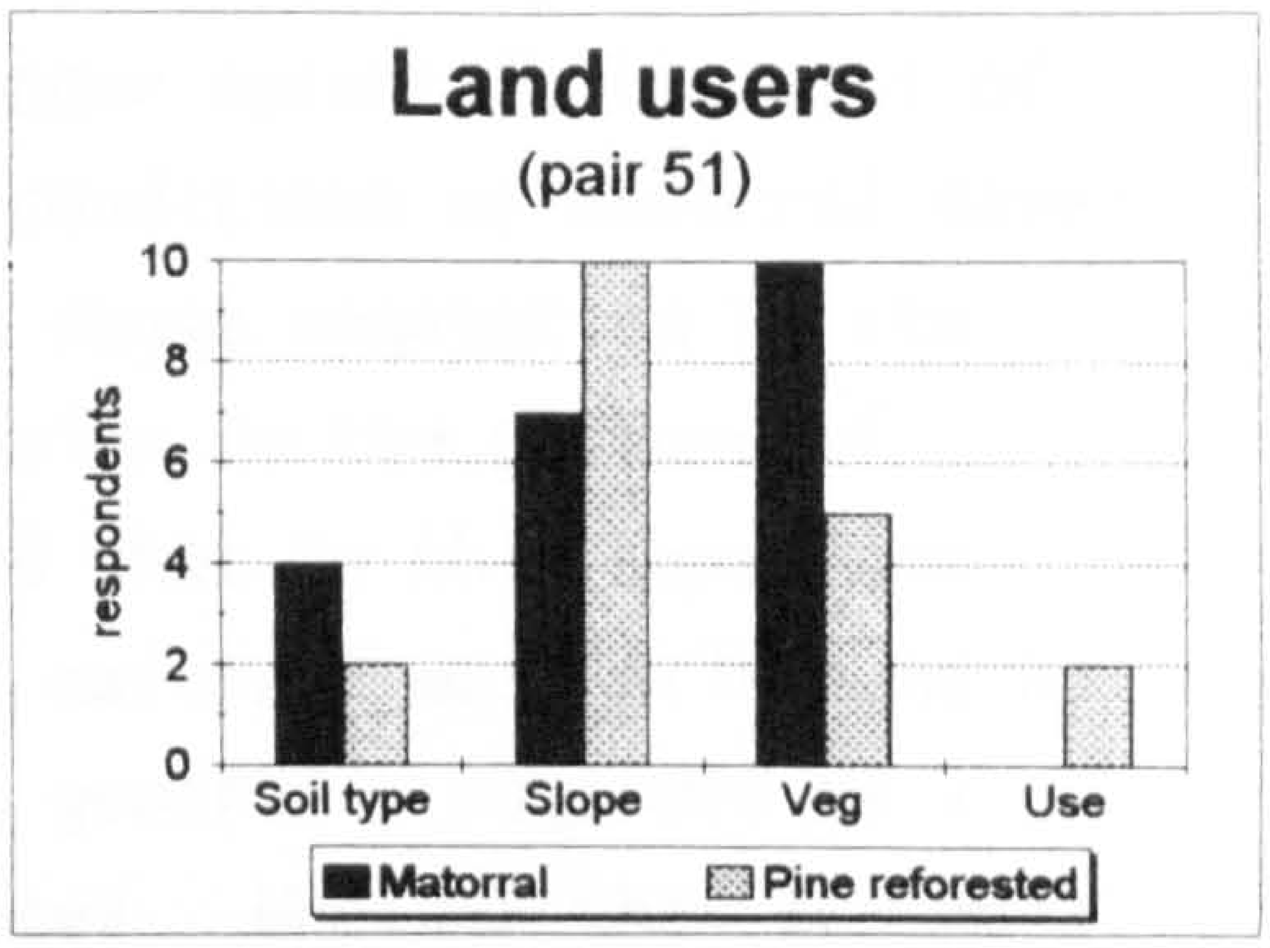

Figure 37: Analysis of choice by land users

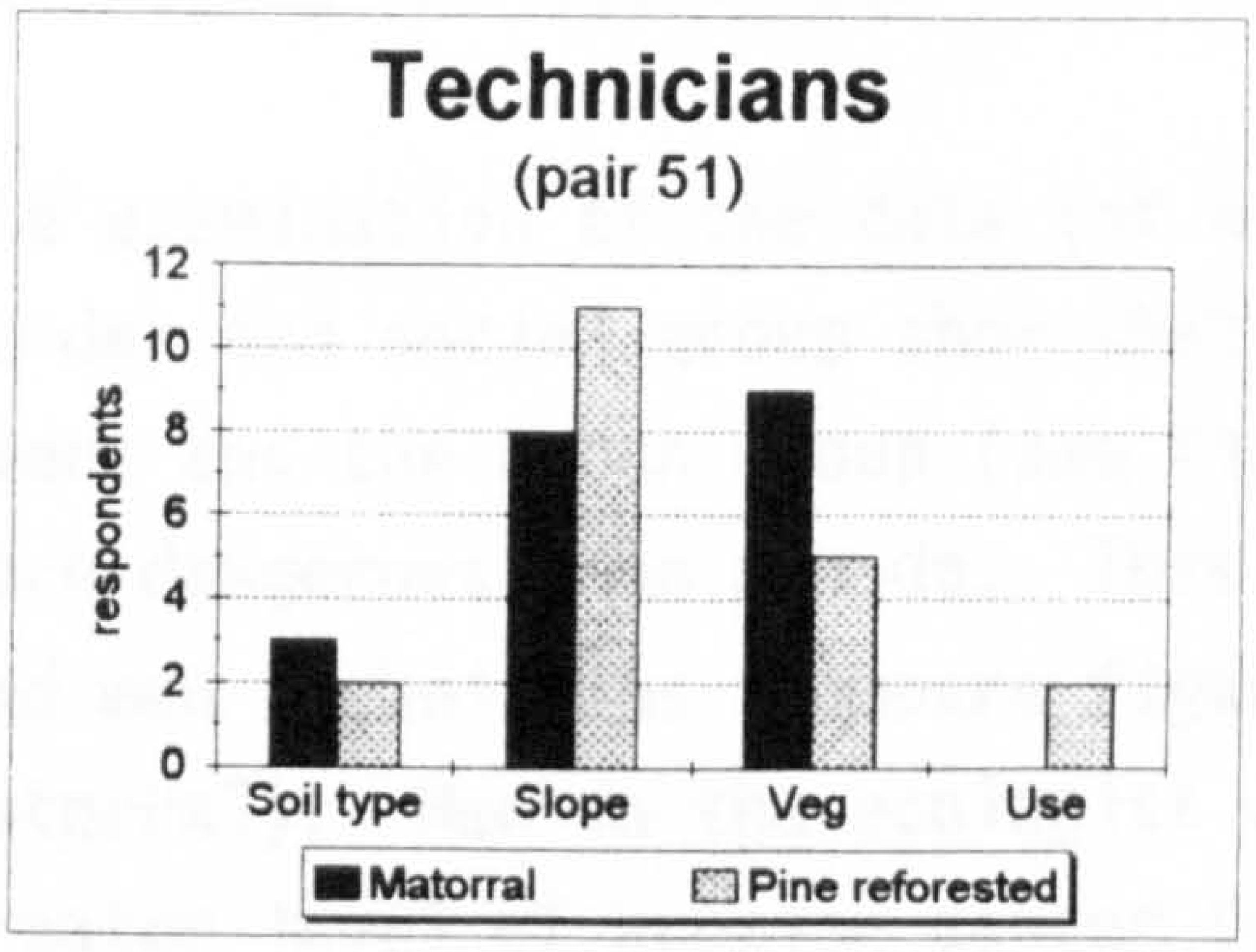

Figure 38: Analysis of choice by technicians

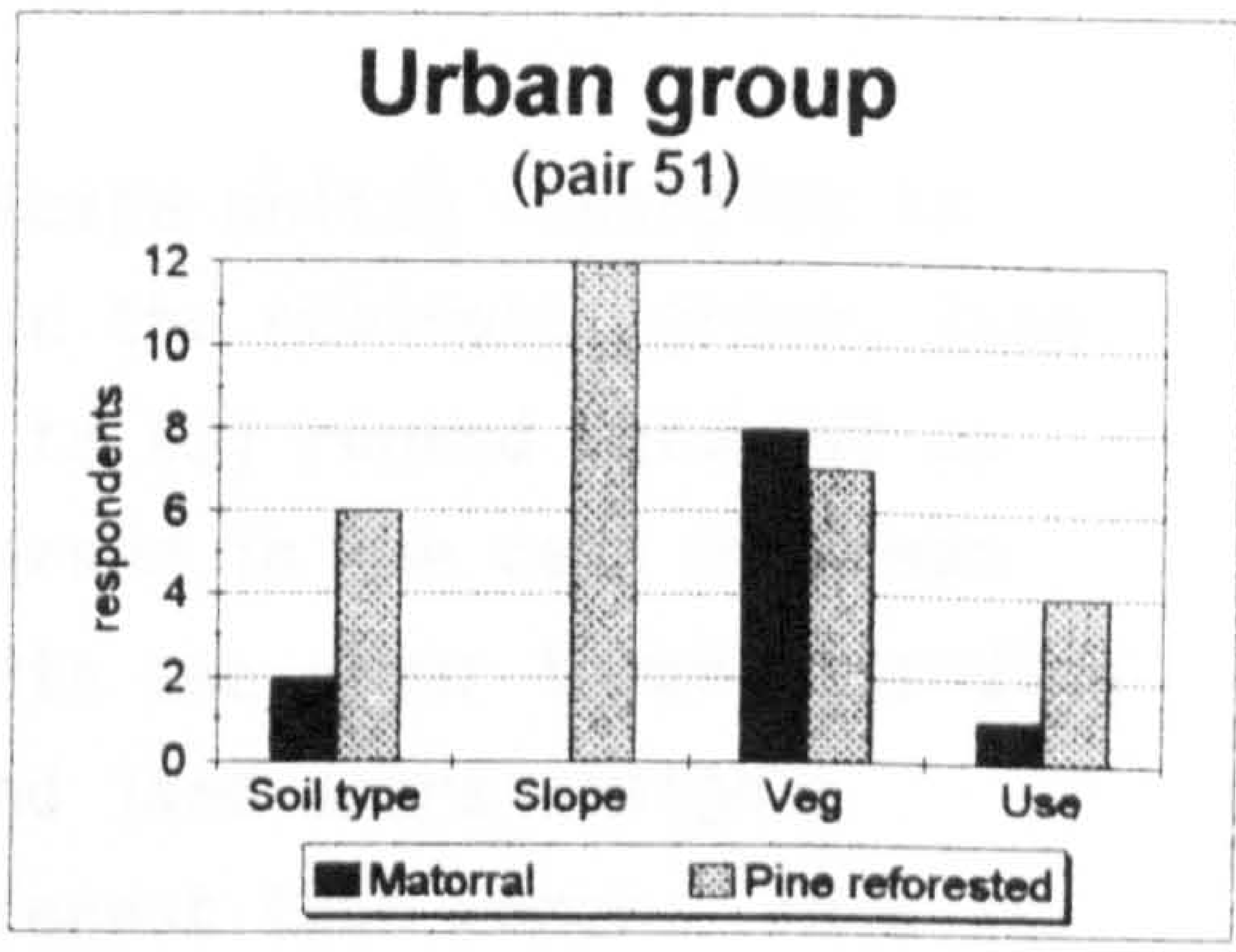

Figure 39: Analysis of choice by the urban group

each other, as for example the greater gradient in pine forest as a function of land use (terracing), these became less significant. In figure 36 it can be seen that the ecologist group attaches greater importance to land use (terracing and reforestation) than the other groups. The most striking difference is with technicians and land users who give land use a very small degree of importance. Land users, technicians and the urban group, similarly attributed slope the greatest degree of importance. It can be argued that because the slope in the riser has been increased as a result of terracing, the choice indirectly is one of land use. If the slope and the type of vegetation are interpreted as functions of land use, this must be identified as the great reason for the danger of erosion.

