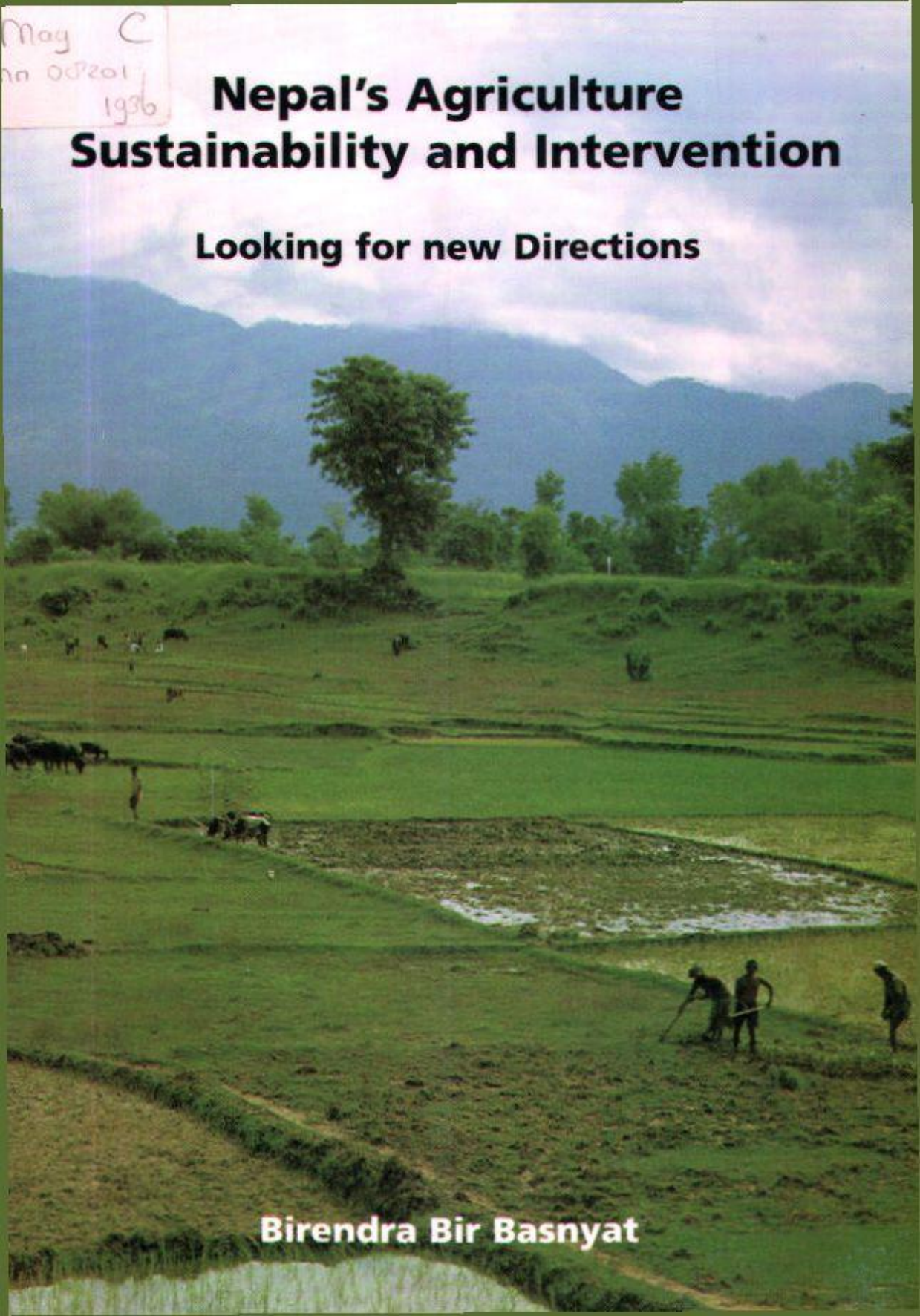
Nepal's Agriculture Sustainability and Intervention

Looking for new Directions



Birendra Bir Basnyat

Nepal's agriculture, sustainability and intervention

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Propositions

1. Mechanistic models of intervention are too rigid and too specialized to address messy real-world problems, and reductionism is too small and too thin to understand intentional, sense-making human beings (this thesis).

2. Intervention is an interaction or a negotiation process where intervening agencies, intervened parties and other actors bring in different (rather than a different level of) expertise and analytical capacity to facilitate mutual learning, joint action, negotiation, accommodation, consensus building and so forth (this thesis).

3. Human ideas, experiences, and intentions are not objective things like molecules and atoms, and results of any attempt to change human behaviour through instrumental reasoning or technical intervention would be of a temporary nature (this thesis).

4. Unless all elements of the knowledge system are appropriately calibrated with, innovation cannot realise its full potential (this thesis).

5. People are not inanimate objects like planets and stars with no will or energy of their own (Uphoff 1992).

6. Problem situations can be made visible to people through language, sense-making and other mental exercises as people are sense makers, knowledgeable and capable (this thesis).

7. Mismatch among various components of the knowledge system is likely to make a development effort slip comfortably back to TOT (this thesis).

8. What to take as a goal? To fly to touch the *Moon* with your hand (Nepal's Great Poet, Laxmi Prasad Devkota).

9. Agriculture produces vital products for mankind but paradoxically this does not result in a corresponding strong economic position for farmers (Veerman 1994).

10. What to do with wealth- hand's dirt, a bag of gold; living on happily with wild vegetables is better (Great Poet, Laxmi Prasad Devkota).

11. The Earth has enough to sustain everyone's need. But not enough to satisfy everyone's greed (Mahatma Gandhi).

12. Work is thy worship, reward is not thy concern (Bhagwat Geeta).

Nepal's Agriculture, Sustainability and Intervention

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Looking for new directions

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To my father and mother

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CHAPTER 1

INTRODUCTION

Nowhere are new directions in the agricultural development process more urgently required than in Nepal. The Green Revolution has passed over the country almost unnoticed. The bulk of farmers are under severe pressure to produce more from a degraded resource base without relevant technologies. Overuse and misuse of an already shrinking agricultural resource base has become reality. As a result, agriculture, the livelihood of about 90 percent of Nepal's population, has become seriously threatened. Although a considerable part of the cause lies with Nepal's difficult terrain, the lack of transport and development infrastructures, and the diversity and extremes prevailing in the country, part of the problem has stemmed from our understanding and activities as agents of development. This research seeks to address the problems and issues with respect to the latter.

1.1 Research context: nature of problem

Of the many development problems faced by the Himalayan kingdom of Nepal, feeding a growing population is the most critical. The available statistics suggest, that despite organized efforts to improve agricultural productivity, the growth in food production in the country in the last one and a half decades has not kept pace with population growth (nearly 2.1 percent or increasing by more than 350,000 people every year). It is also evident that the "Green Revolution" type of technologies have not taken hold (Sacay 1987, Balogun et. al. 1988, Smye 1991, Sill and Kirkby 1991, Mahat 1991). Although some intensification of agriculture has taken place, there is evidence that yields have actually declined over the last 20 years as poorer land has been brought into cultivation (Thapa and Koirala 1992, NPC 1992). Whatever be the reasons, agriculture, the livelihood of about 90 percent of Nepal's population, has become seriously threatened - as suggested by the Theory of Himalayan Environmental Degradation[1], or other rival theories and explanations (for example see Ives and Messerli 1989).

In the Nepal Agricultural Sector Strategy Study, the Asian Development Bank noted that, in 1966, yields of cereal crops- especially of rice- in Nepal were among the highest in South Asia, whereas by the 1980s they had dropped to be among the lowest. This study characterized Nepal's agricultural sector as follows (ADB 1982):

- a high-man-land ratio
- great disparity in land ownership
- high, debilitating rentals
- large numbers of poorly fed livestock of low productivity and high level of disease
- declining forage base

- inadequate knowledge of modern production technology
- ineffective extension services
- lack of timely availability of external inputs
- scarcity of institutional credit and other support services for tenants and small farmers
- deteriorating environment
- declining soil fertility and reduced yield
- reduced availability of the full range of forest products.

Indeed, as appeared at the top of the above list, Nepal's population density in relation to cultivated land (756^2 persons per square kilometre) is one of the highest in the world (Farrington and Mathema 1991). It is not only the population density, but also livestock per human inhabitant (Blaikie and Brookfield 1987) and per unit of land area (Joshi 1992) are among the highest in the developing world. Several studies conducted in Nepal have reported that livestock population pressure is considerable. This has resulted in overgrazing and a heavy pressure on the ecology of the country leading to an ecological and environmental imbalance due to an excessive drain on natural resources (Joshi 1992, Rajbhandary and Shah 1981). Therefore, according to Blaikie and Brookfield (1987), Nepal, with an immensely varied environment, including the world's highest mountains, a strip of the Gangetic plain, and the high-altitude desert of the trans-Himalaya, is a classic area for the study of land degradation.

The problem of Nepal's agriculture is that of declining agricultural productivity and increasing pressure on land, water and forests. This is further exacerbated by an increasing human and livestock population. Nepal's agricultural problems and crises are complex. This requires better understanding of the present status of its agricultural systems in its three major agroecological regions (the mountain, the hill, and the Terai regions) and their interconnections and interdependencies.

Of the three regions, the hill and mountain regions have a clear degradation of the ecological integrity of the system, which Jodha (1989) characterized as a fragile, marginal, diverse niche (Vaidya and Gibbon 1994). De Boer (1989: 139) stated:

> *"The role that increased human and livestock exploitation plays in downstream sedimentation problems is disputed. While on-site soil erosion certainly increases as forest cover is lost and forested land is converted to cropland or common grazing land, there is much less evidence that serious downstream problems are caused by discharges from upstream, overexploited watersheds. Nevertheless, whether carried downstream or deposited in the same watershed, soil erosion on hilly land poses serious threats to future land productivity and stability."*

It has now become apparent that traditional agricultural systems are no longer sustainable, with both human and livestock population densities exerting a pressure upon the land that is insupportable. Despite the overload, Nepal is still a net importer of livestock products. This suggests that the individual productivity per livestock unit in Nepal is very low. Farmers' efforts to increase agricultural production to meet their requirements for basic survival, have exacerbated an already critical situation. This is leading to further

intensification of the downward spiral of decline in soil fertility and environmental degradation, as more marginal areas are brought into cultivation, and forests are overexploited to support livestock and humans alike (Abington 1992: 5). In many areas in the hills, the balance between forest and arable land has now been irrevocably disturbed (Seddon 1990).

Although the nature and form of agricultural problems in the Terai are different from those in the hills and mountain regions, they are no less severe. The 1991 national census reported that the population in the Terai is increasing at a rate of 4.2 percent per annum, contrasting with that of 1.6 percent in the hills, and a national average of 2.1 percent (Abington and Clinch 1992). Such a rapid increase in population density in the Terai, due to combined natural growth and immigration, has considerably increased population pressure on the existing land and forest resources. Not only have surpluses of food grains rapidly declined, but also the reduction of forests has been dramatic. The Terai forests have been heavily depleted during recent decades as farmers have moved from the hills to the plains (and also north from neighbouring India) and cleared the forests for cultivation (Gilmour and Fisher 1991). This followed the eradication of malaria in the 1950s, making permanent habitation possible. In addition to this, the 1970s' active government resettlement programs encouraged the expansion of the agricultural base in the Terai. This prompted the United Nations mission on needs assessment for population activities to report in 1979 that all exploitable forests would be depleted there by 1990 if unplanned migration from the hills to the Terai and the present rate of deforestation continue (Seddon 1990). Not only were there problems with expansion of the agricultural base and deforestation in the Terai, but also, according to Sharma and Anderson (1984), increased silting and floods have begun to erode a sustained production base there.

Not surprisingly, nearly ten years ago some foreign professionals had logically suggested introducing major changes in the agricultural sector to increase production, and to ensure that the surpluses generated would be productively reinvested within the country. They warned that otherwise economic and political collapse would be experienced within a decade or so (Blaikie, Cameron and Seddon 1982).

The problem of agriculture in Nepal is thus not only complex, but also greatly concerns the maintenance of an effective balance between development and the environment through a balanced and complementary utilization of existing natural resources. Given this situation of rapid environmental degradation and consequently declining production levels, the unsustainability of the mountain environment and the development of sustainable agricultural systems are priority issues.