The differences in choices of vegetation, for the same pair 51, between the ecologist group and the other three groups are important (compare figure 36 with the other three). While the ecologist group identifies the type/condition of the vegetation cover provided by pine forest as more dangerous than that under *matorral*, the rest of the groups reverse this, identifying the conditions of *matorral* cover as more dangerous. Above all, land users chose vegetation as the most important factor contributing to erosion in the picture of *matorral* (Plate 20). It can be speculated that in this case land users perception of danger in the case of *matorral* was influenced by their dislike of this type of vegetation, generally regarded as a weed, detrimental to their working practices. Whether this has been a factor or not is difficult to ascertain, which would only be possible to test with a new survey in which specific questions or explanations reminding respondents that what they were supposing to be judging was the danger of erosion *per se*.

The examination of the data (of all landscape units) according to gender and social group show that women in the ecologist group, land users and the urban group (see figure 40 to 43) regard *matorral* as more dangerous than men do. This is reversed in the case of women and men technicians (compare figure 42 with the other three regarding matorral). Men in the ecologist group and land users assign a greater level of erosion danger to pine forest than women. This is reversed in the cases of technicians and the urban group (figure 42 and 43) in which women think the conditions of pine forest are more dangerous. Women from the ecologist group and urban group attach

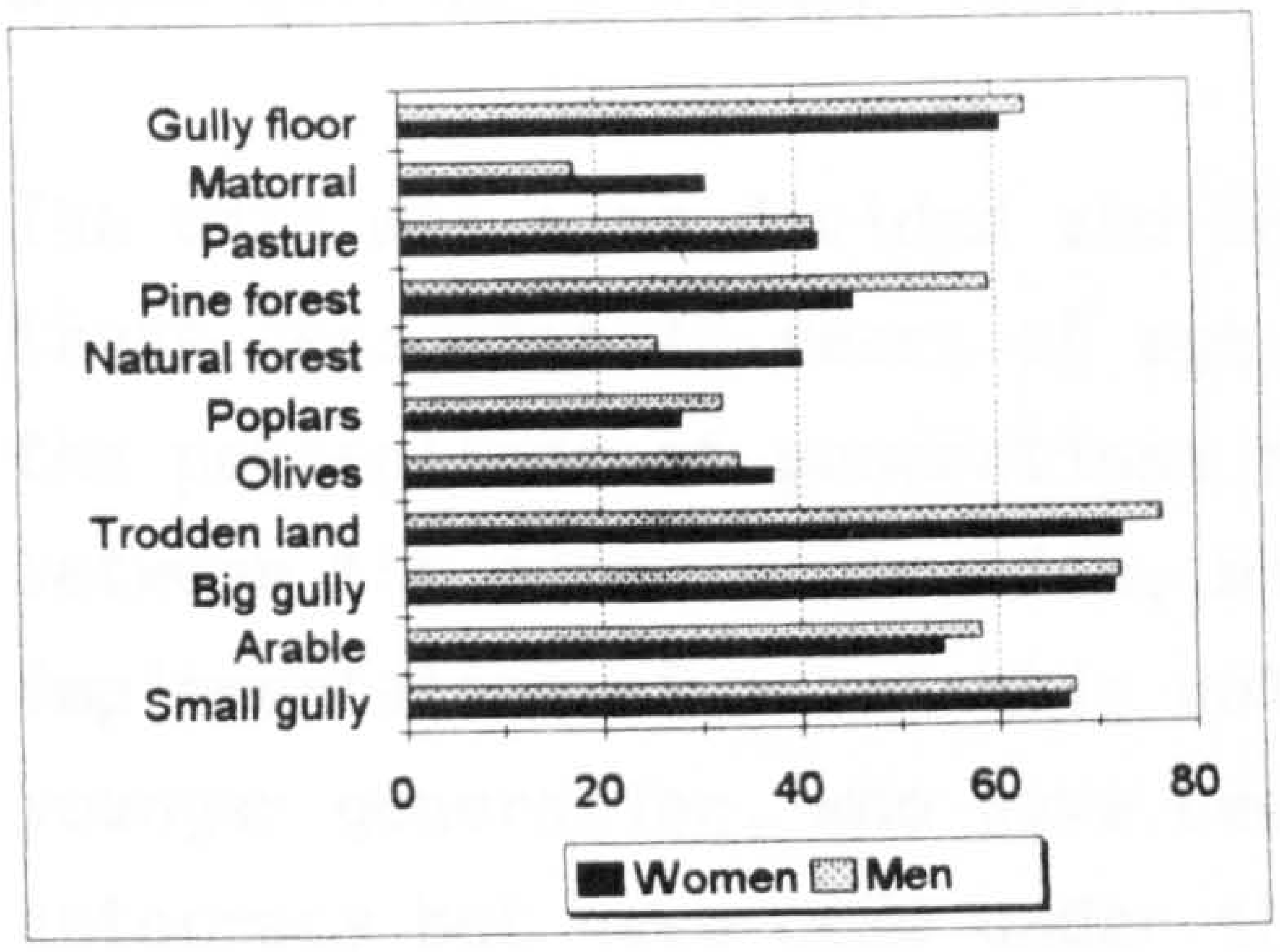

Figure 40: Ecologists women/men

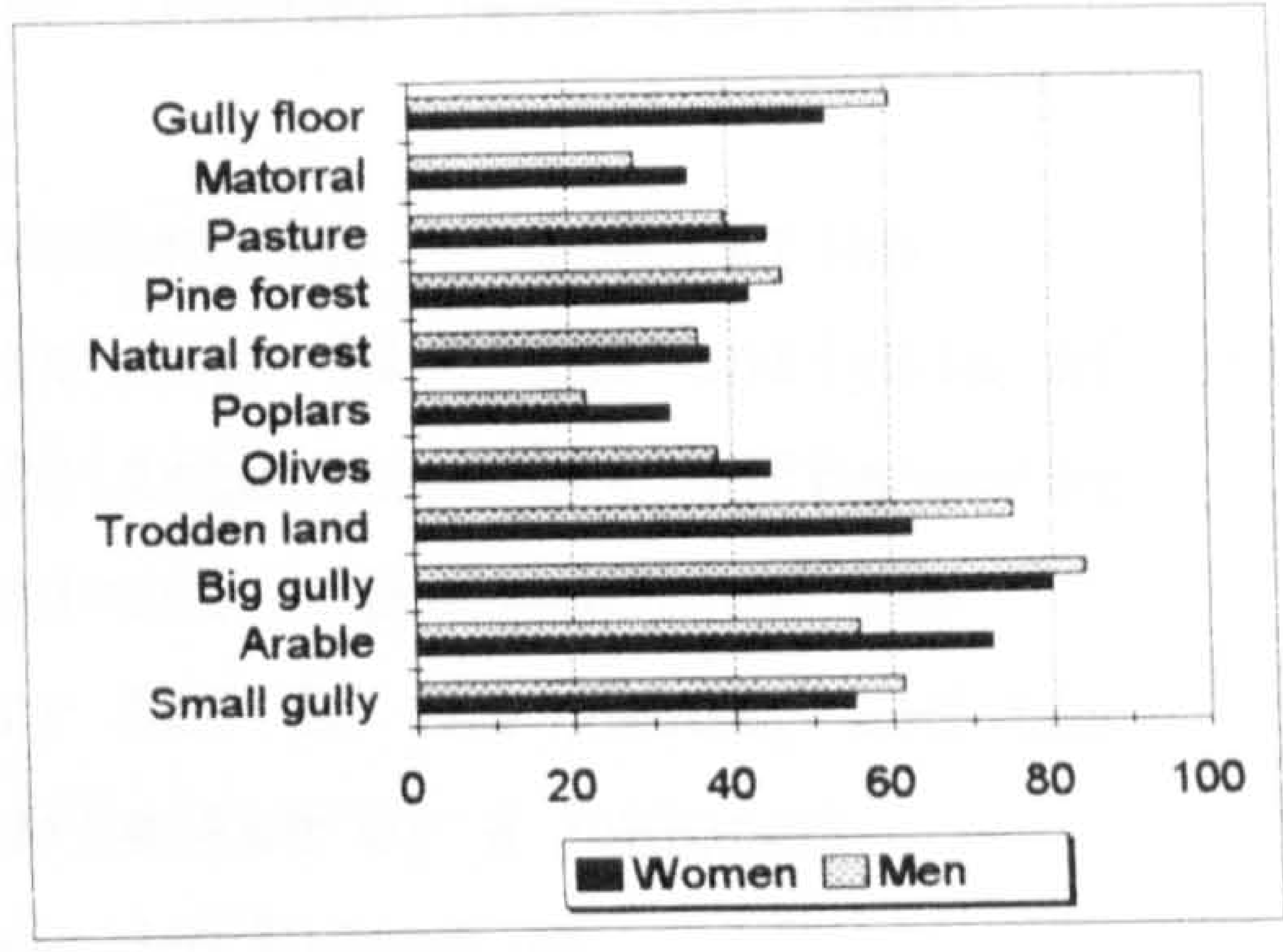

Figure 41: Land users women/men

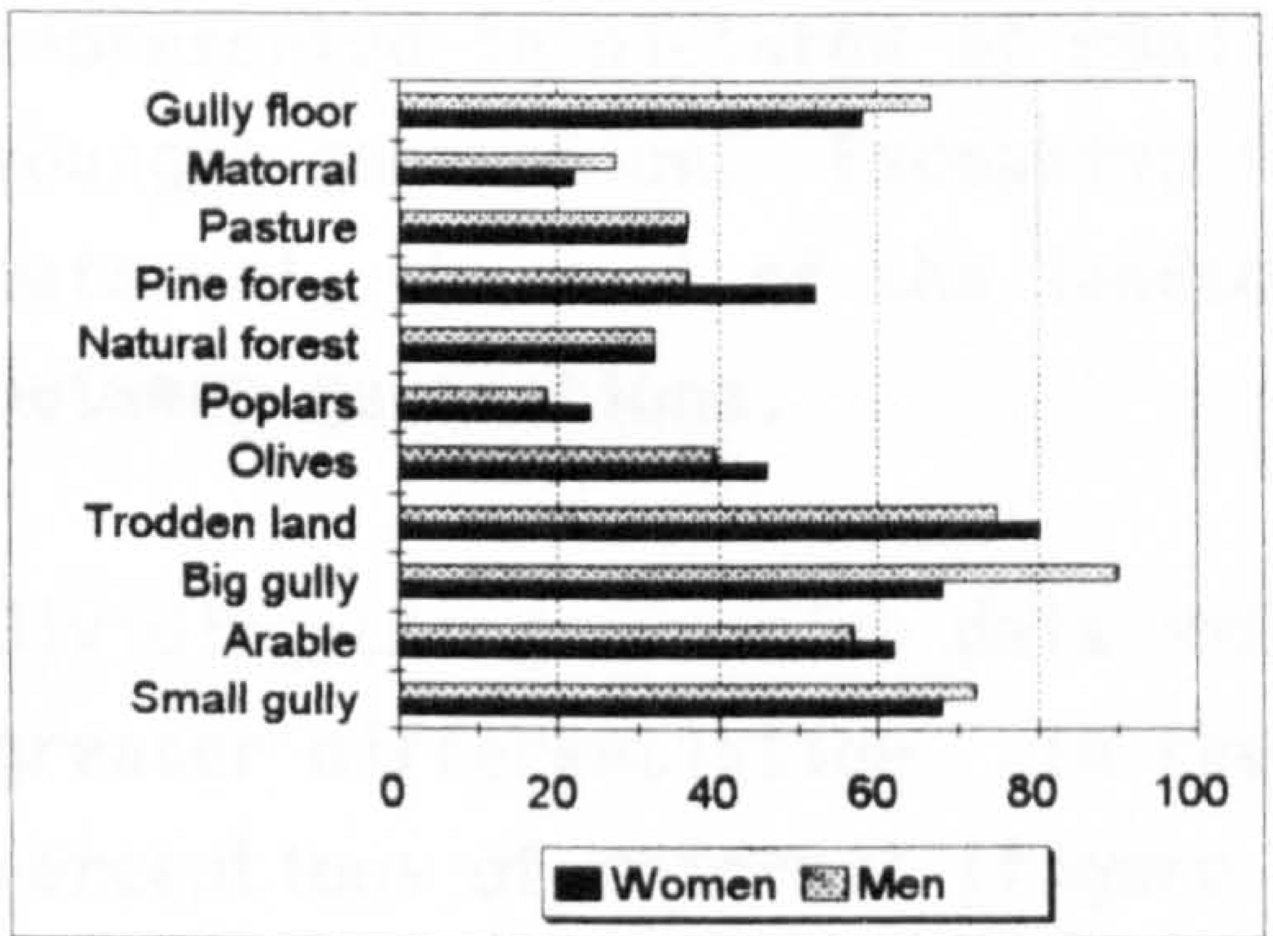

Figure 42: Technicians women/men

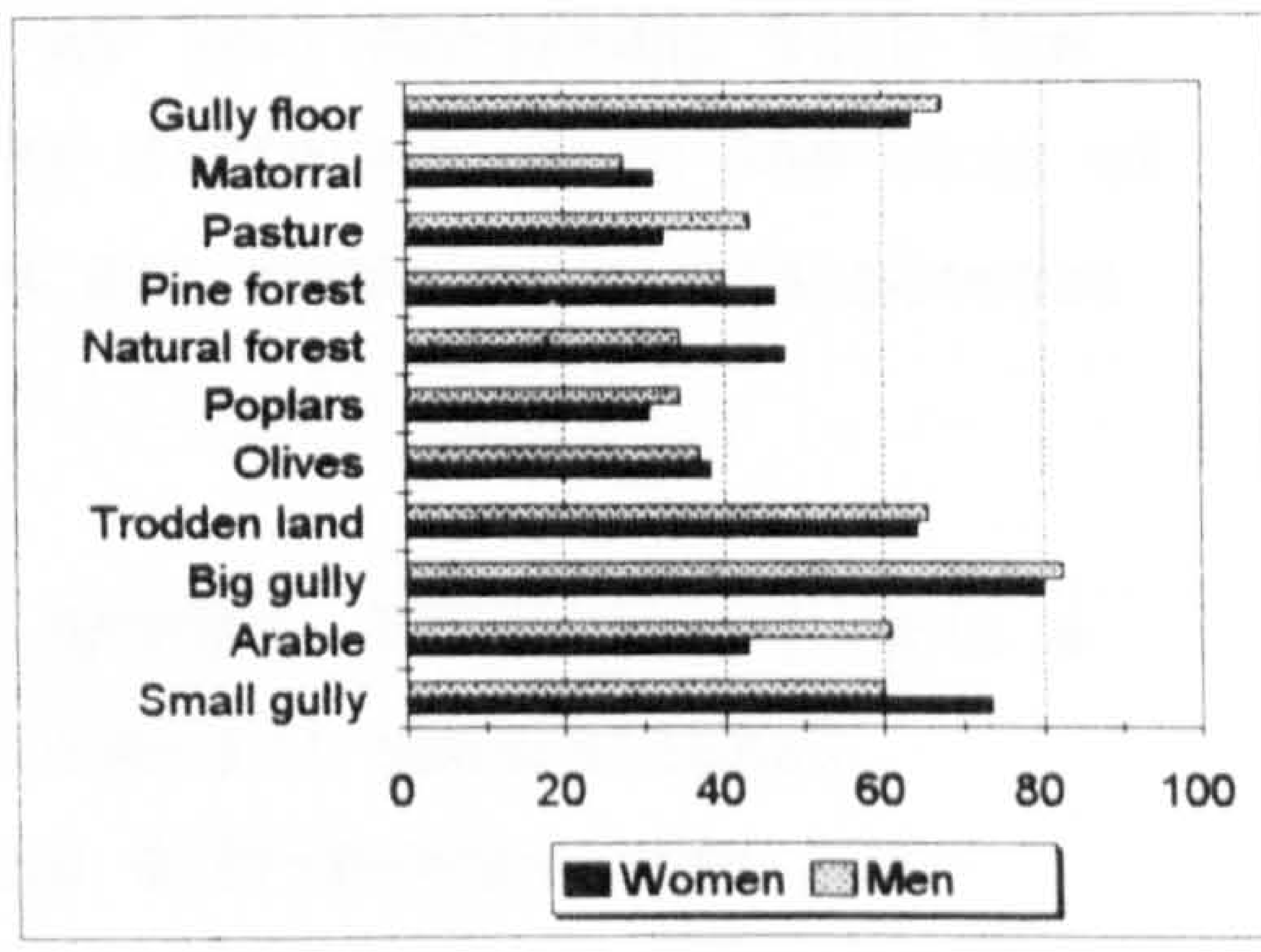

Figure 43: Urban group women/men