The government of Nepal has realized this, and the authors of the Eighth Five Year Development Plan state (NPC 1992: 119-20):

> *"The biggest challenge today is to achieve stability and sustainability in agricultural and forestry development by fostering mutual complementarities among agriculture, forestry and natural resources. Sustainability in agricultural development cannot be achieved unless a close coordination is maintained among agro-ecological conditions, farming systems and forestry-resource utilization. Hence, the task of advanc-*

ing these three aspects as complementary and supplementary elements poses a significant challenge in the formulation of the agriculture sector plan".

Even more significant than the Eighth Plan in terms of ensuring a focus on sustainability is the new Constitution of Nepal written following the restoration of democracy. The 1990 Constitution recognizes the need for preservation of the environment and a wiser use of natural resources. Sub-article 4 of Article 26 (Chapter A) states that the Kingdom of Nepal will give priority to raising public awareness on environmental issues, to mitigating the adverse effects development works have upon the environment, and to the conservation of rare fauna and flora (HMG 1991).

1.2 Intervention: focus of the research

The rapid deterioration in the ecological balance of the hill and Terai regions, and the urgency of action needed to reverse this trend are, indeed, recognized by the authorities in Nepal. The community forestry program is just one example. The program was initiated in 1976 following realization of the need to address the deteriorating condition of the country's forests. As discussed earlier the sustainability of hill farming systems is contingent upon the management, protection and utilization of forests. Estimates show that from 3.5 to 6 ha of forest land are required to support each hectare of crop land (Denholm 1991). Likewise, the government's policy and commitment to the sustainable use of natural resources were accepted and included in His Majesty the King's address to the 33rd Session of the National Panchayat (dissolved following the initiation of multiparty democracy in 1990) (Jha 1992):

"...Activities such as deforestation for the sake of cultivation have given rise to the problems relating to low fertility, soil conservation, environment and energy. We have now no other choice than to confront these problems...With a view to improving forest conservation to resolve the ecological problems as well as soil erosion, my government has decided to impose restrictions on the export of timber and firewood...".

Despite increased public sector (which includes governmental and non-governmental agencies) and private initiatives to reverse natural resource degradation, available evidence suggests that the situation has worsened. Agricultural development efforts in the past proved inadequate to tackle many of the problems and issues. In 1988, the workshop on "Agricultural Development Experiences in Nepal", organized by the International Centre for Integrated Mountain Development in collaboration with the government of Nepal, concluded (ICIMOD 1989):

" Even after seven major development plans, the country's most serious problem is that of a virtually stagnant agricultural sector in face of a rapidly growing population and a deteriorating physical environment. The basic question now and then remains the same, that is how can a hill farm with a family of six persons owning less than 0.5 ha achieve a decent standard of living with such a meagre resource."

As has been evident from the above discussions, the prevailing crisis in Nepal's agriculture is now not so much a subject for debate as is how to reverse such a trend. This requires proper assessment of the problem situation and the nature of prevailing development interventions to support sustainable agriculture. Conventional wisdom suggests that if the perception of the nature of the problem is wrong, then the solutions are also likely to be wrong.

Recognizing the importance of natural resources and having a commitment to their better or wiser use do not mean that such a process is likely to happen by itself. It requires some form or type of external triggering and/or interventions. As Dusseldorp (1990) has argued, the planned interventions of government and individuals, however imperfect they may be, and however disastrous their outcomes sometimes are, will remain with us forever.

Selecting appropriate intervention approaches and processes is a problem, as shown by the conclusions drawn by the following three studies conducted separately in the central, eastern and western hills of Nepal by three different researchers.

In a study on tree cultivation on private land in Nepal's middle hills, Carter (1992: 37) argued that any outside intervention regarding private tree cultivation will be inappropriate in that area in the following ways:

- People who have not had access to communal forest resources for many years (perhaps generations) are likely to have adapted to relying on private resources for their basic needs. Villagers who are in a position to cultivate trees on their own land will probably already be doing so.

- Assistance in cultivating trees on private land may also be inappropriate when working with communities in which land distribution is highly inequitable, and there is a history of control over local forest resources being vested in a powerful local elite.

On the other hand, studying farmers' ecological knowledge of management and use of farmland tree fodder resources in the eastern hills, Thapa et. al. (1994) suggested that the intervening agencies reevaluate the very fundamental assumption of the need to educate farmers in tree planting. They argued that there would be higher returns from resources invested in developing an effective research and extension system if based on examination of local needs and knowledge, than investments made on training and educating farmers in tree planting.

Finally, I turn to my own study on shifting cultivation (*khoria*) in the hills of western Nepal (Basnyat 1994). This study indicated that farmers are not likely to stop the traditional *khoria* practice unless the negative consequences are made visible, and farmers' capacity to analyze problem situations and take actions strengthened.

Although external interventions are necessary (Cernea 1985, Hayami and Ruttan 1985) they are not always likely to have a positive impact on the lives of rural people. For

example, some researchers (Jodha 1990, Shrestha 1992) argue that it is the nature and form of development interventions that are mostly responsible for the looming unsustainability of agriculture in mountain areas. They discuss specific characteristics of the mountain region that seem grossly disregarded by the conventional development paradigm.

Searching for an appropriate intervention process for sustainable agriculture is, thus, problematic. Sustainability means different things to different people. Since "sustain", the root of "sustainability" connotes "support", "keep up" or "bear up", indicating that there is an actor and an object, the meaning of sustainability changes with the context, the area of interest, and the system or systems involved, and the ways people perceive the system and/or environment around them. What is sustainable at one time and place may not be sustainable at another place. And what is sustainable for one person, may not be so for another. This requires defining and redefining our ends as well as our means.

Not surprisingly, many development planners and professionals, have been advancing different technological and institutional innovations and intervention processes for sustainable agriculture. Although these approaches depend on how the notion of sustainability is interpreted, available research reports and literature indicate that the focus of the majority of the current studies has lain in the problems associated with the post-Green Revolution agriculture and industrial agriculture. Ironically, to date we know very little about how to intervene for sustainable agriculture, particularly for areas where there is degradation of natural resources, and where Green Revolution technologies have failed to take hold. And most of the studies have specifically centered only on farmers as the target of research. This is not sufficient because the responsibility of maintaining natural resources for sustainable development of agriculture remains not only with farmers, but with many other actors who have definite and significant roles in the process. Interestingly, in a study on survival and sustainability in the mid-western hills of Nepal, Vaidya and Gibbon (1991, 1994) suggest developing mechanisms that involve the microsocial structures in the research and extension program, in addition to any strategy aimed at increasing the biophysical productivity of a system. They maintain that the use pattern of the resource is an expression of deep political, economic, and cultural structure (Eckholm 1976) and cannot be changed easily. Biophysical, social, economic, and national policies are the factors involved in meeting this end.

Hence, the problem remains: how to intervene (approaches, methods, processes and content), where to intervene (levels), and with whom to intervene (actors) to support sustainable agriculture. What effects are likely to be produced by the development efforts that seek to introduce sustainable agriculture? What are the factors associated with the effects of those efforts? The focus of this research lies, therefore, in intervention processes for supporting sustainable agriculture.

1.3 Research objectives

Nepal's economic development cannot be achieved without developing its agricultural sector (Yadav 1991). This sector has received the highest priority in each successive

development plan. Each year nearly a quarter of its development budget goes to the agricultural sector (Thapa and Koirala 1992). However, performance of this sector has remained far from impressive (NPC 1992). Persistent low productivity and a dwindling natural resource base have been major concerns among all involved in agriculture. To improve the situation the government has introduced a series of reformatory mechanisms that include frequent reorganizations of the Ministry of Agriculture, experimentation and the use of the several extension approaches as well as improving agricultural research processes. In spite of all these strides and struggles, farmers in Nepal for one reason or other have not benefitted (Sacay 1987). As discussed earlier, Nepal is one of the countries in the world where Green Revolution types of technologies have not taken hold. Partly, this is due to its difficult terrain, the lack of transport and development infrastructures and the diversity and extremes prevailing in the country. Partly, it is due to the pitfalls and inadequacies in intervention processes and approaches that have further aggravated the problem situations.

Against this background, this study aims to examine the nature of development intervention necessary to support sustainable agriculture. Specifically, the research intends to:

- study concrete development efforts that seek to introduce sustainable agriculture; and
- better understand the factors associated with the effect of those efforts.

1.4 Structure of the thesis

The thesis consists of 13 chapters. The first chapter is the introductory chapter which describes the nature of the problem, the focus of the research, and the research objectives. The remaining chapters are divided into four parts.

Part one consists of three chapters. Chapter 2 introduces Nepal and its agriculture. It discusses how Nepal's agriculture has suffered for two reasons. Firstly, it represents a country where Green Revolution types of technologies have not taken hold, resulting in declining or stagnant food grain production. Secondly, and more importantly, the country has suffered as a result of degradation and depletion of its agricultural resource base. Overuse and misuse of natural resource bases have become the characteristics of Nepalese agriculture. Chapter 3 reviews past and present agricultural development policies and plans, and provides environmental, institutional and policy context for the research.

While information given in chapters 2 and 3 derives from a review of literature and secondary sources, chapter 4 is based on empirical research. Chapter 4 presents the findings of research conducted in two small villages each in Gorkha, Tanahu and Nawalparasi districts, representing the mountain, the hills and the Terai respectively. The purpose of this chapter is to understand problem situations in sustainable agriculture and to examine farmers perceptions of sustainability and unsustainability of agriculture. It thus builds up problem situations for the present research and for examining development

efforts surrounding the introduction of sustainable agriculture. In addition, this section attempts to provide evidence for the issues raised earlier in chapter 1.

Part two describes theory and method. Of the three chapters comprising this part, the first one- chapter 5- explores critical issues and challenges facing sustainability, with a focus on sustainable agriculture. Chapter 6 is about intervention, particularly intervention for facilitating sustainable agriculture. The purpose of this chapter is to present an analytical framework for studying projects as examples of purposeful interventions (instruments of interventions). The research methodology is described in chapter 7. This chapter describes the physical settings, research methods and data collection procedures used for the study.

Part three presents and discusses results of my research. It consists of four chapters dealing with projects. Projects for the study were selected based on the findings presented in chapter 4. Chapter 8 describes a case of agroforestry. Chapter 9 discusses permaculture and chapter 10 is about community forestry. Last in the series, chapter 11 discusses an agricultural extension project of the Ministry of Agriculture.

Part four has two chapters. Chapter 12 is the core of this thesis. First, it synthesizes the findings from the cases discussed earlier and provides an integrated view against the piecemeal evidence that has emerged from them. Secondly, it combines together the lessons from the cases with other concrete experiences and theoretical insights in order to present my viewpoints with respect to intervention, keeping in mind the concerns of sustainable agriculture. Chapter 13 provides recommendations and discusses implication of this research. In addition, it reflects on the limitations encountered in carrying out this study and suggests further research.

Notes

1. The Theory of Himalayan Environment Degradation refers to the "Crisis" view observed by environmentalists such as Eckholm (1976) and others. The following gives the eight-point scenario of the theory as summarized by Ives and Messerli (1989):

a. Following the introduction of modern health care, medicine, and malaria suppression in the Terai after 1950, an unprecedented wave of population growth occurred which does not yet appear to have peaked. For Nepal as a whole it appears to have reached 2.6 percent per annum for the 1971-81 census decade but in many areas it exceeds 3 to 3.5 percent per annum. Nepal's total population in 1988 was probably in excess of 16 million.

b. This veritable population explosion, with an overall doubling period of about 27 years, is augmented by uncounted and uncontrolled illegal immigration from India into the Nepalese Terai across the open frontier. Furthermore, over 90 percent of the 1981 population was rural and subsistent. This led to rapidly increasing demands for fuelwood (more than 90 percent of Nepal's energy depends upon the combustion of biomass), construction timber, fodder (the domestic animal population has undergone a parallel, or even greater, increase to that of the human population), and agricultural land on which to grow food.

c. The next step in what has been described as a vicious circle, is that the needs of the burgeoning subsistence population are exerting increasing pressures on the forest cover. This has led to massive deforestation, amounting to a loss of half the forest reserves of Nepal within a 30-year period (1960-90) and a prediction that by the year 2000 no accessible forest cover will remain.

d. The deforestation, which includes the cutting of agricultural terraces on steeper and more marginal mountain slopes, has led to a catastrophic increase in soil erosion and loss of productive land through accelerated landslide incidence, and to the disruption of the normal hydrological cycle.

e. This situation, in turn, has led to increased run-off during the summer monsoon and increases in disastrous and massive siltation in the plains, and lower water level and the drying up of springs and wells during the dry season. Related ills are: rapid siltation of reservoirs; abrupt changes in the courses of rivers; spread of barren sand and gravel across rich agricultural land on the plains; and increased incidence of disease in downstream areas.

f. The increased sediment load of the rivers emanating from the Himalayan system is extending to the Ganges and Brahmaputra delta and causing islands to form in the Bay of Bengal. Among the evidence cited are extensive plumes of sediment that can be seen on LANDSAT imagery to extend several hundred kilometres into the bay.

g. The continued loss of agricultural land in the mountains leads to another round of deforestation to enable the construction of more terraces on which to grow subsistence crops. Yet, as the labour of walking greater distances from the village to the fuelwood supplies increases with the receding forest perimeter, a critical threshold is reached whereby the available human resources (principally female) become progressively overtaxed and an increasing quantity of animal dung is used for fuel.

h. Consequently, another vicious circle is linked to the first one: terraced soils are deprived of natural fertilizer- the animal dung now being used for fuel, thus depriving the agricultural terraces, in many instances, of their only source of fertilizer. This lowers crop yields. Also the ensuing weakened soil structure further augments the incidence of land slides. Even more trees are cut on more marginal and steeper slopes to make room for more agricultural terraces to feed the ever-growing subsistence population.

2. While there is no dispute that Nepal's population density per unit arable land is one of the highest in the world, the absolute figure might be found different in different sources. For example, data given in the Land Resource Mapping Project do not correspond with that of Agricultural Statistics of Nepal published by the Ministry of Agriculture (MOA). Likewise, the World Bank's figures do not conform to the MOA's figures.

PART I

UNDERSTANDING NEPAL AND ITS AGRICULTURE

CHAPTER 2

DEVELOPMENT OF AGRICULTURE IN NEPAL: AN ANALYSIS OF OPPORTUNITIES AND CONSTRAINTS

This chapter examines the present status of Nepalese agriculture. The purpose is to give an overview of the nature and extent of challenges posed to the agricultural sector, to understand the meaning of agricultural development in the context of Nepal, and to set the foundation for the present research.

2.1 Understanding Nepal

Nepal, a small country of about 14.7 million hectares, is sandwiched between the two largest and most populous nations of the world- China and India. Located between 80^0 15' and 88 ^{0} 10' E longitude, and 26^0 20' and 30^0 10' N latitude, the Nepalese state was founded in the late 18th century when Prithvi Narayan Shah, the king of the then small state of Gorkha, lying 60 km west of Kathmandu, conquered more than 60 other petty kingdoms. In the 1991 census, the population of Nepal numbered 18.4 million, which is 0.342 percent population of the world or, "one-third of one percent of the world population (Jha 1992). Of the total population, one third live in the Terai, and the remainder in the hills and mountains.

Until April 1990, Nepal was ruled by a partyless Panchayat system under a monarchy, which was replaced by a multiparty democracy with the king as a constitutional monarch following the people's movement for democracy in 1990. Prior to that, for the 104 years since 1846, the country was ruled by the Rana dynasty, by means of a hereditary prime ministership and a king with a ceremonial role. During this period, Nepal was effectively isolated from modernizing influences in agriculture, industry and social services. The people's revolution in 1950 brought an end to the Rana regime and established a multiparty democracy. However, in 1961, the multiparty democracy was put to an end through a royal takeover and the partyless Panchayat system was introduced.

Agriculture dominates the economy of Nepal and provides livelihood for about 90 percent of the population (CBS 1991). It accounts for nearly two-thirds of the GNP and 80 percent of the export earnings (MOF 1992). Grain production (rice, wheat, maize, barley and millet) accounts for about 60 percent of agricultural GDP, while the contribution of livestock is approximately 30 percent. Agriculture's importance to the national economy is indeed unquestionable. People, land and water are the only major resources the country has. Its industrial base is very weak and small, as the chances for Nepalese industries to survive and flourish are difficult, given India's much greater level of development, transport network, geographical advantage, and long, open border with Nepal. Development of hydroelectric power is not easy. It needs heavy investment and other considerations such as environmental impact and potential buyers. Ironically, more than 90 percent of the country's population have yet to get access to electricity, despite the fact that the country has 2.27 percent of the world's total estimated hydropower (Jha 1992).

Because the nature and types of farming systems in Nepal vary with topography and geographical location, this chapter begins with a brief description of the three major agroecological regions of the country. They reflect not only the opportunities and constraints to agricultural development but also illustrate the diversity and complexity of the farming systems in Nepal.

2.1.1 Agroecological regions

Nepal has five well-defined physiographic regions, namely the Terai, the Siwaliks, the middle mountains, the high mountains and the high himalayan regions. But for agricultural purposes its territory is commonly divided into three zones: the mountains in the north, the hills in the middle and the Terai plains in the south, stretching from east to west (Figure 2.1). The climatic conditions, major landforms, soil types, natural vegetation, production potentialities, the social and cultural settings of the people, ways of life, farming, food habits, etc. differ amazingly not only among the regions but also within the same region due to sudden changes in altitude. As a result, many different types of microclimatic pocket areas exist within the same district located in a particular agroecological region. Nepal is also a country of extremes. Within its borders are contained some of the most dramatic variations of landform and climate to be found anywhere in the world. Sill and Kirkby (1991) rightly say, "Diversity is the key word that describes Nepal".

The mountains

The region comprises land between 4,877 and 8,848 m above sea level in the Himalayan range, between 1,500 and 3,000 m above sea level in the Mahabharat mountains. Of the total land area of 147,481 sqkm, 35 percent are in the mountains. Approximately 7.8 percent of the population lives in this area. Areas with less steep slopes and narrow valleys are used for cultivation in the mountains. The upper limits of cultivation are 4,200 m elevation. These high regions can support only one crop of buckwheat, barley, or potatoes a year or once every two years.

High Himalayan areas are mostly rocky with snow fields and glaciers. Agricultural activities are limited to a minimal tilling of land. Raising of sheep, goats and yaks is common. Meadowlands in the area are used for grazing livestock. Rotational grazing is characteristic of the high altitude areas.

The hills

The hill region lies north of the Siwaliks in a belt 40 to 60 km wide running the length of country. Although the elevation ranges mainly from 800 to 2,400 m it includes peaks up to 3,000 m above sea level. Of the total land area, 42 percent is in the hill region. Approximately 45.6 percent of the population lives in this area. Cultivated areas lie in tars (river basins) and steep terraces. In the hills, 96 percent of the population are small farmers. In general, there are two basic cropping systems in the hills: one is based on rice production on wet lands, and another is based on maize and millet on dry land. In addition, potato is one of the main winter crops.

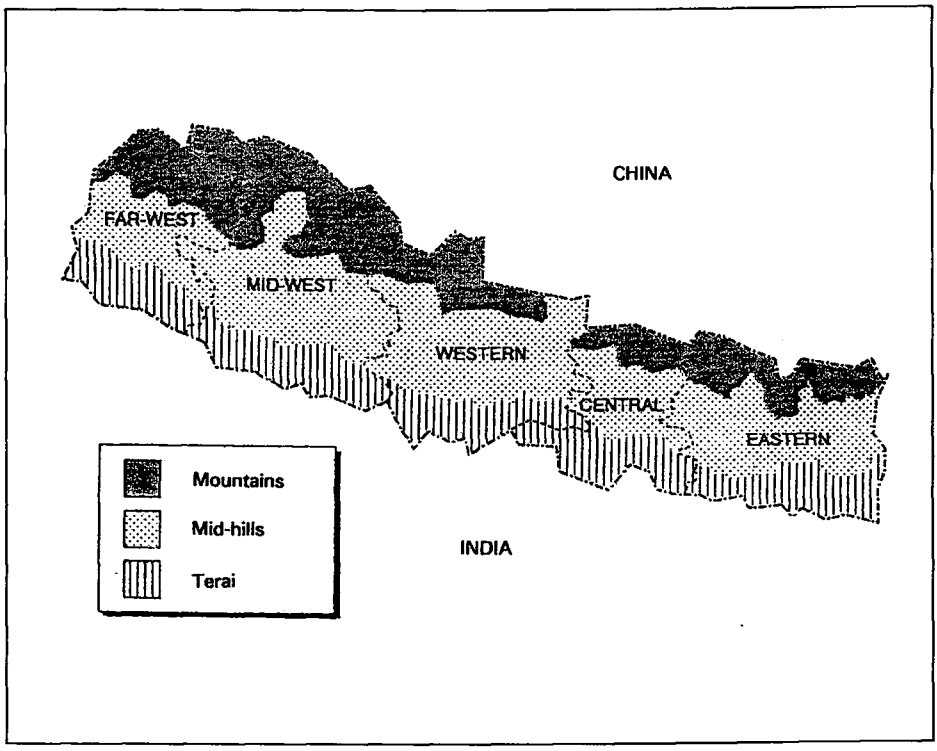


Figure 2.1 Map of Nepal by administrative and physiographic regions

Source: Abington (1992)

The Terai

The Terai, a flat plain stretching across 800 km length of the country, is an extension of the Indo-Gangetic plain. Elevation ranges from 60 m near the Indian boarder to about 300 m near the hills. This region ranges from 25 to 32 km in width. The climate in the area is sub-tropical. Although it comprises 23 percent of the total land area, agriculturally, this region is very important, often called "Grain Basket" of Nepal. The Terai is the major producer of cereal crops, cash crops, tropical fruits and vegetables. The major contribution of food grains in the overall agricultural GDP, 42 percent, comes from the Terai and the inner Terai region. Of the total arable land, 54 percent are in this region. Land holdings in the Terai average 1.5 ha per family. With more favorable soil conditions, a uniform climate, homogenous environment and more extensive irrigation, most of these farms are capable of producing a marketable surplus.

Table 2.1 summarizes the distinct features of the three agroecological zones of the country. This table shows that the population density of Nepal in relation to arable land is very high, probably one of the highest in the world. Not only is the population density with respect to arable land one of the highest, but average cultivated land per capita is perhaps smallest in the world, not exceeding 0.15 ha even in the Terai region.

Table 2.1 Major features of the three ecological regions

SN	Items	Physiographic Region			Nepal
		Mountains	Hills	Terai	
1.	Total area in sqkm[a]	51,850 (35 %)	61,530 (42 %)	34,100 (23 %)	147,480 (100 %)
2.	Cultivated land, in thousands of hectares[b]	208 (9 %)	904 (37 %)	1,299 (54 %)	2,441 (100 %)
3.	Population, in thousands of hectares[c]	1,444.5 (7.8 %)	8,411.3 (45.6 %)	8,606.3 (46.6 %)	18,462.1 (100 %)
4.	Forest area, in thousands of hectares[d]	1,408 (22.7 %)	3,251 (52.4 %)	1,542 (24.9 %)	6,201 (100 %)
5.	Pop. density/ hectare of cultivated land	6.94	9.30	6.62	7.56
6.	Forest area per hectare of cultivated land	6.77	3.60	1.19	2.54
7.	Cultivated land per capita, in hectares	0.14	0.11	0.15	0.13
8.	Forest per capita, in hectares	0.97	0.38	0.18	0.34
9.	Grazing land, in thousands of hectares[a]	1,137 (64.7 %)	546 (31.1 %)	74 (4.2 %)	1,757 (100 %)
10	Dominant farming systems	Live-stock	Horticult-ure	Cereal	-
11	Nature of farming systems	Subsistence		Partly market	-

Source:
a- Land Resource Mapping Project, Draft Economic Report, 1985
b- Agricultural Statistics, CBS, 1991
c- Population Census, CBS, 1991
d- Forestry Master Plan, 1988

2.1.2 Administrative and political structure

For administrative and development purposes the country is divided into five development regions and 75 districts. Development regions are constructed in such a way that every region consists of districts located in the mountain region, the hill region and the Terai region. Most of the ministerial departments have regional and district offices. The districts are further divided into 9 to 17 sub-districts (called *Ilakas* in Nepali) and 40 to 70 village development committees (VDCs) and a few municipalities (one to two). The Ilakas are intended as the administrative centres of four to six VDCs that are yet to be developed.