greater level of danger to natural forest than men. In the case of land users and technicians, both men and women broadly agree on the level of danger in natural forest. Men in the ecologist group, land users and the urban group attach a greater level of danger to trodden land than women. This is reversed in the case of technicians where women ascribe a higher level of danger to trodden land than men.

The data was also divided and analyzed according to generation - those less than 40 years of age and those over 40. The analysis of the perceptions of generations intends to ascertain the differences between the older generation, who have direct experience of the implementation of autocratic policies for SWC in the 1950s, and the younger generation, who have been less affected by a reduced autocracy but have come under the greater influence of environmental/ecological concerns and ecological pressure groups.

Figure 44 shows that except in the cases of pine forest, natural forest, and small gullies, there is no great discrepancy between the perceptions of both generations. The younger generation perceive the conditions of pine forest and natural forest as less dangerous than do the older generation. The older generation sees the conditions represented in pictures of small gullies as less dangerous than the younger generation. Excepting the smaller differences in the case of *matorral*, the rest of the landscape units are remarkably homogeneous between generations.

Dividing the generation data into social groups, however, reveals a greater differentiation. In the case of overall generational perceptions of *matorral* (figure 44), these differences were not apparent because the results of different social groups cancelled each other out. The younger generation of the ecologist group and technicians attach a greater level of danger to *matorral* than the older generation. This is reversed in the case of land users and the urban group. The remarkable difference between the younger and older generations of land users with regard to pasture (see figure 46) is cancelled out by the perceptions of danger of the other three groups as shown in figure 44. Although in all social groups the older generation ascribe a greater level of danger to the conditions of pine forest than the younger generation, in the case of land users this difference is more marked than in the other three groups