At the district level, the maintenance of law and order is the responsibility of the chief district officer. The district administration plays quite an important role in Nepal, as it is where ideas from the "top" and from the "bottom" converge, at local level. The local development officer, who is also the secretary of the District Development Committee, is the coordinator of all district level offices of development related sectoral offices of line departments such as education, agriculture, forestry, health, soil and water conservation, and women's development. He performs this role by the authority vested in him by the Decentralization Act 1992.

At the local level, the smallest political unit is the Village Development Committee (formerly Village Panchayat). Presently, there are 4,200 VDCs and 38 municipalities spread throughout the country. The functions of VDCs are to plan and implement village development works through the grant assistance of the central government, channelled through the District Development Committee, and to mobilize people's participation. They also perform other administrative, judicial and social activities entrusted to them by the law and government. Each VDC is further divided into nine wards consisting of several villages or hamlets (usually 15 to 20). Developmentally, the VDC is very important, as it is a territorially-based politico-administrative unit.

The political structure consists of three layers: at the local level, village and town councils having VDCs or municipalities as the executing body; at the district level, a district council with a DDC as the executing body; and at the center, the Parliament, with the Council of Ministries and corresponding line ministries as the executing body.

2.1.3 Farming systems

To fully comprehend the Nepalese farming systems it is first of all necessary to have an understanding of the system of land classification currently in use in Nepal, even though the system was initially conceived for the purpose of collecting land revenue from the farmers. Under the prevailing land classification system the land is generally classified into two mutually exclusive types: Wetland *(Khet* in Nepali) and Dry land (*Bari /Pakho* in Nepali).

Khet refers to the land where water can remain on the surface or the upper soil layer, making it suitable for rice cultivation. As rice is the most prestigious grain crop in the country, farmers measure their wealth according to the amount and type of *khet* they own. Up to 900 m above sea level, it is possible to produce three crops per year on *khet*, and this system is

usually based upon two crops of rice and one of winter wheat. From 900 to 1,800 m above sea level two crops per year are grown, one of rice and the second another a winter crop of wheat, maize or vegetables.

Dry land (*bari*) refers to any land other than the wet lands that for various reasons cannot be flooded for rice cultivation. Maize is the most dominant crop and is grown on 81 percent of the rainfed land in the country, usually relayed or followed by a cereal crop, pulse, or mustard. Rainfed cultivated land (*pakho* or *bari*) accounts for 1,717,000 ha (64 percent) of the total cultivated land in Nepal.

Since *bari* and *khet* indicate nothing concerning fertility, they are further graded arbitrarily into four categories depending on the availability of water for irrigation and production capacity , namely *awal* (the best land, with year-round irrigation), *doyam* (medium), *sim* (not bad) and *chahar* (poor). The taxes are levied based on these land classification systems.

With these brief notes on land classification systems in Nepal, the following paragraphs briefly describe the Nepalese farming systems.

As I have said earlier, in Nepal the dominant farming systems vary with physiographic region. In general, livestock-based farming systems dominate the mountains, horticulture-based farming systems the hills, and cereal-crop based farming systems the Terai. Nonetheless, farming systems are generally mixed, subsistence and dependent on the use of resources from the forest. In the Terai, farmers have begun to produce for the market due to improvements in transport and communication system and better transport connections with Kathmandu and other big cities. Of the three regions, the Terai is nearest to the Indian border and has uniform climate and fertile plains.

The basic unit of farming in the hills is the individual farm, which consists of four main components: the farm household, the land it cultivates, the livestock it holds, and other available areas that may include privately owned forests, pastures and other lands. Any changes in one component will then obviously exert a significant influence on the others. Numerous cropping patterns exist in the hills, and crop combinations vary greatly with altitude, climate and soil. Figure 2.2 shows the principles of cropping systems in the hills diagrammatically.

In Nepal, forests are as integral part of the farming system as are arable land and livestock. But one would definitely notice decreases in dependency on the forest resources as one moves south from the northern mountain region to the Terai plain. Figure 2.3 illustrates a general hill farming system of Nepal, showing how each household draws on the resources available to it for its sustenance, and influences the biological ecosystem surrounding it.

This complex nutrient transfer system also helps in maintaining the fertility of cultivated land to a great extent. Estimates show that from 3.5 to 6 hectares of forest land are required to support each hectare of cropland in these areas (Denholm 1991). Monocrop or specialized farming is rare, even in the Terai. Vegetables and fruits are commonly grown in home gardens, irrespective of region.

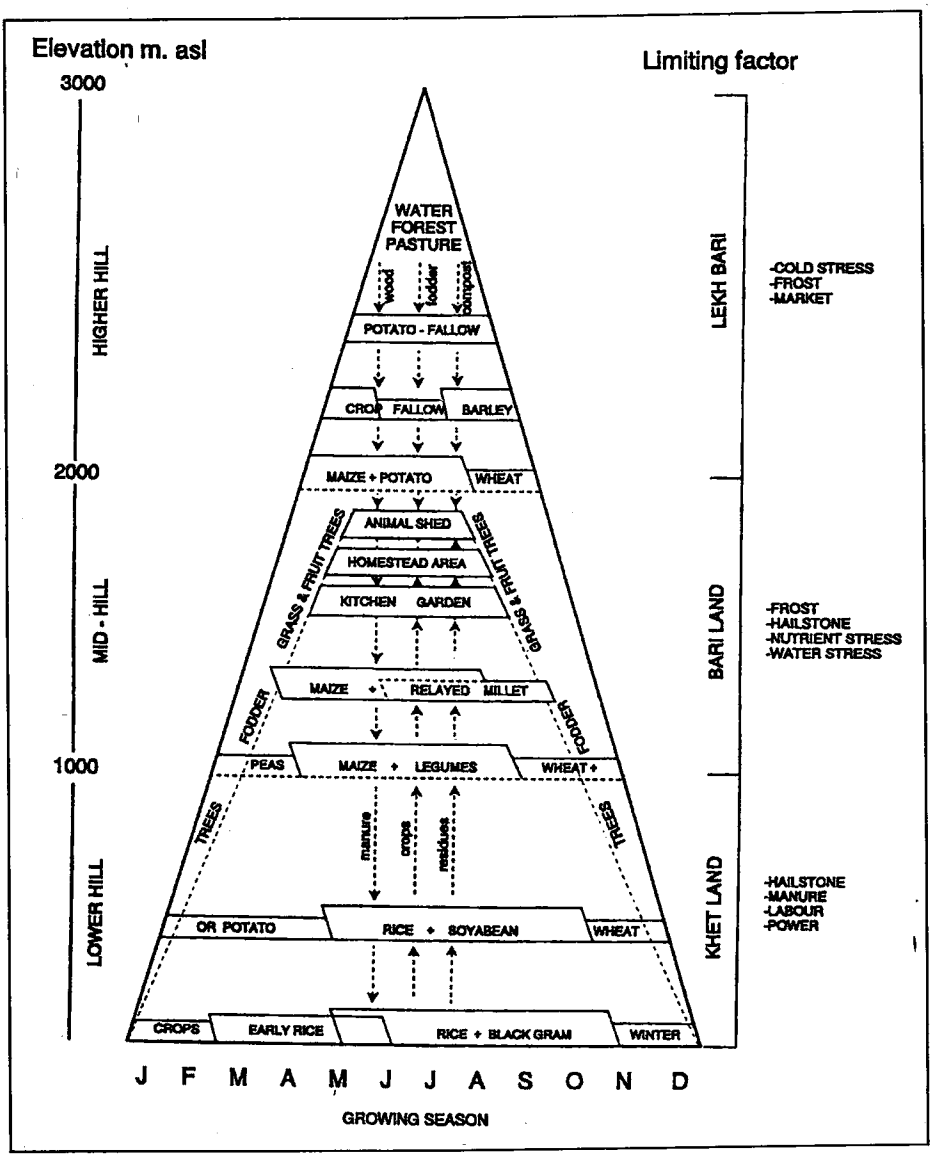


Figure 2.2 The farming systems in the hills of Nepal as influenced by altitudinal variations

Source: Sthapit (1983), cited in Abington (1992)

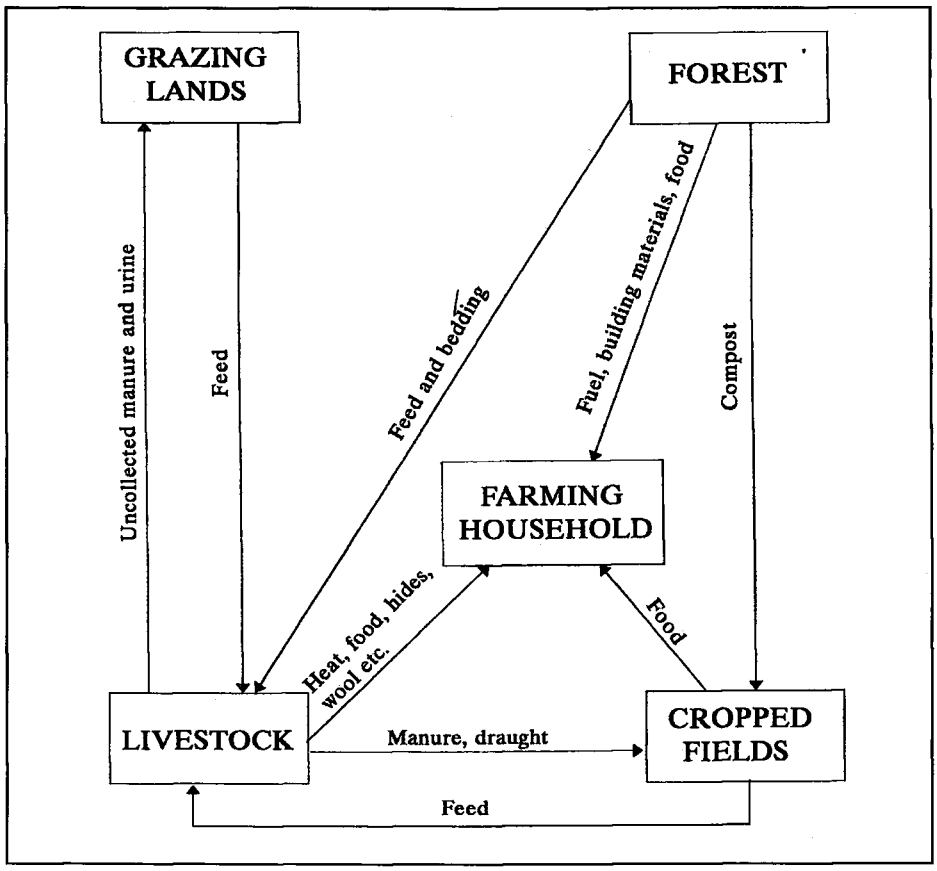


Figure 2.3 Interrelationship of livestock with forests, agriculture and human subsistence in a typical middle hills agriculture area

Source: LRMP (1986)

2.1.4 Farm size and land fragmentation

As a result of heavy population pressure on land, most farms are small in Nepal. The 1991/92 National Sample Census of Agriculture showed further decline in average farm size, from 1.12 ha to 0.95 ha. The problem is relatively more acute in the hills, over 62 percent holdings are less than 0.4 hectares and 28 percent of holdings are in between 0.4 and 1.0 hectare. Quite contrary, in the Terai, 53 percent of the holdings are larger than 1.7 hectares, of which 22 percent are larger than 5.1 hectares.

The change in distribution of households among farmers with different land holding sizes of the two censuses in 1981 and 1991 respectively is shown in Figure 2.4.

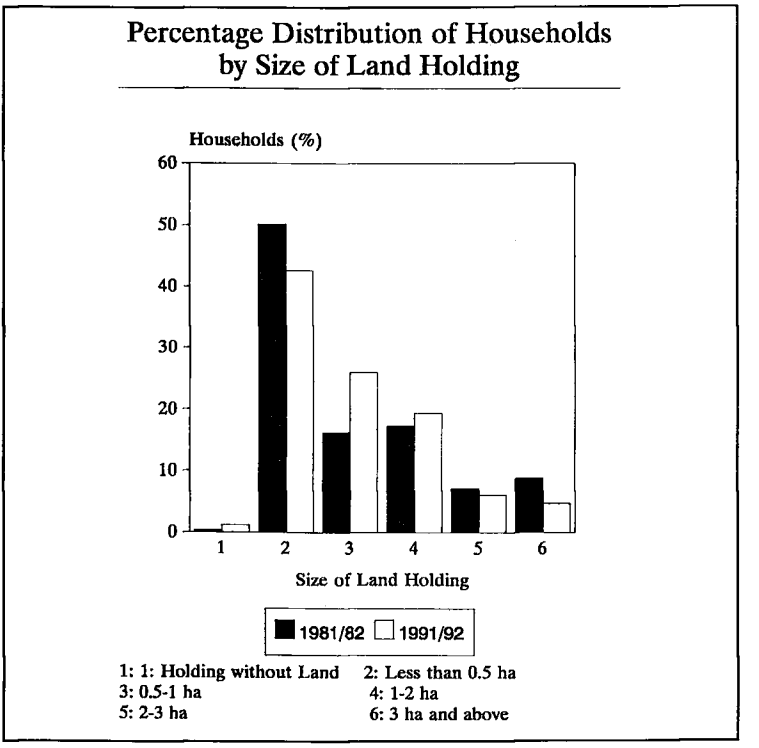


Figure 2.4 Percentage distribution of households by size of holding (1981/82-1991/92)

The figure shows that half of households had less than 0.5 ha of land in 1981 and still less in 1991. This means that a great number of small farmers with holdings less than 0.5 ha in 1981 were further marginalized, squeezed out of agriculture and switched to other professions. As a result, number of landless laborers increased over a period of a decade. In 1981/82, there were about 8,000 landless laborers which increased by more than 300 percent to 32,109 in 1991/92.
(1981/82-1991/92).

Not only are farm sizes small in Nepal, but they are also fragmented. As a result, farming units are smaller and less economical.

These are the characteristics of Nepalese agriculture. The next section examines the present status of the use, misuse and overuse of natural resources, especially the agriculture resource base. This information establishes the environmental setting for the research.

2.2 Agricultural resource base

Similar to those of many other developing countries, many official statistics in Nepal are characterized by unreliability, gaps, over-aggregation, inaccuracies and mutual inconsistencies (Balogun 1989, Gill 1992). Keeping this in mind, the following sections have attempted to understand use, misuse and overuse of agriculture resource base in Nepal.

2.2.1 Land resources

Although some discrepancies exist among different sources of agricultural statistics in Nepal, in general, nearly 18 percent of the total land area is reported to be in cultivation. Table 2.2 gives the detailed land use pattern.

In Nepal, many people believe that continued population pressure on land resources in the hills and mountains (of Nepal) has resulted in expansion of farming into marginal cultivable land, with ensuing environmental degradation - soil erosion, loss of soil fertility and deterioration of forests and forest covers (NARC-ADB 1991). However, some researchers (Carson 1992, Balogun 1989; Tamang 1992) question this over-simplistic statement.

Carson (1992) argues that areas cultivated in the hills, far from increasing, is actually declining, as a result of loss of organic matter, growing soil acidification and the increase of aluminum toxicity in the land. Similarly, presenting detailed analysis of cultivated areas for the Western Development region of the country, Balogun (1989) concluded that the apparent trend of increasing cultivation in the hills is actually due to the substitution of previously-used census figures in the official estimates with the results of a cadastral survey. To date, of the 75 districts of the country, the cadastral survey is completed only in 55 districts.

Table 2.2 Land use pattern

S.N	Types of Land Use	Area (Sq. Km)	Percent
1.	Agriculture	26,533	18.0
2.	Forest	55,334	37.6
3.	Snow	22,463	15.3
4.	Pasture	19,785	13.4
5.	Water	4,000	2.7
6.	Settlements and Roads	1,033	0.7
7.	Waste land, Barren land	18,033	12.3
	Total	147,181	100.00

Source: LRMP (1986)

2.2.2 Forest resources

Following demonstration of the fact that forests and farming are related, particularly in the hills and mountains, people in all sectors have begun to realize the value of forests. In addition to the direct commercial value of forests, their greatest value to the economy is as providers of essential inputs to the farming system. The forest is the foundation upon which the sustainability of hill agriculture is based. It provides raw materials in the form of forage and fodder from animals. This farming-forestry-livestock relationships has begun to weaken in areas where forest resources are scarce and where a strong influence of market forces on farming exist, resulting in a significant transformation in agriculture. In such areas, most of the material inputs previously derived from forests have been replaced partly by market products and partly by farm products.

Forest depletion has been an ongoing process in Nepal since the colonization of the sub-tropical hills. Agrawal et. al.(1985) reported further decline of the forest area from 48,230 sqkm to 40,997 sqkm, a decrease of about one-sixth between 1975 and 1980. However, the rate of forest depletion varies widely among different physiographic regions.

Table 2.3 reveals that nearly 90 percent of all forest area lost was in the Terai plain at an annual rate of 1.8 percent and about 0.2 percent in the hills. The mountains seem to have gained marginally. Forest degradation, rather than complete loss of forest cover, seems to be the typical case. There is virtually no forest with a crown cover greater than 70 percent in the Western, Central, and Eastern Development Regions (Deboer 1989). This means that in the hills, forest depletion should be judged by the density of crown cover. The general pattern is one of low density forest in regions of high population density, mainly in the hilly areas.

Table 2.3 Forest depletion by physiographic regions, 1979/86

Elevation Zone	1979 ,000 ha	1986 %	Change %	Annual Rate
Mountains (High himal+High mountains)	2,034.6	2,037.7	+ 0.2	0.0
Hill (Middle mountains)	2,203.4	2,198.6	- 0.2	- 0.0
Inner Terai (Siwaliks)	1,476.0	1,468.6	- 0.5	- 0.1
Terai Plain (Terai)	592.7	521.7	- 12.1	- 1.8
TOTAL	**6,306.7**	**6,225.6**	**1.3**	**- 0.2**

Note: Land Resources Mapping Project terminology is given in parentheses

Source: Ministry of Forest and Environment (1987)

Despite various harmful effects generally associated with deforestation, such as desertification, soil degradation, erosion, floods and even climate changes, Gurung (1989) claimed that there is no scientific evidence in Nepal to support such phenomena. Nevertheless, he relates forest depletion to two major phenomena, declining of agricultural productivity and increasing migration from the hills and mountains. In a way, they are interrelated. Depletion of forests leads to reduction of nutrient supply in the soil and decline in productivity. Decline in productivity in turn induces migration to new areas.

Even if, the question of expansion of cultivated land in the hills is disputable, the expansion of cultivation in the Terai is a reality. In the Terai, forests have been heavily depleted during recent decades as farmers have moved from the hills to the Terai (and from India) and cleared forests for cultivation. Government resettlement programs, eradication of malaria in the 1950s, declining soil fertility and land fragmentation in the hills are among the major factors inducing the expansion of the agricultural land in the Terai.

To sum up, expansion of agricultural land seems already to be reaching its limit in the Terai, although there might be some potential for further development of land there through the expansion and development of groundwater and storage systems, as is now being done in the Central Terai and some parts of Eastern and Western Terai. But, it is hard to comment on it in the absence of detailed feasibility studies.

2.2.3 Pastures and rangelands

Rangelands are an important natural resource in Nepal, and comprise 1.6 million ha or about 12 percent of the total land area of the country. The number of animals exceeds the carrying capacity of the land in many cases. Approximately 70 percent of the livestock population of the country is found in the mountains and hills. Due to increased numbers of animals, overgrazing has now become a common phenomenon in the mountains and hills. Many rangelands Nepal have been degraded, causing loss of biodiversity as a result of inappropriate management practices (HMG 1988).

2.2.4 Water resources

Although Nepal is said to be rich in terms of surface and underground water resources, most of agriculture is still rainfed. According to NPC, Nepal's irrigation potential is 1.9 million ha for the Terai and 0.3 million ha for the hills. However, the net command area is currently estimated at 1,089 553 ha (about 50 percent of the potential area), which includes both the systems developed by public sector agencies (governmental and semi-governmental) and farmers. Of the net command area, about 71 percent is in the Terai, 24 percent in the hills and 5 percent in the mountains. Most of these facilities are seasonal in nature. Government irrigation covered 525,706 ha (23 percent of the total cultivated land) by the end of the seventh plan (1989/90). About 60 percent of the area covered by surface irrigation systems was developed by farmers (Thapa and Koirala 1992). Of the total irrigated area, 350,000 ha are under agency management and the rest (68 percent) are managed by farmers.

These are the major characteristics of Nepalese agricultural systems and their dependence on forests and other natural resource bases. The next section moves on to the present agricultural production situation in the country.

2.3 Area, production and yield of major crops

More than half (approximately 55 percent) of the value of the Agricultural GDP is derived from the three major crops- rice, maize, and wheat. But the average yield of these crops is low and fluctuates from year to year. Table 2.4 shows the annual growth rates of area, production, and yield of major crops in the last two decades. This table reveals that yields of rice and maize stagnated or declined in the mountains and hills and production increase was achieved solely due to an increase in area planted. In the 1970s, rice area, production and yield stagnated in the Terai as well. However, rice production and yield increased at an impressive rate in this region in the 1980s, and the area did not change significantly. Thapa and Koirala (1992) showed that the impressive growth of productivity in the Terai in the 1980s can be explained by several factors. First, irrigation development in the public sector was concentrated in the Terai in the past. Second, most modern rice varieties are suitable for the Terai. Third, production programs implemented by the government have emphasized the delivery of support services and inputs to promising areas of the Terai. But, the lower than average growth rates in production and yield of wheat in the Terai during the 1980s as compared to the 1970s suggests either that wheat cultivation expanded into marginal lands or that productivity declined. The negative growth rate of millet in the Terai further suggests declining productivity in the Terai.

Likewise, using the official data of the Ministry of Agriculture, Farrington and Mathema (1991) also reported a decline of 17.4 percent yield in maize yields in Nepal, against a 24.4 percent increase in maize cultivation between 1975 and 1985. The situation in the mid hills was still the worst as yield declined there by 25.9 percent, against a 39.6 percent increase in area.

Table 2.4 Annual growth rates in percent of area, production and yield of major food crops by ecological zones, 1967/68 to 1989/90

Crop	Mountain			Hills			Terai		
	1968-90	1970-79	1980-89	1969-90	1970-79	1980-89	1968-90	70-79	80-89
Area									
Rice	3.36	5.70	5.35	3.45	1.91	6.35	0.35	0.77	0.20
Wheat	1.17	-10.04	15.68	5.87	3.86	8.87	5.60	9.40	2.52
Maize	1.41	0.50	3.23	3.50	1.01	8.67	0.27	-0.83	10.18
Millet	2.56	0.79	5.21	2.56	1.21	5.97	-2.29	-0.17	-7.23
Potato	2.30	2.06	6.52	2.70	2.41	4.78	2.49	-3.72	10.18
Produc.									
Rice	2.35	3.88	4.72	2.28	1.29	5.57	1.17	0.57	3.48
Wheat	0.39	-12.72	14.42	5.93	4.42	8.09	8.43	13.32	4.69
Maize	-0.24	- 0.71	2.60	1.32	-0.93	6.81	0.38	-1.10	2.69
Millet	1.25	1.33	4.20	1.40	0.60	5.18	-1.81	-0.51	-6.18
Potato	4.25	1.75	7.67	3.41	1.80	6.13	3.33	-1.90	15.96
Yield									
Rice	-1.51	- 1.82	-0.63	-1.17	-0.62	-0.78	0.82	-0.10	3.28
Wheat	-0.78	- 2.68	-1.26	0.06	0.56	-0.78	2.83	3.92	2.17
Maize	-1.55	- 1.21	-0.63	-2.18	-1.94	-1.86	0.11	-0.27	-7.49
Millet	-1.30	- 0.44	-1.01	-1.16	-0.61	-0.79	0.48	-0.34	1.05
Potato	1.45	- 0.31	1.51	-0.71	-0.61	1.35	0.84	1.82	0.98

Source: Computations based on DFAMS Data (Adapted from Thapa and Koirala 1992: 25)

2.4 The role of livestock

The importance of the livestock sector in the Nepalese economy can not simply be attributed to its contribution to the agricultural GDP, which is roughly about 30 percent. As has been stated earlier, agriculture in Nepal is subsistence-based and very complex, with a mutual interdependency of crops, livestock, and forest resources. Table 2.5 presents result of a survey done by the Nepal Rastra Bank on cash income and labor use for livestock in different regions of the country.