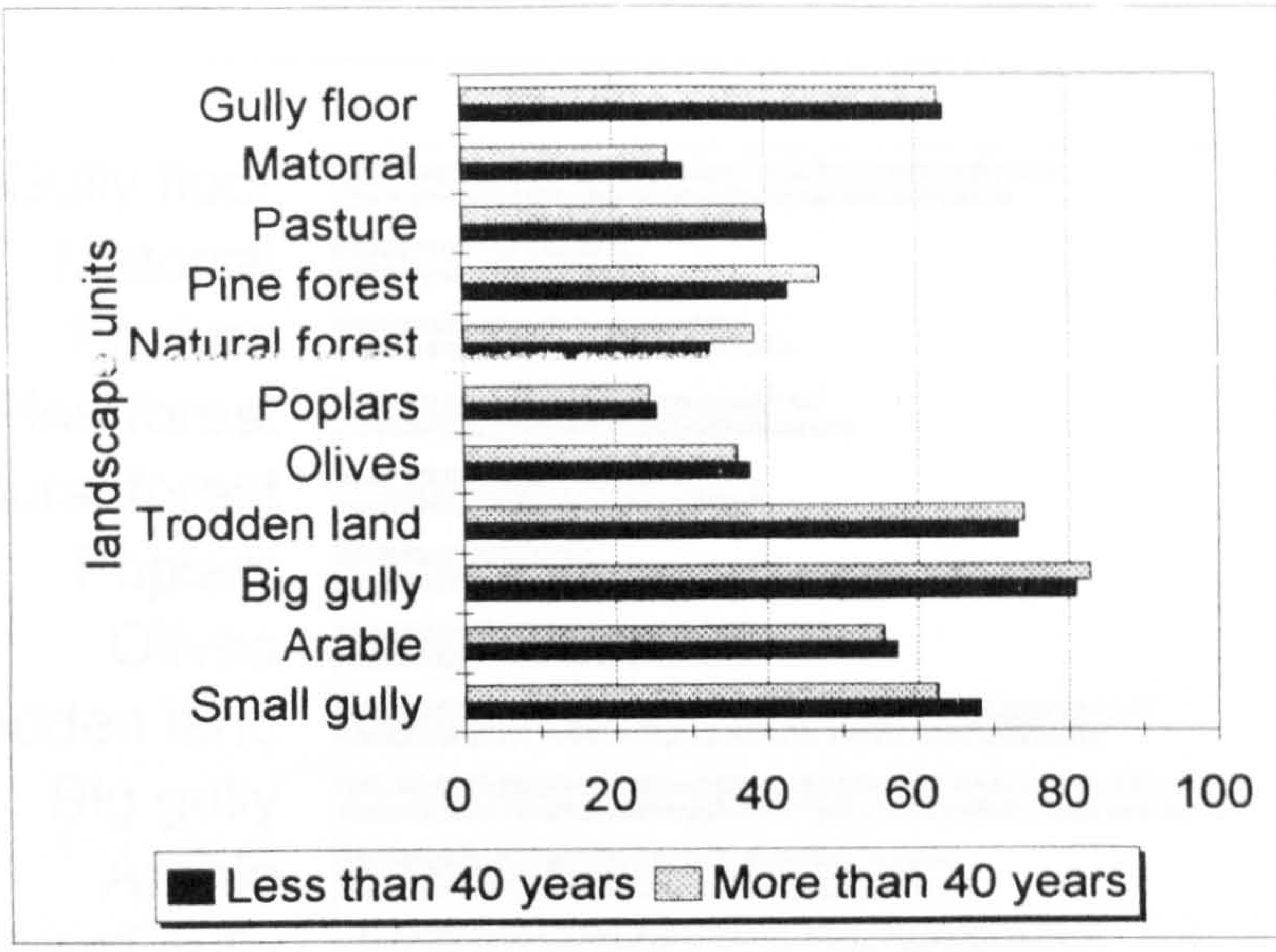

Figure 44: Analysis of choice by social groups and age

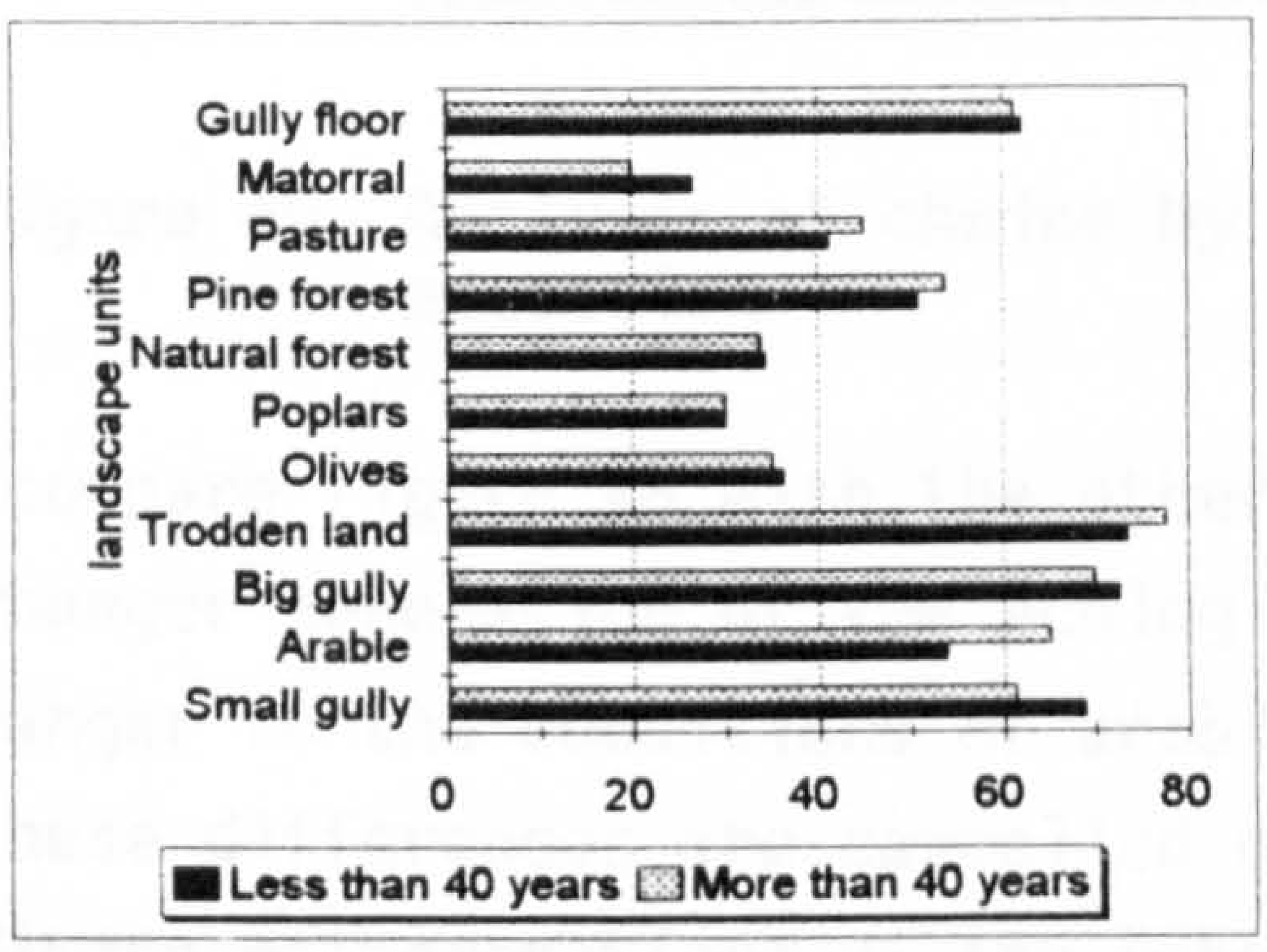

Figure 45: Differences between generations (ecologists)

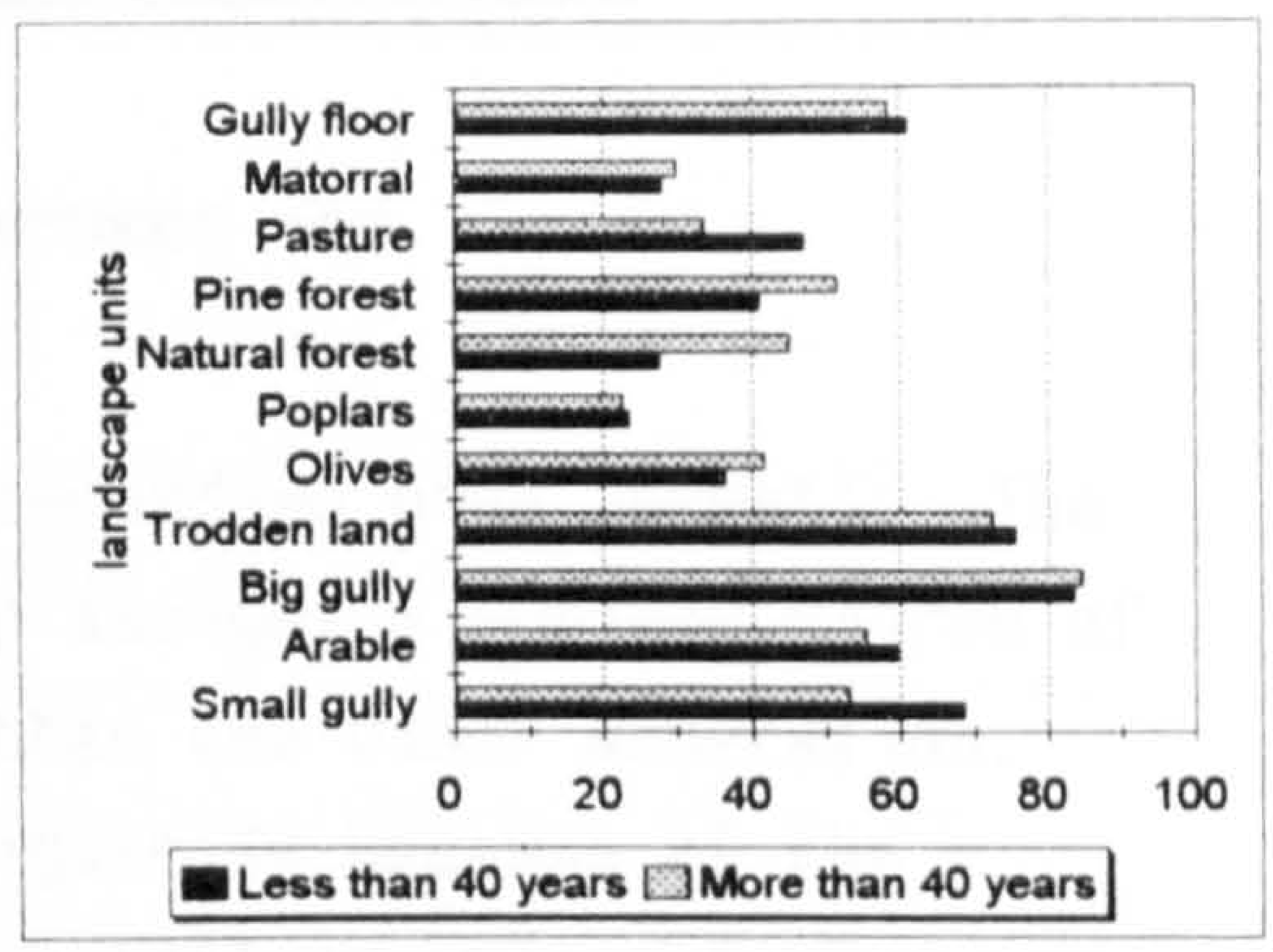

Figure 46: Differences between generations (land users)

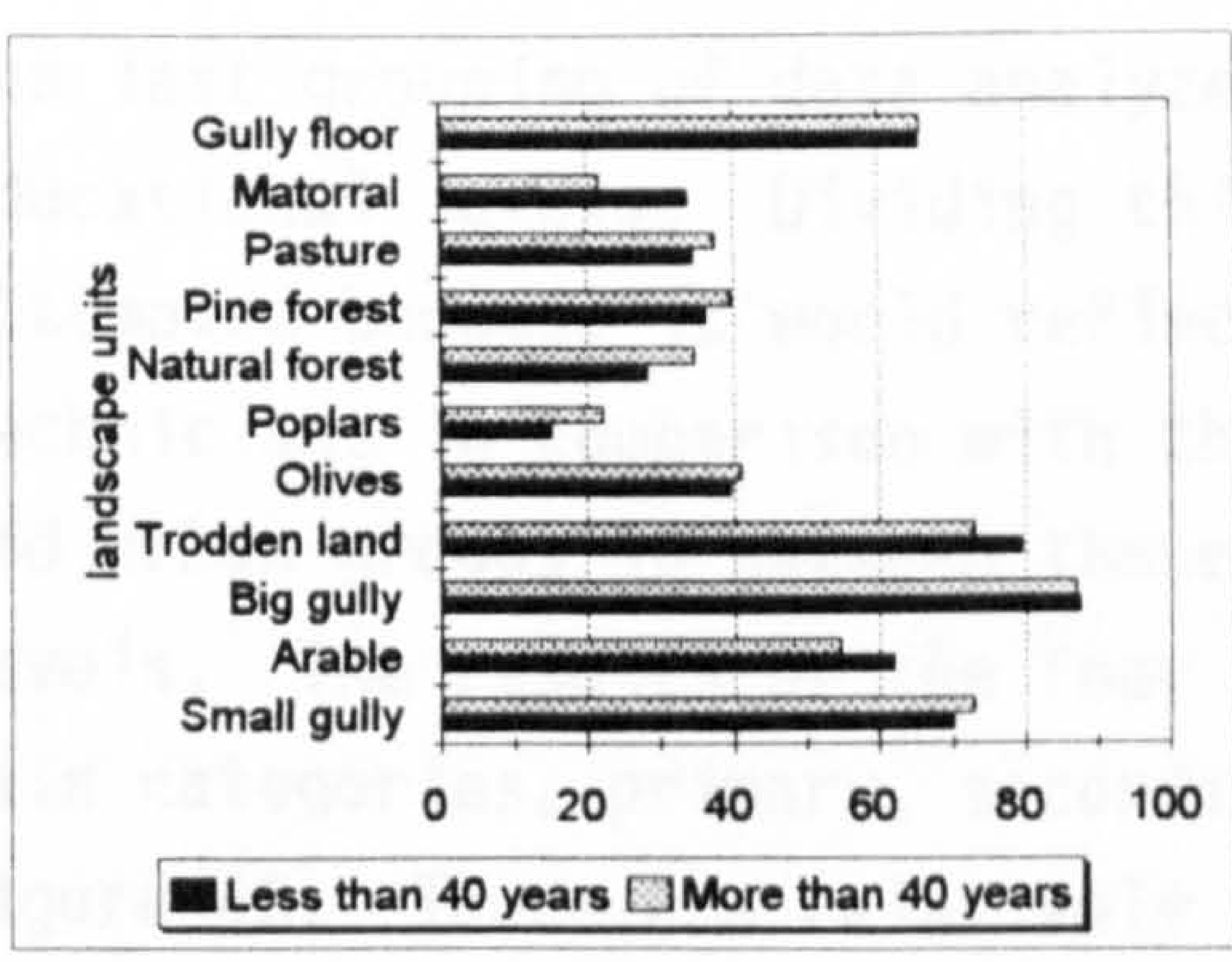

Figure 47: Differences between generations (technicians)