Table 2.5 Household income and labor utilization pattern

	Terai	Hills	Mountains
% cash income from livestock	9.7	19.7	21.2
Man days used for livestock	64.0	73.0	51.0

Source: Nepal Rastra Bank (1988)

The above table shows that the contribution of livestock to cash income was highest in the mountains as compared to the hills and Terai despite the lowest man days used for livestock there.

Although the strategies of farming households to own and utilize several species of livestock at the same time has helped farmers to spread risks over several species and make better use of plant resources within the livestock production systems, it has resulted in increasing pressure on fodder supplies and declined productivity of individual animals. Rajbhandary and Shah (1981) reported that in the hill areas the current livestock stocking rate is nine times larger than the carrying capacity of the forest. This has led to rapid deforestation, and consequently to serious problems of soil erosion. But for smallholders, livestock are also the means of saving and investment as well as a source of food, income and employment for the family.

Having given these short descriptions of the agricultural production situation in the country by ecological regions, this chapter next looks into some major socio-environmental problems.

2.5 Socio-environmental problems

2.5.1 Soil erosion

In Nepal, although hill slopes up to about 45 percent are cultivated (Lal 1988) and loss of soil is estimated at an annual rate of 20 to 25 metric ton per ha and in critical areas up to 200 metric ton, lack of reliable data and records makes it difficult to assess the extent of soil erosion and its consequences for Nepalese agriculture. According to Blaikie and Brookfield (1987), of the various types of land in Nepal, charan land (grazing), including abandoned cultivation patches, and *pakho* land are the most seriously affected, followed by *khet* land.

2.5.2 Energy crisis

Fuel wood shortages due to decreased crown cover in forests and a growing population have increasingly led farmers to use dung as fuel, rather than as fertilizer, which in turn could adversely affect agricultural yield. Table 2.6 details energy consumption in Nepal.

Table 2.6 Structure of energy consumption in Nepal

Total consumed energy in thousands of Kcal

S.N	Form of Energy	1979/80	%	1987/88	%
1.	**Traditional**	4,4471.1	96	8,513.0	96
	a. Fuel wood	4,4340.8	93	6,433.0	72
	b. Agricultural waste	77.1	2	1,116.0	13
	c. Animal dung	29.2	1	964.0	11
2.	**Commercial**	209.2	4	383.7	4
	a. Petroleum	157.9	3	287.6	3
	b. Coal	31.4	0.6	46.0	0.5
	c. Electricity	19.9	0.4	49.4	0.5
	TOTAL	4,656,3	100	8,896.0	100

Source: Ministry of Finance, 1988

2.5.3 Migration

Due to small farm sizes in the hills and mountains, along with a lack of on-farm and off-farm opportunities, lack of resources and other constraints, farmers from the mountains and hills often migrate to the Terai, permanently or seasonally. As a consequence of this steady migration, the proportion of population in the mountains decreased from 9.9 percent in 1971 to 7.8 percent in 1991, while that in the hills from 52.5 percent to 45.6 percent in the same period. Even with migration, total population in the hills and mountains has increased, as shown in Table 2.7.

Table 2.7 Population changes by agroecological region

Region	1971		1981		1991	
	Million	%	Million	%	Million	%
Mountains	1.1	9.8	1.3	8.7	1.4	7.8
Hills	6.1	52.2	7.2	47.7	8.4	45.6
Terai	4.3	38.0	6.6	43.6	8.6	46.6
Nepal	11.5	100	15.1	100	18.4	100

Source: CBS (1986, 1991)

The proportion of the population in the Terai has increased from 38 percent to 46.6 percent. Of these migrants to the Terai, 61.3 percent originated in the hills and 30.3 percent in the mountains. On the one hand, seasonal, circular, and permanent migration have been helpful in partly sustaining the economy of the mountains and hills since the mid-19th century (Gurung,1989). On the other hand, these processes have led to another set of societal problems such as unemployment and cheap labor. Farm sizes in the Terai have become further fragmented and smaller. This has often led either to pushing out the indigenous inhabitants of the Terai (Tharu, Majhi, Danuwar, etc.) towards the marginal lands or forests, or changing them from landowners to tenants.

2.6 Summary

This chapter provided an overview of Nepal and the present status of its agriculture in its three agroecological regions. As indicated in this chapter, Nepalese agriculture involves highly complex interaction and interdependence among crops, livestock and forest resources, although such interdependencies decrease while moving from north to south. The purpose of presenting these data and figures was to:

- urge that in any attempt to improve the performance of agricultural systems in the country one needs to consider agriculture in all three regions- the mountains, the hills and the Terai simultaneously.

- demonstrate the necessity of searching for appropriate intervention strategies and approaches to sustainable agriculture in Nepal.

CHAPTER 3

POLICIES AND INSTITUTIONS FOR DEVELOPMENT OF AGRICULTURE IN NEPAL

The purpose of this chapter is to examine past and present agricultural development policies and plans within the context of sustainable development of agriculture, and so to provide policy and institutional contexts for the present research. In this chapter, I will first review the past policies and then examine present ones. Any analysis and description of policies would remain incomplete unless some historical accounts of past development plans and efforts are examined. The successes and failures of the past provide avenues for learning. As an old adage has it, " If one does not read or heed history, one is destined to repeat it- mistakes and all".

3.1 Past development policies

The history of development planning is not old in Nepal and dates from 1951- the year in which the monarchy resumed control of the state after 104 years of rule by the Rana regime. Although the incoming regime immediately began planning the development of Nepal, it experienced severe difficulties due to an almost nonexistence of suitably skilled labor, and almost no data on the state of the economy (Sill and Kirkby 1991). Besides, there was hardly any institutional base with which the development of agriculture could be initiated. This means that it started virtually from a zero base. However, the country has completed seven periodic plans, the first of which was initiated in 1956, and now is undertaking the Eighth Five year plan (1992-97). Annex 3.1 summarizes past and present agricultural development objectives and policies.

Ironically, one can find hardly any documents in Nepal or elsewhere which hail the performance of the Nepalese agricultural sector. There are a number of causes for this. Some concern policy matters, some relate to implementation problems and some are institutional. For some, the cause was the shortcomings in the formulation of motivating programs and more so in the ineffective implementation of such programs, rather than the articulation of plans, policies, and strategies for agricultural development (Shrestha 1988). Against this background, this chapter attempts to examine policy issues.

3.1.1 Agricultural development strategies

Flaws in policies

Agricultural development strategies of the past years, which required concentration of productive resources in the areas of greatest potential, served to direct agricultural services towards the needs of the farmers in the "most potential" areas. The arable areas were to be categorized into three categories, 'special', 'pocket' and 'general' depending on factors such

as availability of irrigation water, road access and market facilities. As a result, areas of rainfed agriculture and upland farming were generally bypassed because these areas would automatically fall under "general areas" (Rana et.al. 1988). The results of such a program would be obvious. This program was clearly not in the interests of small and marginal farmers who are mostly found living in 'general' areas. Indeed, this strategy motivated the research and extension services to serve rich and resourceful farmers. These services have been already championed to serve the interests of resource-rich farmers worldwide (Chambers and Jiggins 1986).

In addition, the other agricultural development strategy endorsed and standardize a general policy for developing livestock in the mountains, horticulture in the hills, and cereal and cash crops in the Terai. However, it failed to take into account the immense variation within and amongst the ecozones of the mountain region. As stated by Denholm (1991), the conventional development interventions, with their biases towards uniform and standardized contexts, treated diversity as a major constraint to development and then happened to replicate options evolved in non-mountain situations. Naturally, this policy overlooked the intricate relationships among livestock, forests and crop production of Nepalese farming systems.

Concentration of development in the Terai was another cause of the considerable migration of people out of the hills to exploit better agricultural opportunities there, following the clearing of the forests and the eradication of malaria. Population in the Terai is still increasing at a rate of 4.2 percent per anum, compared with that in the hills of 1.6 percent, and a national average of 2.1 percent. According to official statistics, in spite of migration out of the hills, the land area under cultivation in the hills has continued to increase. This has had a detrimental effect on remaining areas of natural forest, as arable cropping spread into more and more marginal areas.

In addition, inadequate understanding of problem situations has been one of the serious constraints in implementation. This was evident in an environmental conservation project launched in the Sagarmatha area (Mt. Everest) in 1976. The project was initiated with the objective of saving the Sherpas' (agro pastoralists, growing potatoes and herding yak and other livestock) mountain homeland both from themselves and from the swelling numbers of visitors drawn to that area. The idea of a national park in the Sagarmatha area was conceived in direct response to concerns about environmental crisis and an underlying sense of urgency. But, according to Brower (1991), people started to worry and took it as an intervention to halt them from wood-cutting when rumors of impending park status began to circulate in Sagarmatha areas. As a result, the Sherpas went into their forests, and disregarded their own traditional prescriptions on indiscriminant felling. They stockpiled fuelwood and construction timber to the extent that began to rot by dozen in the Sherpas' yards. When park planners bought up villagers goats and placed restrictions on goat keeping, they had few difficulties. The goat owners were mostly untouchable Kamis and recent Tibetan immigrants- people, who lacked representation in village affairs and ranked low in the concern of their neighbors as well, but for whom a few goats provided essential manure, milk and salable meat. However, the Sherpas could not understand: "Why worry about these goats, when it is *zopiko* (crosbreed yak-cow males) that eat young fir trees?". Some said, "Today the park takes goats- next time may be *zopiko*". Many Sherpas saw the park as intrusive, arbitrary, insensitive, and even stupid. Thus the bigger picture of man-environment interactions in the

Himalayas-Ganges system was misconstrued. Brower says, "The national park idea is a Western idea- an American construct that fits an unpeopled landscape and wide-open wild spaces". It was predicated on an apparently erroneous assessment of the nature, degree, and place of environmental deterioration in the High Himalayas.

Flaws in implementation

As in the case of policy, several flaws in implementation can be noted. However, several of these flaws stem from differences and shortcomings in policies. We could take the example of food subsidy programs in the hills and mountains. Even if we forget for a while the possible impact of this food subsidy as a direct disincentive for the farmers in the hills and mountains to produce more, it has failed to meet its objectives because the bulk of grains procured under the subsidy program have been distributed in the Kathmandu valley in the first place, and the main beneficiaries in the hills and mountains are government officials in district headquarters (Thapa and Koirala 1992).

In general, plans in the past expected to promote generation, dissemination and adoption of modern agricultural technologies to achieve productivity, by providing and strengthening support services such as fertilizer, pesticide, credit distribution and irrigation facilities, and through the expansion of bureaucratic networks. As a result, top-down policies prevailed in practice, despite the government's intentions of institutionalizing decentralization. Recently, Paudyal (1994) found decentralization no more than a "window dressing" to obtain the continuous support of the international community and aid donors. Extensive institutional arrangements and procedural formalities made it virtually non-existent at the local level.

The lack of inter-institutional coordination, and lack of scope of discussion, debate and acknowledgement of failure, were other problems. We can cite a sweet orange (Junar in Nepal) development project implemented in two hilly districts of central Nepal, Sindhuli and Ramechhap. I was one of the major actors in this program. I worked first in Ramechhap district as District Agriculture Development Officer, and then was transferred to Sindhuli district.

In 1978, when the government designated Ramechhap and Sindhuli districts as sweet orange districts, the Ministry of Agriculture set an ambitious target for them without taking into account resources available such as manpower and finance, or the likely impact on other programs and activities of the district. Although the government designated this program a national priority project, it appeared only so for the Ministry of Agriculture. The other ministries took it differently, as the target remained within the Ministry of Agriculture. The Ministry of Finance was slow in approving the budget. With much reluctance, this ministry approved the budget for the program, but the Ministry of General Administration didn't approve any additional manpower. The latter ministry had set rules and regulations for manpower for any program or project. For the staff of the Ministry of Agriculture, these requirements were not only difficult to fulfill and rigid, but were also absurd and stupid. For the Ministry of General Administration, these rules were practically "lessons from the Bible". The hidden agenda of this Ministry was to stop increasing the size of an already expanding bureaucracy. Thus, the objectives of the two ministries clashed utterly. This, in turn, negatively affected not only that particular national priority project, but all other agricultural

development programs. The limited resources of the district were diverted to the priority project. As Paudyal (1994) stated, there was no scope for discussion, debate or even for acknowledgement of the failure of this project because it originated from the top, the highest level.

Although Nepal's forest policies are known around the world as progressive for their aim to turn control of nationalized forest lands over to local communities (Denholm 1991), there are several flaws. Since this issue will be raised while discussing the case on community forestry (Chapter 10), it suffices here to say that villagers are uncertain about their ownership of community forests established in their areas. They are also confused about their rights and are reluctant to use them without the written permission of a forestry officer (Gautam 1986). This brings us to van Woerkum's comment (1992): "A law does not work because it is a law. It heavily depends on carefully developed and implemented communication strategies".

Institutional problems

Frequent reorganizations of the Ministry of Agriculture destabilized the agricultural sector (Basnyat 1991). Annexes 3.2 and 3.3 present the history of agricultural research and extension services respectively. These frequent reorganizations have not only created confusion among the staff, but also tended to make them further commodity- or sector-biased. The last reorganization was in 1991/92, which brought the previously fragmented extension services under a single command structure within the Department of Agriculture Development. The new reorganization is said to have been introduced with a view to overcome existing top-down planning, weaken the technology transfer bias and reorient agricultural organization to deal with farmers' realities. Although the long-term impact of this reorganization is yet to be seen, it has already been changed or adjusted several times, following reported problems from the field and farmers. There is still confusion and it has created a severe institutional problem. Struggles among staff from different disciplines have now become common, rather than an exception. This has further weakened planning of already weak programs at field level (Kayastha et.al. 1989).

In addition, review of past policies and programs shows that plans were dominated by a narrow sectoral approach even though the agriculture production system comprises food crops, livestock, horticulture, forestry, etc. There is a lack of coordination among ministries related to natural resource management and within the Ministry of Agriculture as well (FAO 1994). Government ministries and their respective departments have their own program, many funded by external aid, and too frequently suffer from a lack of coordination. District level planning, as a result, becomes difficult in the extreme. Moreover, plans and programs are rarely coordinated vertically. District-level staff, for instance, are normally not involved in regional-level planning procedures and regional staff are not involved in central-level planning. As a result, there is little contact or cooperation between various services, and the approach towards hill farm development is fragmented and does not effectively take into account the integrated nature of all necessary components of the hill farming systems (Abington 1992).

With these general remarks on past agricultural development policies and strategies in mind, the next section examines agricultural research and extension policy specifically as it directly relates to this study.

3.1.2 Research policy

Presently, apart from Nepal Agriculture Research Council (NARC), the following organizations also conduct agriculture-related research and studies.

- The Royal Nepal Academy for Science and Technology (RONAST)
- The Institute of Agriculture and Animal Science (IAAS) of the Tribhuvan University
- The Institute of Science and Technology (IST) of the Tribhuvan University

However, the magnitude of research in these organizations is very limited, and they have important roles apart from conducting research in the agriculture sector. Hence, NARC together with its 12 central technical divisions, 16 commodity programs and 20 research stations distributed throughout the country, form the agricultural research network, the National Agricultural Research System (NARS). Annex 3.2 gives a chronological history of Nepal's public sector agricultural research organization. For purposes of this research, this section focusses on the functioning and operation of the government research system, although some externally funded research stations, such as Lumle Agricultural Research Centre and Pakhribas Research Centre, have developed several institutional innovations and mechanisms useful in overcoming present weaknesses and shortcomings observed in the NARS.

Many research reports and studies sponsored by the government, indicate that in the past there was no system for planning research according to agricultural development policies or allocating resources commensurate to national priorities and targets (NARC-ADB, 1991). Research was often conducted that did not take into account the needs of the specific target groups, by concentrating on cereal crops; research neglected the horticulture and livestock sectors. Kayastha et al (1989) have noted a number of factors responsible for the limited performance of agricultural research in Nepal. These include:

- the lack of a well-defined operational strategy;
- inadequate facilities at research farms and stations;
- poor feedback systems limiting the flow of information between researchers and farmers;
- unscientific monitoring and supervision of research programs and staff;
- wasteful competition between research programs and prioritized production programs for scarce resources; and

- financial procedures and management systems that are not responsive to the seasonal nature of research and other reasons for delayed release of required budgets during critical periods.

However, the role of agricultural research in Nepal should stem from the need to generate and disseminate technologies that can enhance land productivity as well as augment the carrying capacity, fragile and marginal as it is.

3.1.3 Extension policy

In Nepal, agricultural extension is presently viewed as an implementation agency to reach the production targets of the National Development Plan. As a result, it has become production-oriented with a strong technology transfer bias (Compton 1993, Sen 1994). Setting production targets for extension has encouraged it to deviate from its main task of educating and facilitating the efforts of farmers. As a result, extension programs too often appear to be aimed at meeting certain preordained quantitative targets such as the number of trials, demonstrations, tours, trips and training sessions, without regard to their impact on agricultural production. This has not only undermined the role of farmers in determining the production programs, but has also made extension staff spend too much time reporting progress toward the target, as no reliable system has yet been developed to verify the area and production.

Ironically, no policy documents issued by the government have yet stated objectives and policies for agricultural extension (DOAD 1994).

With a view to improve the functioning of agricultural extension a number of models, approaches, and styles of agricultural extension have been tried in Nepal after planned extension activities were initiated in 1952. These include:

- Block Production Program Approach
- Conventional Approach
- Training and Visit System
- Integrated Rural Development Approach
- Tuki (Lamp) Approach
- Commodity Group Approach
- Farming System Research and Extension Approach of Lumle Agricultural Research Centre (LARC).

These approaches have generally remained not only uncoordinated but also differ widely in staffing and resource allocation (Basnyat 1990, Thapa and Koirala 1992, Sen 1994). And they have had varying degrees of success over limited areas. Moreover, all these approaches seem to have focussed their attention mainly on material resources and structural changes of extension services to achieve their objectives. Hence the eighth Plan (NPC 1992) found no approach which could be used as the sole model at a larger scale. Likewise, no extension approach gave enough attention to the human resources, the farmers themselves.

In sum, as Compton (1993) remarked, a strong technology transfer bias prevails in Nepal's agricultural development programs. Sufficient attention has not yet been given to farmers' realities (i.e. their conditions, needs, and potential). Efforts to promote a lateral transfer of knowledge and skill among farmers themselves are lacking. The World Bank (1994) stated that a fundamental shortcoming observed in Nepal's agricultural extension is its general lack of ability to respond to the needs of the individual farmer. Annex 3.3 gives a chronological history of Nepal's agricultural extension organization. It shows how the organization changed more than six times within a 40-year period.

3.1.4 Subsidies

In Nepal, as in other countries, many incentives such as minimum price support, subsidies on production inputs, marketing facilities, price information, and extension service have been provided to farmers with varying extent of coverage and impact. For example, the minimum price support provided to selected agricultural commodities has not been effective mainly due to the government's inability to intervene in the market with limited financial resources and organizational capacity. On the other hand, various kinds of subsidies have been provided on the price and transportation cost of production inputs such as fertilizers, seeds, planting materials, animals and credit interest. These items were promoted in the hills and mountain areas to achieve the objectives of food sufficiency at the regional level. The net impacts of such policy thrusts were:

- increased budgetary burden to the government;
- increased difficulty in sustaining inputs promoted under the subsidy policy; and
- rejection of technologies by the farmers on a large scale since they did not fit in with the micro environments prevailing in the hills and mountains, compounded by the marginality of the areas and the resource limitations of the poor farmers.

However, subsidies have not always been counterproductive or distortive as conventional wisdom would suggest. When judged against the national goals of raising agricultural production and productivity, some subsidies may turn out to be highly desirable while others may not be so desirable.

Having discussed research policies and extension policies of the past years, this chapter goes on to present agricultural policies and priorities, as established in the current eighth Plan.

3.2 Present agricultural policies

Circumstances changed dramatically in 1990. The old Panchayat system was replaced by a new multiparty system after the people's revolution. The new government announced its first development plan, although it is the Eighth in the series. The current Eighth Plan (1992-1997) appears to be the reflection of the government's concern over issues such as deteriorating economic conditions of the rural people, overuse and misuse of the natural

resource base, poor performance of the agriculture sector, deterioration of the natural environment, etc. The issue of sustainability has been explicitly raised for the first time in the history of planned development of Nepal.

Of the three major objectives that the current Eighth Plan (1992 -1997) seeks to achieve, attaining sustainable economic growth is the major one. The National Planning Commission of Nepal (1992) defined sustainable economic growth as follows:

> *"Sustainable economic growth implies management of valuable biophysical resources in the most productive manner without depleting or damaging such resources."*

Needless to say, it is hence counterproductive to look at the agricultural program in isolation from the policy management framework of the entire country. Taking these things into account, the Eighth Plan has even provided a conceptual framework for planning agriculture and forestry programs, in which sustainability, farming systems, agro-ecological zones, transport and market facilities and farmers' resource endowment constitute prime factors.

Sustainable development of agriculture is a pre-requisite for attaining the objective of *sustainable economic growth*. To attain sustainable development of agriculture, safeguarding the natural resource base is crucial.

The main features of the current agricultural policies can be summarized as follows:

- Priority of management and protection of agricultural resource base;
- Adequate attention to agroecological concerns and commitment to research on the basis of the total farming system approach suitable to different ecological belts;
- Encouragement of farmers' participation through a group approach for all activities related to agriculture, such as irrigation systems, forestry, technology generation, verification, extension activities, etc.;
- Commitment to further involve the private sector;
- Recognition of importance of developing sustainable technologies; and
- Emphasis on the need to reorganize agricultural organization so as to make it efficient and farmer oriented.

3.3 Summary

This chapter reviewed Nepal's agricultural development policies and institutions. On reviewing agricultural development policies and organization, it seemed that the recent policy of the government is to shift from a "top-down" approach with heavy government involvement, to a more participatory approach where people would have a key role in making

decisions affecting their day-to-day life. For this the present policy is to promote increased participation of the rural poor through the formation of user groups for community forestry and agricultural extension involving small farmers, women farmers, etc.

Protection and management of the natural resource base has now become the prime concern of the state. Obviously, the government is presently confronted with the twin goals of simultaneously increasing agricultural production and productivity, and halting the degradation of the natural resource base. As a result, issues such as comparative advantage, agroecological concerns, sustainability, privatization, and decentralization have started to dominate the policy environment in the country. But policies and programs in agriculture and forestry still appear dominated by the sectoral focus.

The Ministry of Agriculture was reorganized in 1992 to bring the previously fragmented extension services under a single command structure of the Department of Agriculture Development, with a view to overcoming existing top-down planning and technology transfer biases, and to reorienting itself to deal with farmer realities. Nevertheless, policies reflecting the different needs of the Terai and hill districts for technology generation and information in extension programming and staffing are yet due. Furthermore, there seems to be no evidence in the policy to correct the presently observed, distinct lack of effective coordination among the Department of Agriculture Development (Extension), the Nepal Agricultural Research Council (Research) and the Institute of Agriculture and Animal Sciences (Education).

CHAPTER 4

FARMERS' PERCEPTIONS OF AND RESPONSES TO SUSTAINABILITY OF AGRICULTURE

While information given in chapter 2 and 3 derived from the review of literature and secondary sources, this chapter presents the findings of research conducted in two small villages in three districts situated in the mountain, hill and Terai regions of Nepal. The purpose of this chapter is to:

- *assess problem situations in sustainable agriculture;*
- *understand farmers' perceptions and responses to sustainability/unsustainability of agriculture; and*
- *provide insights regarding selection of projects for the case studies later on.*

Since the study was conducted in a smaller village setting and with limited time, the findings of this study do not allow generalization. Nonetheless, this chapter attempts to build up problem situations for the present research and for examining development efforts surrounding sustainable agriculture.

This chapter has three major sections. The first section describes the study sites, the second section is about the research method and nature of respondents, and the third and final section discusses research results.

4.1 About study sites

4.1.1 Selection of study sites

This chapter presents the results of research conducted in two villages each of the Gorkha, Tanahu and Nawalparasi districts of Western Nepal, situated in the mountain, hill and Terai regions respectively.

Selection of districts

The above districts were selected based on the following criteria:

- These districts are situated in the three major agroecological regions of the country- the mountains, the hills and the Terai.

- These districts can be approached during any season of the year. And in one trip the researcher can visit all three districts. This left much more time for the research by saving travelling time.

- These districts probably top all other districts in Nepal in terms of presence of donors, external assistance, private organizations and NGOs. This factor may be particularly useful for a study such as this which intends to study sustainability from a social perspective that is, as an outcome of people's behaviour and pays special attention to intervention.