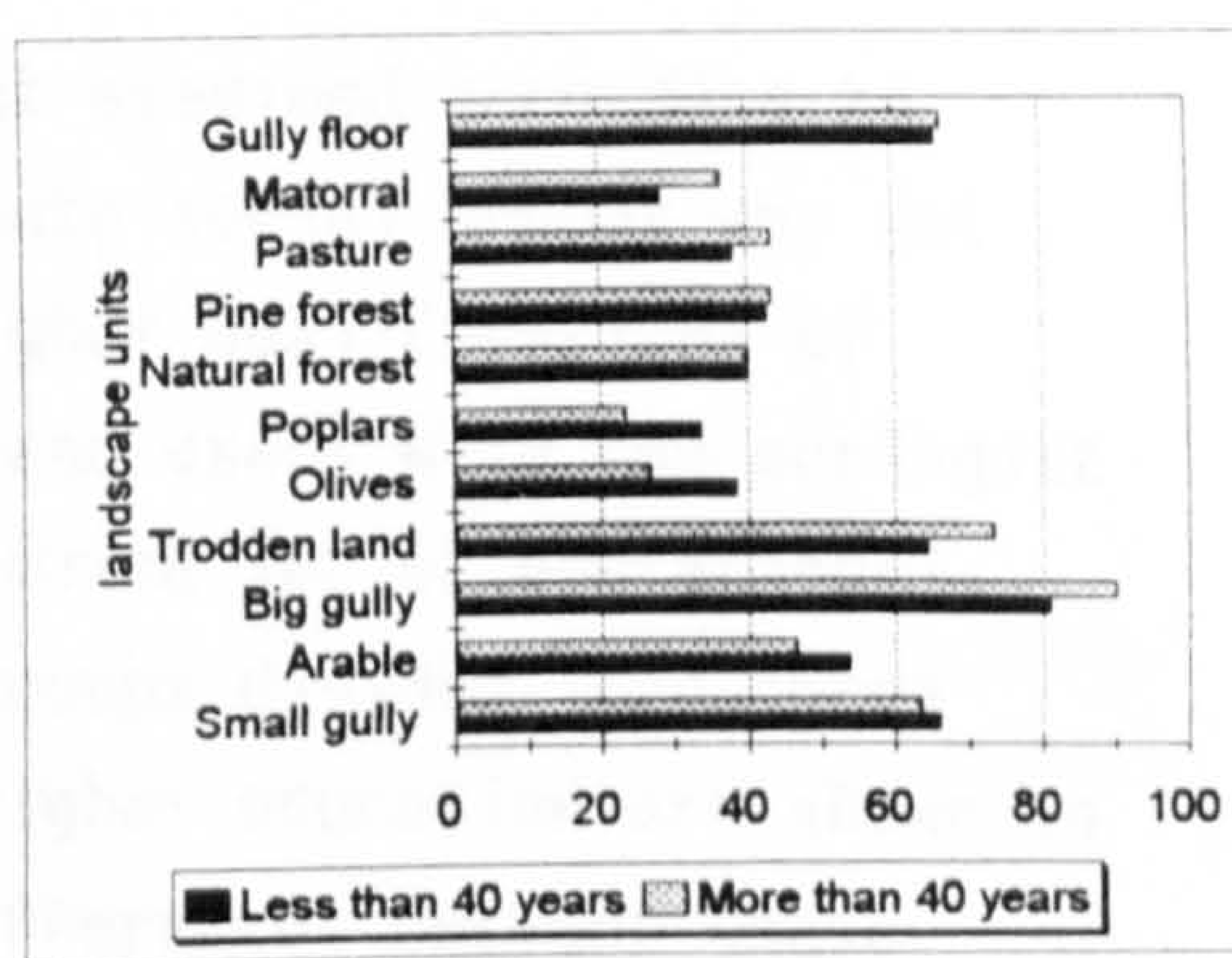

Figure 48: Differences between generations (urban group)

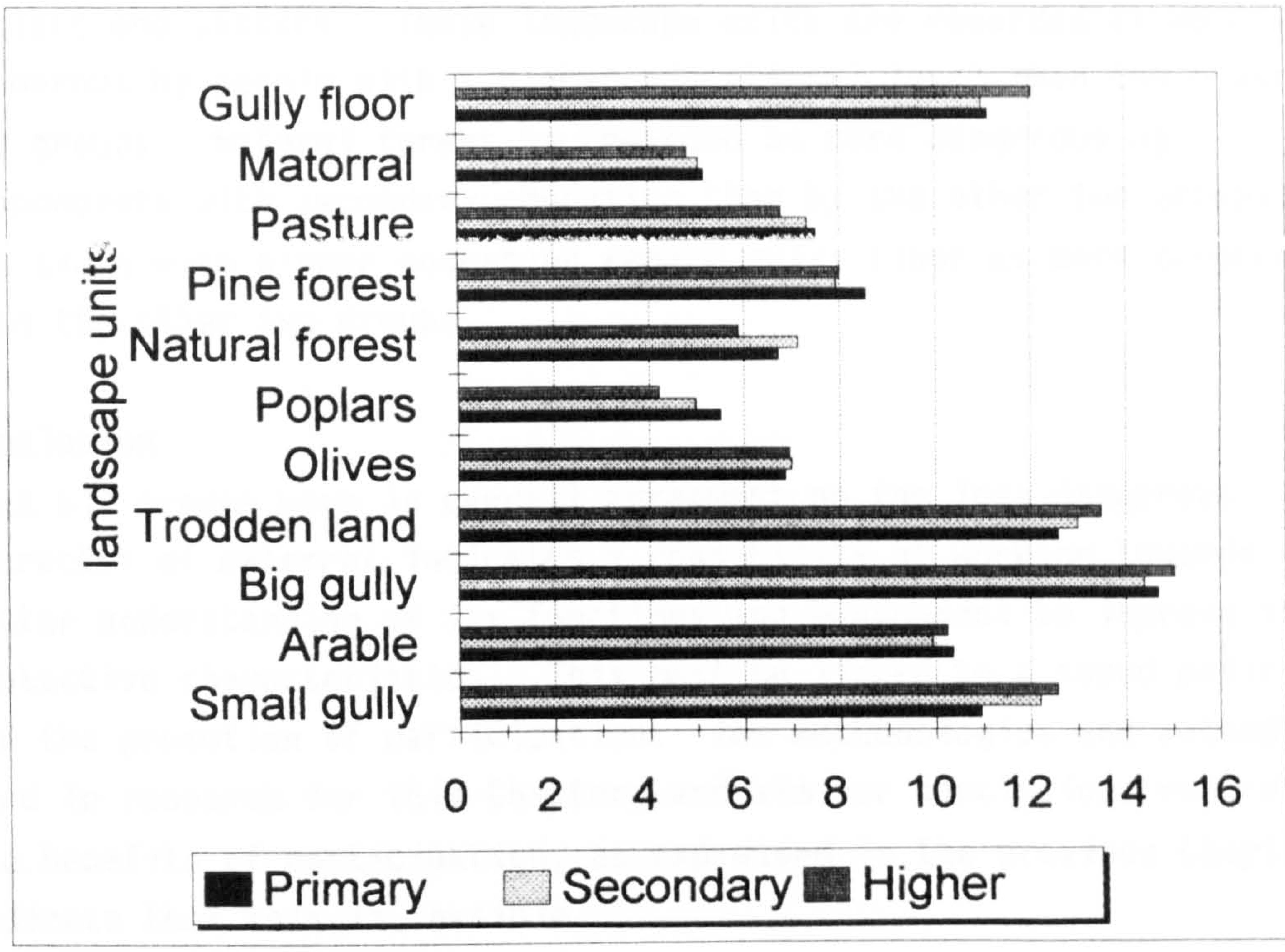

Figure 49: Analysis of choice by social groups and education

(compare figure 46 with the other three regarding pine forest). The younger generation of the ecologist group assigns a greater degree of danger to the conditions of arable land than the older generation. These differences are cancelled out in figure 44 because of the divergent perceptions of the other three social groups. The younger generations of the ecologist group and land users account for most of the perception of the level of danger in small gullies, a difference which is reflected in the combined result in figure 44.

The last grouping of data analyzed is that examined according to educational levels. Dividing this data into social groups was not attempted because it would reflect the higher qualifications of technicians in comparison with those of land users with the ecologist and urban groups in between these with a mixed set of educational levels. The results of the four social groups divided into three main categories, primary, secondary and higher education are shown in figure 49. There are relatively small differences between these groups in small gully, trodden land, poplars, natural forest, pasture and gully floor. Respondents with primary education regard the conditions of small gully and trodden land as less dangerous than the other two groups. This is reversed regarding the conditions of poplars and pasture. These landscape units are regarded as more dangerous by people with a higher educational level than the other two groups. Natural forest is regarded as more dangerous by respondents with secondary education than by the other two groups, and those with higher education regard gully floor as more dangerous than the other two groups.

Conclusion

That all groups were in overall agreement on the less dangerous character of *matorral* indicates a possibility of working towards a better understanding of its functions and management to improve its protective characteristics. This must be linked to a sound policy for the promotion of participation. The methodologies and methods used in research for this Chapter, and similar conclusions regarding the benefits of participation, as expressed in the previous Chapter, indicate that this is feasible.

Summarising the main patterns of the results of all groups and landscape units, as shown in figure 18, showed that technicians are in great disagreement with the ecologist group about big gullies. They are also in disagreement with the urban and ecologist groups about poplars, and with the ecologist group and land users about pine forest. Overall the ecologist group and technicians are in great disagreement, although of special importance for policy making is the disagreement between technicians and the ecologist group regarding pine forest. This reflects the ideological antagonism between these two groups marring possibilities of consensus in policy making for SWC through reforestation.

Reflecting on the reasons for the choice of pictures or landscape units by different social groups is as important as the interpretation of direct results from the analysis of data. An understanding of the history of policy making and implementation processes and the training and ideology of the social groups involved in these processes, is crucial when attempting to make sense of these reflections. In applying this understanding it can be discerned that the practical approach of land users, in wanting to know where the pictures were from, contrasted with the lesser interest and not so intimate knowledge of conditions shown by the urban group (although these have a relatively good geographical spatial knowledge of the area).

The general tendency of technicians to see pine forest as less dangerous than that perceived by the ecologist group and land users, as in the case of pairs 37 and 51, can be a reflection of their training, ideology and/or their relation to the means of production and the State. The choices of land use, slope and vegetation by the ecologist group in pair 37 indicates a desire to show that the main reason for their choice is one they politically oppose, reforestation and the construction of terraces. This reflects an ideology of concern about the ecological balance of nature and the effects of its management as in the case of reforestation.

The consideration given by land users to these pairs reveals their concern with the degraded condition of the soil as a factor of production they understand and which would have affected them greatly. Their perception is a pragmatic one in relation to this important factor of production. Their choice of vegetation in the olive grove and *matorral* also demonstrates their understanding of the effects of land abandonment as they regularly observed in the cycles of fallow and production they operated until the 1960s.

The concern of technicians with the slope of both the pine forest and olive grove in pair 37 may be a reflection of their engineering training in the construction of physical structures to deal with problems of erosion. The differing reasons given by this group for danger of erosion, lack of terraces, in the olive grove and in *matorral* (both shown in Table 26b) indicates that there are great discrepancies in opinion among this group and the others. Views about the need for terracing are not fully supported within the group of technicians. There are differences among themselves (these opinions were often expressed during the show of pictures), with some respondents clearly opposing this technique and others defending them. The choice of slope as a function of terracing in pairs 37 and 51 in the pine forest pictures, can be interpreted as the concern and awareness within the group of technicians opposing the terracing technique.

Although there are signs among technicians' understanding that past reforestation techniques, such as terraces, did not produce the expected results to stabilize the degraded conditions of the soil, the insistence by a considerable number of them trying to demonstrate that in the long run these will work (by trying to visualize pictures of pine forest in some future date, and unreservedly arguing the long term validity of the technique), demonstrates that the subject still is a highly sensitive one. Although in the long term the plantation of conifers will reduce to a minimum the level of erosion, as ascertained by the IBERLIM report, the question is the length of time required to repair the damage caused by this type of reforestation work, in the shorter term increasing erosion if compared to that of recolonised areas of *matorral*. Another issue is the social and economic problems which these plantations have caused to the economies of the affected villages, which must be taken into account. The defence of these techniques may reflect a fear in the possible loss of pride (which may be an effect of the technocratic ideology, that technicians could not be seen as fallacious), or arrogance, which in the minority of cases was detected during interviews. Because of these differences of opinion and perceptions, involving important ideological values of technocracy, the process of data gathering must be handled with sensitivity and care by researchers and planners to make information reliable, especially among technicians.

The pair-wise method generated a considerable degree of useful discussion among respondents, a key value of the technique. The spontaneity of land users' comments regarding further information on the location of pictures and their tendency, and that of the ecologist group and technicians, to engage in further discussion and comment demonstrates that the method encourages people to participate. The method's main weaknesses were these which may have been inbuilt in the preconditioned perception of particular landscapes by some respondents. The cases of members of the ecologist group condemning reforestation and some technicians defending it, or the possibility that some land users viewed *matorral* as detrimental to erosion, because of their dislike of this type or vegetation, are some examples of weaknesses in the method. The only way of minimising these possible distortions is by emphasising to them, even in more detail than in the way it was done during data gathering, the importance of judging the pictures as they were presented and not as in the future.

Apart from ascertaining the perceptions of danger of erosion as it was done here, the method provides a good opportunity to break barriers of distrust, or provide a point of entry into social groups which may be suspicious of sensitive questioning, especially among land users or technicians. The method provides the researcher a possibility to engage in discussion which must be considered as an important starting point for further development geared to the elaboration of plans and projects. Disagreements in perceptions between social groups can only be harmonized if a participatory approach is seriously adopted by Government, ie., the reforestation office or whoever is implementing and overseeing the work in Guadalajara.

Apart from assessing groups' perceptions of danger of erosion or providing the opportunity for discussion, the pair-wise method can easily be given an added dimension, that of estimating what kind of landscape affected populations would like to see in their area. This could have been crucial in the planning of reforestation in Puebla de Valles, to ascertain the preference of tree species by the affected people and other 'interested' groups, such as ecologists and urban dwellers. Such a test could be done by reducing the number of landscape units, even with a mixture of landscapes representing the existing situation and others with reconstructed pictures (by photo-montage) showing possible outcomes of reforestation with different species in photographs of the area which are easily recognisable to respondents. Shorter interviews by reducing the number of landscape units chosen and doing two shows of picture pairs with two different questions would make the task of data gathering more rapid. The first show of pictures, to ascertain the perception of danger of erosion by affected and 'interested' groups, could be similar to the one used in this Chapter. For the second picture show the question could be 'which of the two landscapes would you like to see in your area'. The reasons for the choice of danger may be similar to the ones ascertained here. Enquiring into the reasons for the choice of the particular landscape which would, in pilot tests, be identified as the most desired, should be added to ascertain the degree of 'concern' for the environment in comparison with profit making objectives from forest products.

This type of research would indicate economic, social and aesthetic priorities, an analysis of perceptions of erosion danger, and through the dialectical exchanges which the method provides, help break barriers of distrust between social groups of respondents and researchers. These perceptions of the aesthetic and danger of erosion, in an dialogical climate in planning for SWC through reforestation, should be approached with the objective of formulating a sound rural development project and not purely as an engineering operation of erosion containment.

The relative rapidity with which the pair-wise method can be put to use can help planners (according to Johnston, geographers working as planners especially) to bridge the gap between theory and praxis influencing policy. The aesthetic dimension of the landscape, a different focus to the one in this Chapter, can be put into practical use in planning involving the affected communities. These two characteristics, the landscape and the detail knowledge of the spatial dimension of their area by land users affected by reforestation are two main pillars more akin to studies of geography than to the other three disciplines used in this part of the study with photographs, anthropology, political economy and history. The study of perceptions, to which the pair-wise method clearly belongs, is of great interest to geographers (Mitchell, 1989: 100). It can be argued that geographers possess the necessary disciplinary skills to operate this type of method of data gathering and influence policy.

Methods of data gathering do not exist in isolation and if combined, using a variety of methodologies and disciplines, they give better results. The way of promotion of participation of affected people in planning which the pair-wise method provides, however, must be complemented by further work. An important outcome of the pair-wise method is that it demonstrates that although it is 'quick and fairly clean', it would benefit from greater involvement in a follow-up research exercise, adopting an open-ended discussion approach such as in the method of the previous Chapter.

An improved exercise for a follow-up exercise in this case would be to emphasize the areas of existing consensus among the four groups - those in which all agree, as for example, on the less dangerous character of *matorral*, poplar plantations and natural forests. The answer to the question, why if most respondents agree on the less dangerous character of these three landscape units a policy of planting conifers is still pursued (and only reluctantly relinquished under pressure from ecologist groups), must be answered in relation to existing political and economic interests. To understand the reasons for proposals for the continuation with conifer plantations, the position of those defending such policy and those opposing it must be contemplated in their relation to the means of production, ideology or training. These interests must be reconciled by careful Government intervention through changes in policy at the same time as effecting changes in the composition of planning teams to promote participation.

The inability of the Governmental agency of agriculture in Guadalajara and most of Spain to operate the kind of approach to project elaboration and implementation proposed in this Chapter and the previous one is an obstacle to participation because of lack of training of officials in 'social engineering'. The last part of the thesis draws together the main conclusions from the previous Chapters and proposes some recommendations for changes in policy, the professional and social structure of decision making teams, and for changes in academic approaches to the study of socioeconomic processes of LD for SWC.

Final conclusions and recommendations

Concerns about the deteriorating condition of land in Spain have resulted in different approaches to averting further damage and redressing it by using the economic and technical means available. The success of damage limitation or repair has been determined by the perceptions of the causes and effects of LD by land users and those formulating policy and/or technical measures. The highly conjunctural character of the processes of LD makes the assessment of its causes and effects and their solutions an intricate one. Explanations of the physical and socioeconomic processes are coloured by the degree of influence of the scientific discipline used in the study, assessment and explanation, and these are often open to various interpretations.

Differences in interpretation of SWC between land users, academics and policy makers and the influence of their disciplines, ideology and position in relation to the means of production determines the explanation of socioeconomic, political and scientific perceptions of LD and erosion processes. In the case of Spain, technicians of influential ranking in the decision making process, because of their position in relation to the means of production and the State, have been conditioned to espouse 'modernization' approaches to SWC.

Partial understanding of the socioeconomic processes places limitations on the range and effectiveness of SWC policies in Spain. These policies must satisfy a range of objectives, including the better management of vegetation, soil and water resources, for environmental protection and ecological balance, and to entice a rural population to remain in these areas through the promotion of sustainable rural development. Limitations in the understanding of processes and the social and physical solutions needed can impair SWC programmes.

The study of socioeconomic processes provides guidance to planners and academics to improve understanding and minimize the narrowing effects of ideology and discipline. The advantage provided by a multidisciplinary approach is that a wide range of the factors influencing LD processes are explored. The integration of social science perspectives with research into physical processes can render more comprehensive explanations of processes and more effective ways of tackling the problems of LD.

In the past, scientists or policy makers have often alleged that the irrationality and irresponsibility of land users is the root of LD problems in Spain. This narrow explanation has been used to justify the imposition of equally narrow technical solutions. Such explanations can be counteracted by a comprehensive and multidisciplinary exploration of socioeconomic processes. An anthropological perspective makes it possible to incorporate the perceptions of land users and other social sectors with a stake or interest in SWC. This offers access to information which has been under-researched by academics and ignored by planners in Spain.

The examination of land users' economic and social situation in a context of class struggle provides a reference point in the social, economic, and political relations determining their working organisation and its milieu. Explanations of their mode of production in a historical perspective coupled with a thorough understanding of the geographical area are essential in understanding their perceptions of LD and erosion processes. It is only through history that changes of a social nature affecting the landscape can be understood. However, there are two main constraints in the application of the multidisciplinary approach in practice, one related to the difficulties of integration with physical assessments of processes, and the other the recognition of its usefulness by Spanish planners.

Understanding the importance of specialised findings can pose a problem for researchers, bureaucrats or planners. For example specialist researchers in the social sciences adopting a multidisciplinary approach may encounter difficulties in understanding and integrating the findings of physical science, or vice-versa. Thus an effort must be made to integrate single discipline research into a more comprehensive multidisciplinary approach from the very beginning of the study. The integration of different disciplines can be achieved by making use of the findings of other disciplines and integrate them into a multidisciplinary explanation, or still better working from the very start in a team in which scientists from disparate disciplines examine and participate in each other's research. The case for the work in this thesis has been one, because of lack of initial planning objectively geared to a multidisciplinary approach, and practical reasons, that falls between the two above. Some work by the author in the installation of erosion measuring equipment, the gathering of some field physical data, and the regular discussions/exchanges held with the scientists working in the IBERLIM project in Spain, provided a improved understanding of the physical processes in the context of the methodologies used in field work. This has been particularly useful to the author afterwards in helping to understand the most relevant findings of the IBERLIM study and make use of them in the context of the socioeconomic processes of LD. An improvement to this would have been that physical scientists allocated some time to talk to land users to exchange opinions about their research, its results and the implications of these for land management.

The second constraint, regarding the usefulness of the less 'technical' findings and recommendations which the study of socioeconomic processes may provide to Spanish planners, is that these may find them difficult to apply to practice. The shortcomings of the existing professional composition of the forestry agencies mean that findings and recommendations of the socioeconomic processes can easily be misinterpreted, or that the full implication and importance are not understood. If on the one hand policy makers and planners are subservient to powerful economic interests, the task of improving planning through better socioeconomic understanding and the participation of people in the rural areas in planning is hampered. If on the other hand planners professional background is in engineering or other technical sphere which lacks an appreciation of the relevant socioeconomic factors, the task of planning in conjunction with land users is also reduced.

Explanations of LD processes are related to social, economic, political and scientific perceptions of the problem and these are coloured by ideology, training and the position of individuals or social groups to the means of production. It has been shown that the technocratic strategies for SWC are closely linked to the ideological persuasion of the political class in power and that of financial interests in wood production or the construction industry. The economic interests of the wood pulp and conglomerate industries gained and retain ideological hegemony by authenticating reforestation as the technical solution to the problems of SWC. This group has greater social and political influence over decision makers than land users, especially those on the less productive marginal areas most likely to be selected for reforestation.

The way LD has been perceived and depicted by industries using wood as a raw material, the pulp and conglomerates industry, is calculated to serve their interests, rather than those of land users or other groups, such as the ecologist movement or people living in urban areas with an interest in the environmental condition of rural areas. The view of these industries for reforestation is based on an ahistorical but influential account of the self-destructive actions of peasants. These destructive actions could only be halted by the State gaining direct control over land use through expropriation. Legislation to protect land classified as 'of national interest' through compulsory reforestation has been supported by this industry (as argued by Rico Boquete in page 85 above). They have argued that land users' activities cannot be justified on economic grounds because of the scant returns generated by their mode of production, yet contribute to degradation. Instead they promote wood production and soil protection as an alternative of greater economic and environmental value for the nation. This alternative is strengthened by the scientific reputability of reforestation techniques, and echoed, implicitly, by EU set-aside reforestation policies.

Experimentation with local materials, the sowing of *Cistus matorral* (and its use to construct check dams), and the plantation of natural species of trees and conifers, was abandoned in favour of 'modern' techniques and reforestation solely with conifers in the 1950s. These techniques were portrayed as scientific, since they use machinery in the preparation of the land for plantation and present an apparently orderly and efficient arrangement of trees rather than the 'chaos' of natural forests, but had detrimental effects on the condition of land and the landscape. Although there is a growing recognition of the shortcomings of these techniques among technicians, a review of the agricultural and silvopastoral production systems of the past, or the techniques of SWC using local materials proposed in earlier projects, is not considered. A review of silvopastoral production systems, using goats to manage the undergrowth and reduce the risk of fires in plantations is anathema among Spanish foresters, even the high demand and price for goat's meat in Spain can justify its production. Technicians' portrayal of techniques using machinery and monocrop plantation as more scientific is ideologically, often politically inspired, and has its roots in the modernization (positivist) approaches to development.

The necessary scientific data to justify the need for reforestation in the areas of study, using 'modern' techniques or those proposed by earlier projects, however, has been consistently missing. Invoking the value of science without carrying out in situ tests and measurements of the conditions of the soil and LD in the area of study for this thesis, indicates that the name of science has been used to further the policy of SWC solely designed by foresters. The assessment of local conditions for the elaboration of reforestation projects has mainly been done via visual checks by technicians visiting the field in the area of study. This assessment does not provide a comprehensive explanation of the socioeconomic and physical processes and conditions of LD, but one which acquiesces in the official 'perception' for action which has stopped agricultural practices and reforested the land concerned. Simple visual evaluations and surveys by technicians supplant thorough physical tests and measurements, and ignore land users' perceptions of the condition of land and the risks it faces. As a result the data required for planning and implementation using suitable techniques and the necessary social organization for the participation of affected people is missing. Arrangements are made on technical (visual) assessments through the single disciplinary approach of forestry engineering. The result is that there is inadequate scientific research of the physical and socioeconomic conditions underpinning land use and the rural economy.

Because the collection of data (or lack of it), its conceptualization and presentation is a reflection of the planning arrangement used by foresters, especially for approval by decision makers, the prospect for the participation of rural people in the decision making process is small. Foresters lack training in assessing the views, experience and perceptions of the processes of LD and erosion by land users. Their training emphasises the physical condition rather than the socioeconomic processes involved. Explanations of LD and erosion processes from land users' perceptive, economic, political and practical standpoints are not sought. The potential of land users' contribution to planning and implementation is wasted and supplanted by that of technicians.

Closer examination of the socioeconomic and political factors accountable for changes in the condition of land helps to dispel accusations of land users' irrationality and irresponsibility. The adoption of factors and effects on the landscape by their working practices brings the land users to the forefront of the assessment of processes. Their perception of the processes is based on observation, experience and values in a time and space setting. Some of the results of the study of their perceptions in this thesis are particular to their geographical area, while others which relate to political and economic forces, such as those relations of production with the more successful producers of the valley of Henares, refer to the national context. The methodologies and methods, however, can be used in studies seeking to contribute to explanations of perceptions of LD and erosion from a socioeconomic point of view.

As with other social groups, be they scientists, technicians or policy makers, land users also perceive the processes of LD and erosion from a socioeconomic, political and practical viewpoint. The explanation of their working practices and their awareness of the problems of erosion and LD are related to these. They analyze their agrarian practices and the effects these have on the land in association with the need for constant adjustment to socioeconomic and political forces and their natural environment. This adjustment and its effects on the condition of land is perceived as determined by their position in relation to the means of production, the land they own or control and their need to survive. Their struggle for economic survival is perceived from the standpoint of a social group struggle in competition with other social groups. They perceive the evolving process of LD and erosion firstly as the result of this struggle, manifested in the need for intensification of production, and secondly, as the result of fragmentation of land ownership because of the inheritance system. The inheritance system ensures that all descendants have a similar (albeit diminished) chance to survive given the equal parts in land they receive.

Land users and technicians differ in their position with respect to the means of production and in their involvement in the struggle for the control and ownership of land. Influential technicians in the decision making process are likely to be those ideologically dedicated to the objectives of the State. The Spanish State did not provide the necessary political and legislative arrangements to effect changes in the professional composition of its forestry agency with the advent of democracy, after the death of Franco. Successful land management requires more complex, broad-based research and management planning through the involvement of people affected by a project, as Korten (1988) proposes for the example of the Philippines, adding a community organiser (p,122) to the planning organisation. The inclusion of decision makers with a social science background, as well as those existing ones with a physical one, in reforestation planning teams would foster improved understanding of socioeconomic processes and lead to greater efficiency in the planning of SWC projects in Spain.

Although there is recognition of the need for participation by some Government officials, this may amount to early deliberations towards this end or may simply be political rhetoric. The technocratic way of planning and implementation of SWC projects through reforestation favours the construction and wood pulp industries, and farmers using irrigated land. Given the power of these influential forces in the decision making process, the participation of people affected by reforestation in water catchment areas is regarded by decision makers as less significant. The struggle by ecologist pressure groups and affected rural populations against the concern of the construction industry to build more dams, and the struggle over water resources by water users and providers are examples of the results of inefficient conservation measures.

Technicians' conviction that the only solution to SWC was through the plantation of conifers but that this would have had a detrimental effect on the local economies in some cases resulted in the delay of many reforestation projects. During the expansion of reforestation, the interests of, initially, the wood pulp industry, and more recently also those of the construction industry, together with the inevitable compliance of technicians with tasks devised by senior decision makers and planners, ensured that the directives of the

Spanish Government were observed. Although the policy for the provision of irrigation to the southern parts of Spain has consistently been followed since the 1950s, Spanish planners did not envisage the extent of the problem the increase in water consumption was to create - the resulting water shortages experienced today due to the economic development process which has generated so many unforseen environmental consequences. The technocratic approach, lacking understanding of the socioeconomic processes of LD, missed the opportunity to start providing early solutions for the collection of water in any other way but through reforestation.

Technicians and planners had three alternatives, singly or in combination, to assess the conditions of LD and erosion and soil properties before the mid 1950s. One was to use the measurement techniques available to them to ascertain sediment yield and the chemical and organic composition of the soil. The second was to gather information from land users' perceptions and experiences of the processes of LD and erosion, and the third was to assess the situation visually. After 1956 air photographs from Guadalajara province and measurement techniques 'imported' from the US by Spanish foresters attending specialised courses there, were available but not used. The frequent and life-long observations of the processes by land users, especially in particular points of their geographical area, could have been used to complement the visual assessment by technicians to elaborate more efficient SWC projects. However, neither before nor after 1956 did forestry engineers in charge of the elaboration of projects in the areas studied make use of any methods apart from personal visual assessment of the situation.

The decision not to use other methods of assessment was ideological and political, and project elaboration and implementation suffered from inadequate cognizance of the socioeconomic processes of LD. A major reason for overlooking other methods of assessment, running through project documentation, is that the indiscriminate reforestation with conifers did not need to take into account particular physical conditions, except for those related to altitude, climate, type of soil and species of conifers. It was assumed that there was no need for understanding socioeconomic or physical processes. The result is the aversion the policy of conifer plantation created among land users, ecologist pressure groups proposing greater biodiversification, and the problem of the reduced amount of water which is collected in reservoirs.

Forestry engineers proclaim the superiority of scientific reforestation techniques, without carrying out studies other than basic ones matching species of conifers to the particular area to be reforested. Science is used to boost status and to justify and endorse these projects. The current increase in the use of Geographical Information Systems (GIS), as an example of a 'meritorious' scientific method in Spanish planning, are advanced by influential planners, such as Lopez Cadenas del Llano. GIS is portrayed by this planner as a crucial tool to fill the gap in information previously unavailable to engineers (personal communication). This, according to this respondent, can be an important step ahead in the improvement of the planning process. This may yet be another indication that the value of physical science, however realistic and useful it may be, is invoked at the expense of the collection of social data, greater understanding of the socioeconomic processes and the promotion of participation (seen and portrayed as unscientific).

A multidisciplinary approach to planning with the intention of understanding the socioeconomic processes from the point of view of the affected people (mostly land users), coupled with GIS and other measurement techniques, such as those used in the IBERLIM study, is necessary if SWC measures are to improve efficiency. The application of GIS methods in planning, for example, the reforestation project of Puebla de Valles or Palancares, will not bring the existing conflicts of interest, at present thwarting the possibilities of their implementation, to an agreement, hence the need for multidisciplinary approaches to provide physical and social scientific data.

Methods of social and physical data gathering should be flexible and able to evolve into new types of assessment to improve understanding of processes. The evolutionary development of the field survey in the present research, with its use of factors and effects, demonstrates the value of flexibility in the collection of reliable data, and the importance of reducing barriers of distrust if participation is to be promoted. The pair-wise photographic test is another example of the advantage of extending and diversifying methods of data gathering and analysis which are crucial to planning for SWC - that of the visual perceptions of the danger of erosion by diverse social groups. Although some 'mainstream' scientists of erosion studies may contest the validity of lay persons' visual perception of erosion, the results of the pair-wise photographs, showing existing areas of consensus among the main social groups provides and valuable form of explanation and opens the possibility of participation in planning for SWC. An appreciation of these areas of consensus would help planners and affected people to reach agreements on the type of SWC strategy necessary to improve efficiency.

Advancing the understanding of socioeconomic processes of LD for planning a more efficient implementation of SWC projects requires a study of the decision making processes used by land users to avoid LD and erosion. These decision processes by land users have been shown to be part of their general working practices. The measures for SWC adopted and implemented by individual land users in their working practices are also often subject to agreements reached at village level leading to group action. Group decisions, such as those of management of 'La Capitana' in Puebla de Valles, Dehesa del Pueblo in La Mierla, or communal land in Palancares present a great opportunity for Government officials. This is to build on land users' latent organizational capabilities, reviving processes of decision making for SWC for planning, implementation and land management through participation. Understanding their work organisation to share pastoralist duties among households can present planners with the opportunity to make use of these arrangements for cooperation in planning. The decision making process for these arrangements are a continuation of old forms of informal organization passed down from generation to generation.

These past cooperative structures indicate that there is a great possibility for land users to reach agreements on the most suitable form of SWC and work together again by drawing upon cultural and personal interrelationships still in existence among them. The existence of organizations in Palancares (CPAES) opposing reforestation actions by the State, or that of the steering committee of Puebla de Valles (CLCAPV) proposing the reforestation of land in their village, demonstrates that their is certain social coherence among land users. These organizations need all the encouragement officials can provide so the task of planning, implementation and *a posteriori* management or projects is sustainable. Officials, especially those with skills in the social sciences, should be looking into the social structure of villages and build upon existing organizational arrangements. Although the social structures and groupings in rural areas are subject to radical changes, triggered by migration to the cities in the late 1960s and 1970s and land abandonment, what is important in the study of these areas is to identify the existing structures and their cohesiveness. The example of Puebla de Valles, although the existing social and economic structure bears little resemblance to the one in the 1970s, the forms of agreement (and disagreement) are still determined by interrelationships based on past experiences and values. The task of the planner in this case would be to work on the existing organisational framework of the village and facilitate their participation in planning. The nature of the community and its organisation is an issue which could be researched in greater depth in order to ascertain the existing conflicts of interest in reforestation, identify the form of operation of existing organizations, and if this is to be of value to planners, facilitate the participation of villagers in the decision making process.

To improve existing processes of decision making for SWC, by involving land users in planning, requires that information, as for example the results of scientific findings such as those provided in the IBERLIM report, are made available to them in an accessible form. Should IBERLIM have been designed with local participation from the start? Is IBERLIM itself an example of the 'top down' non-participatory approach to SWC/LD research and action? Could local land users and other 'social groups' have played a valid part in the research process? These are *a posteriori* questions to be considered in the event of further research in the area. The involvement of villagers in the installation of the measuring instruments, the collection of data and samples to be analyzed by researchers, and making the results available to them in a form which is within their lay comprehension, would help scientists with little time to spend in the field.

Tentatively on the one hand it can be said that the involvement of land users in the research design can be initially time consuming and even unproductive if they do not understand its practical relevance. On the other hand, because of their detailed knowledge of the area and the proximity in which they live to the experimental sites, they could be trained to record field data or collect samples during crucial peak climatic events that researchers may miss being at some distance from the field.

In the case of Palancares and Puebla de Valles, land users are 'ready' to cooperate in exchange for scientifically based information which would help them to make better decisions regarding the reforestation of their land. They do not trust, and in the case of Palancares do not agree with the information upon which Spanish foresters base their argument for reforestation with conifers. A form of paving the way to participatory-based research in the area of study, is not only to make findings available to those affected, but also emphasising the relevance these studies may have to their decision making process. The method of some of the data gathered during field work for this thesis, its analysis and writing up an article in conjunction with one villager, later published in Britain (García Pérez *et al*, 1995), are examples of the effectiveness of participatory methods in the promotion of participation. It can be argued that building up mutual trust still is an ongoing process which can be mutually beneficial if further research is considered.

There are indications that findings of this type affect the processes of decision making for SWC among land users. Both CLCAPV, in favour of reforestation, and other smaller groups opposing it in Puebla de Valles refer to these findings (subject to interpretation), in order to assist their case [1]. Improving the decision making process for SWC, including that of Governmental planning, requires working out alternatives which are acceptable to those involved by making information available and fostering organic arrangements.

The methodologies and methods used in this thesis provide

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[1] During a short visit to the field in August 1995, 4 land users showed interest in my interpretation of the content of the IBERLIM report made available to them 10 months before. Their questions, reflecting the ongoing debate on the best actions to take in their land, revolved around the desirability of reforestation as a form of SWC, as opposed to leaving the *matorral* area undisturbed.

explanations of the processes as well as promoting participation. The initial stages in the promotion of participation have been achieved through the involvement of respondents in the construction of the questionnaire and the provision of reliable data. This increased their interest in their own organization concerning issues of SWC and the reforestation of land in their village. Without further research, however, it would be presumptuous to assume that the formation of CLCAPV has been due to the reflective effects of this research among land users. However, it is possible to assume a certain influence. The choice of methods of research especially those of RRA and PRA, clearly indicating to respondents that they were the experts on their own right and that their opinions were highly regarded, can stimulate self esteem and have an empowering effect explaining increased organic activity among themselves.

The problems of integration of local knowledge with the researchers' knowledge (or initially the lack of it) can be minimized through the anthropological method of 'sitting and listening' during research. This presents the opportunity to those interviewed to provide a more comprehensive and reliable explanation, boosting their credential and self esteem as sources of useful knowledge. After years of constant mortification through the disparagement of their working practices and ways of life, creating a guilty and subservient complex [2], such a reversal of relationships must have an empowering effect akin to that described by P. Freire (1974) among poor peasants in Latin America.

The characteristics of the pair-wise photograph method encouraged participation in discussion within social groups which would otherwise have been difficult to attain. This method of data gathering is particularly productive with technicians. With conventional questionnaires or open ended discussion this social group can remain aloof, defensive or suspicious about the political and social consequences of providing information and this leaking to the press. The technical and practical character of the photographic method attracts their interest in the issues they understand best and they have been trained for, the physical conditions of the landscape. Discussing social, political or economic issues related to reforestation for SWC is not as productive as discussing technical

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[2] In Spanish the word peasant, *'campesino'*, or country man, *'de pueblo'*, have similar humiliating connotations as in English.

matters such as their perception of danger of erosion. This indicates that their function as planners, having to assess and take decisions encompassing social and economic issues, is an uncomfortable one for them. They find it more difficult to relate to the social and economic complexities of planning than to technical matters. Their technical expertise and guidance would be much more productive if their task was to participate in a multidisciplinary team with other specialists in the social and economic sciences.

The role of forestry technicians in a multidisciplinary planning team, as specialists in their own right, would be enhanced rather than curtailed. This, however, is only possible if the Spanish Government helps in bringing about changes in the working practices and mono-professional structure of its bureaucracy to multidisciplinary teams promoting the participation of affected people in planning.

The constraints of working through the State, to effect a multidisciplinary approach to the study and practice in SWC, are great but not unsurmountable. Assessing these imply having to provide further tentative recommendations for research. These would have to consider immediate, medium and long term changes in organization, a subject of further research. This research could assess the existing workings and ongoing changes of the State bureaucracy at the level of Castilla-la-Mancha and that of its Office of Agriculture in Guadalajara in greater depth. The research could also assess the relevance of the existing university curriculum in forestry, especially in planning for SWC including studies of socioeconomic processes and the promotion of participation. A relevant question to be answered in this type of research perhaps would be to what extent the involvement of a new type of forester, one well versed in the study of socioeconomic processes and the promotion of participation, change the existing technocratic trend?

Changes in approach, from top-down to participatory, should also be integrated into EU policy. For instance, policy for the protection of 'set-aside' land should not only be based on the leverage of subsidies, but also on the promotion of participation, which should be developed as a conditional part of EU funding. Setting aside land and making sure it is kept in an environmentally sound condition must be accompanied by appropriate social and economic arrangements. While economic arrangements in the form of subsidies, can help in this endeavour, those needed for improved social organization are deficient. Those, taking into account the existing limitations of the EU, since the improvement of organisation is best facilitated by people who are already working or familiar with the field area, require greater consideration by EU planners to yield better results than purely relying on the existing strategy of financial subsidies. Further, the strategy of financial subsidies in isolation can create a climate of complacency or opportunism detrimental to the advancement of participation and self-reliance as a means of retaining an economically active and solvent rural population residing in the rural areas.

The use of EU funds by land users for the reforestation of land abandoned in the 1970s, which some of them falsely claim has been recently set-aside from production, has been encouraged by the Office of Agriculture in Guadalajara. This is an example of what happens by solely relying on subsidies and not paying enough attention to the other main objective of that policy, averting human desertion from marginal rural areas. Plantation of abandoned *matorral* areas (rather than of set-aside agricultural land) with fast growing conifers, present land users and their inheritors with the opportunity of making a profit out of land which would otherwise remain unproductive, and for those staying in the village an opportunity of long term employment in the management of the forests. The opportunity to manage existing *matorral* and improving and extending areas of natural forest requiring greater attention and hours of work are not presented to land users as an alternative and naturally not considered by them. The same as any other 'rational' investors (such as the construction and wood pulp industries), land users' primary objective is to make a profit by minimising costs and maximising returns, even when this may be detrimental to the condition of land such an operation of reforestation can entail.

Neither the level of national economic activity nor the objectives of SWC would be compromised by changes in the nature of reforestation. Reducing the production of cheap conifer wood and the construction of reservoirs in the area of Palancares and increasing the production of hardwood and the management of *matorral* imply changes in the nature of economic activity but not its reduction. These require a willingness by Government to resist the lobbying influences of the well established economic interests of the wood pulp and construction industries. The construction of reservoirs uses a large amount of machinery but also considerable unskilled labour. The reforestation and management of existing *matorral*, according to the natural conditions in particular areas, such as gully floors, gully walls, small or big gullies, gully heads, *paramos*, etc., make use of a greater amount of smaller machinery and a greater amount of unskilled or semi-skilled labour than the construction of reservoirs. An increase in reforestation work in the plantations of mixed forests with natural trees and conifers, the construction of check dams, and the improvement of existing *matorral*, could absorb some of the surplus labour from the construction of reservoirs and local labour. The need for maintenance in the new plantations and management of *matorral* would contribute to the reduction in rural unemployment and retain a resident population in the rural areas.

These tentative issues and recommendations can only be put into practice if Government is able and willing to effect changes in the working practices and professional composition of its bureaucracy. Experimenting with multidisciplinary teams in planning with the objective of finding out physical and socioeconomic constraints and opportunities can be achieved either by recruiting social science based specialists on permanent or temporary consultation work to promote participation. Staffing multidisciplinary teams with consultant specialists in the social sciences to work in conjunction with the existing teams of mainly physical specialists such as forestry engineers, should present Government the opportunity to assess results and decide on the best combination. The utilization of consultants from university or other agency should be easier and cheaper, at least initially, than expanding the existing bureaucracy. This would present geographers and other scientists with the opportunity to bridge the gap between theory and practice and influence policy to attain a greater understanding of processes and achieve a more successful SWC policy through participation.

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