- Developmentally, the people in these districts are at least as conscious, than other districts in the country. If the presence of multiple donor agencies is one factor, another equally important factor is that Gorkha is historically important. It was that tiny state in the 18th century, which laid for the foundation for the establishment of today's greater Nepal.

- Gorkha and Tanahu districts come under the research-outreach support of the Overseas Development Agency (British government) "Lumle Regional Agricultural Research Centre" (LRARC). The center has produced a number of research studies on the agricultural systems of these districts, which could be used as secondary information for cross-checking the findings. Likewise, Nawalparasi district is supported by the Western Regional Agricultural Research Centre, Bhairahawa. This center has also produced a number of research reports on Nawalparasi.

- In the selected districts, the World Bank funded an Agricultural Extension Project (AEP II), which has recently shifted away from the Training and Visit system to a Contact Farmer Group Approach and the Problem Census/ Problem Solving (PC/S) process. This provided a good opportunity for the researcher to study the functioning of the Problem Census/Problem Solving (PC/S) process after use of the T&V approach for more than a decade. Extension is not only in the interest of the researcher but also fits well with the purposes of this research, as we shall see.

- The probability of getting reliable and accurate data was high in these districts, since the researcher knew personally many of the officers in the agriculture-related offices working in these districts. This means that rapport-building, imperative if one is to do qualitative research, was not a problem. Indeed, support from these officials was crucial to getting quality and reliable data timely. However, familiarity might also be a source of bias. To minimize possible bias the researcher took a number of measures, which are described later in Chapter 7.

Annex 4.1 gives brief information about the three districts.

Selection of villages

In the second stage, two villages from each of these three districts (Table 7.2) were selected for in-depth study. Since the purpose of the research was to study the behaviour

of different actors (people), but not the farming systems or other physical things, the following processes were carried out in each of the three districts separately.

Gorkha district

Gorkha district has two major agroecological regions, the mountains and hills. Hence, the VDCs were first categorized into two groups- one in the mountains and one in the hills. There were 10 VDCs in the mountains and 59 VDCs in the hills. Second, the researcher visited all the district level development offices, particularly the District Agricultural Development Office, District Irrigation Office, Women Development Section, District Forest Office, and the Soil and Conservation Office, to draw out the number of development projects per VDC. The VDCs that were highest in terms of the number of development interventions were selected. Following the selection of the VDC, a village was selected based on approachability, ethnic composition and suggestions from the VDC office.

Tanahu district

All of the VDCs in this district are in the hills, although some areas of only a few VDCs might be as low as 80 to 100 m in altitude, having a tropical climate. However, all VDCs were considered to be hills. Hence, in Tanahu district two VDCs were selected following the same technique as mentioned earlier for Gorkha district. But this time the first VDC, Bandipur, represented the VDCs having the highest number of development projects; the next, Deorali, represented that with the least. There were two VDCs on the high side and three VDCs on the lower side. Hence, one VDC from each group was selected considering approachability, historical importance, presence of NGOs etc. In each VDC, a village for in-depth study was selected based on the criteria mentioned earlier for Gorkha district.

Nawalparasi district

Although some VDCs in Nawalparasi district are in hills, one VDC was selected from among those VDCs that are in the Terai region and had a maximum number of development interventions in 1992. Considering the homogenous environment in the Terai, two villages were selected in Ramnagar VDC. Table 4.1 gives the name of the study villages.

Table 4.1 Name of the selected villages

S.N	District	Village Dev. Committee	Selected Village
1.	Gorkha	1. Sirdibas (Mountains) 2. Taklung (Hills)	Sirdibas Maskichhap
2.	Tanahu	1. Bandipur (Mid hills) 2. Deorali (Mid hills)	Jhargaon Jaalbhanjyang
3.	Nawalparasi	1. Ramnagar (Terai)	Tallopratappur Bhumahi

Table 4.2 presents some basic information about these villages.

Table 4.2 Some basic information concerning study villages

Village	HH number	Dominant Farming Systems	Altitude (m above sea level	Major Ethnic Groups	Distance from HQ
Sirdibas	74	Livestock based	2,410	Lama, Gurung, Chhetri	70 km north
M.chhap	42	Maize-based horticulture	1,300	Magar, Chhetri	18 km south
Jhargaon	106	Cereal crop-based	1,410	Gurung, Magar Kami	10 km north
Jaal bhanjyang	43	Maize and upland rice	1,600	Magar, Bhujel Gurung Tharu, Brahmin, Chhetri	21 km north
T. Pratappur	68	Rice-based	210	Brahmin, Chhetri, Tharu	14 km north
Bhumahi	32	Rice-based	205		13 km north

Note: HH- Households,
km- Kilometer
HQ- headquarters

Source: Field study

Table 4.3 describes the number and nature of development interventions operating in these villages in 1991-92. The table reveals that in the Terai (Ramnagar VDC) and Maskichhap the Ministry of Agriculture made arrangements for providing an integrated support service to the farmers for agricultural production, especially cereal crops. For example, ASC is to disseminate technologies, the cooperative society is to provide production inputs (seeds, fertilizers and chemicals) and the Agricultural Development Bank is to distribute production credit to the farmers, should farmers demand credit to buy them. This table further reveals the government's method of pushing modern capital intensive agricultural technologies.

Table 4.3 Nature and number of development projects operating in the study villages

Name of study villages	Number of Interventions	Nature of the Projects
Sirdibas	7	Agricultural extension (ASC), Education (Secondary school), Drinking water, Pasture development, Community development through NGOs (2 NGOs)
Maskichhap	5	ASC, Education (Secondary school), Drinking water, Cooperative society, Small farmer development program (Agricultural Development Bank)
Jhargaon	5	ASC, Education (Secondary school), Drinking water, community forest, Community Development through NGO
Jaalbhanjyang	1	Education (primary school)
Tallopratappur/ Bhumahi	5	ASC, Education, Drinking water, Cooperative society, Small farmer development program (Agricultural Development Bank)

Source: Field study

Having selected the study sites the question arises: are these villages representative of the three different agroecological regions of the country?

Indeed. it is very difficult to accept that these villages would represent the extremes and diversity found in Nepal. In my own research, if we take two villages of Tanahu district, Jhargaon and Jaalbhanjyang, physically they are very near to each other. Agriculturally they are different. For example, *khoria* (a type of shifting cultivation) is practised in both the villages. But if community *khoria* is a part of livelihood systems in Jhargaon, Jaalbhanjyang has a different system- claiming khoria right around the forest bordering private farms (Basnyat 1994). Likewise, they differ in terms of predominant farming systems and ethnic group composition. Hence, any attempt to select a representative village in the hills and mountains is an extremely difficult task (see Chapter 2), which a random sampling procedure would only mask.

In general, Ramnagar might represent the Terai, as the Terai has a more or less homogenous environment. But agriculturally, the eastern Terai differs from the western Terai and the western Terai from the mid-western Terai and so forth, depending on the interplay of various forces such as market, transport, industries, and socio-economic conditions.

If these areas do not represent the respective regions, the obvious question would be then why a study was conducted in three agroecological settings. As has been stated earlier, the primary purpose of this study was to get a first approximation of the problem situation in sustainable agriculture, understand farmers' perceptions of and responses to sustainability/unsustainability of agriculture, and to gain insights into concrete development efforts that seek to introduce sustainable agriculture. In short, this part of the research could be referred to as an orientation phase or a reconnaissance phase of the research. Lastly and most importantly, this research does not intend to generalize findings to a larger population, but to allow the researcher to identify relevant processes and relationships in issues important to the study.

4.1.2 Farming systems in the study areas

Of the two villages studied in Gorkha district, Sirdibas represents a high mountain farming systems and Maskichhap the middle mountain farming systems. Likewise, Jhargaon and Jaalbhanjyang of Tanahu district have middle mountain farming systems. And both the villages in Nawalparasi district have the Terai farming systems. Since I have already described the main features of these farming systems in Chapter 3, this section describes typical farming systems observed in the study villages based on my field research.

High mountain farming systems in Sirdibas

Sirdibas is too high to grow rice. Winter barley (locally called karu), maize, potatoes, and finger millet are the main crops. Yak and yak/cattle crosses (locally called Chauri, Jhopa, Jhuma etc.) are the common cattle. Local cattle, Kirgo cow, are kept for milk, wool, manure, and transport. Very few trees are grown in the bari land. Farmers noted that the climate, especially the altitude, is not conducive to fodder tree growth. Hence, the system is heavily reliant on the forest for fuel, wood, and fodder, and also for access to migratory grazing. Further north from Sirdibas is the Bihi village, where most of the young people- except for the very few who are sick or poor having no place to go -leave the village from about December to March, for Kathmandu or other big cities (mostly Pokhara) in search of work. Obviously, there is no work in the village due to heavy snowfall in these months. The general cropping pattern is as follows:

- Maize-Naked Barley - Karu-Fallow - Maize+Potato-Karu
- Potato-Karu

Middle mountain farming systems in Maskichhap, Jhargaon and Jaalbhanjyang

Maskichhap, Jhargaon and Jaalbhanjyang have middle mountain farming systems. Chapter 2 has already given a conceptual model of Nepal's hill farm production system. Maskichhap and Jhargaon have some *khet* lands (good for growing flooded rice) while Jaalbhanjyang has no *khet* land. In Jaalbhanjyang all farm households own only uplands (*bari* lands). The area is dominated by maize based farming systems- with maize+finger millet followed by fallow. Also, a small proportion of the households grow the upland

rice (*Ghaiya*)- mustard cropping pattern. The farmers say that the soil is too shallow to grow potatoes. Except one or two pear trees, no fruit trees of any kind were observed in the village. Buffalo, cows and goats are the chief livestock reared in the area. Farmers, however, said that these days the population of buffalo in the village as a whole has decreased due to lack of fodder, lack of money to feed animals and scarcity of drinking water. Nevertheless, some fodder trees such as Tanki (*Bauhinia purpurea)*, Utis (*Alnus nepalensis*), and Badahar (*Articarpus lakoocha*) can be found in the risers of upland terraces. For the farmers in this area, Tanki serves not only as a good fodder source, but also as a vegetable for the humans. Buds and flowers are eaten as a vegetable and pickled (*Achaar*).

Also in Jhargaon the farming system is as complex as in Jaalbhanjyang, but the economic condition of people in this village seems a little bit better as compared to Jaalbhanjyang. According to farmers, the quality of land is better in this village. Instead of a maize+ finger millet to fallow cropping pattern, the upland paddy-mustard pattern is dominant here. In addition, many farmers have at least a few ropanis (20 ropanis make 1 hectare) of *khet* (low land) along the basin of a seasonal stream. In khet lands farmers follow mostly a rice-wheat or rice-maize rotation depending on the availability of irrigation. A few orange trees in very good condition can be observed on the risers of the terraces and kitchen gardens. Many farmers said that they abandoned growing potatoes because of insect problem and lack of irrigation water. As in Jaalbhanjyang, buffalo, cows and goats are the major livestock in the village. But the people in the village say that the population of animals has increased over the last few years after they were successful in installing a drinking water project through the support of the District Panchayat (now the District Development Committee). The general cropping patterns found in *khet* and *bari* lands of Jhargaon is as follows:

Khet	Bari
Rice- Fallow	Maize+Millet-Fallow
Rice- Wheat	Upland Rice-Cereal
Rice-Maize	

In Jhargaon and Jaalbhanjyang farmers practice a type of shifting cultivation better known as "slash and burn agriculture", or locally called *khoria* in Nepal. Since khoria is a part of farming systems in Jhargaon and Jaalbhanjyang the following section briefly describes this practice.

Khoria practice

Khoria is a type of slash and burn agriculture where a large portion of steep forest is burned for growing cereal crops in a space of few years. It is generally practiced in steep slope forests where ploughing by bullock is not possible. The farmers practicing *khoria* live in permanent settlements and generally possess some permanently cultivated land. The following three types of shifting cultivation were found in the study areas.

a. *Khoria* in the forest bordering private farms
b. Community *khoria*
c. Uncontrolled *khoria*

a. *Khoria* in the forest bordering private farms

In Jaalbhanjyang, local residents have a general understanding that one has the right to farm forest lands bordering one's private farm (called *numbari jamin* in local terms). It is the capacity of the individual family (labour availability) and quality of forest that determine the extent of forest that a farm family would use in a season. The other people in the area do not challenge this khoria rights, even though the Forest Act of 1957 does not recognize such a right. Hence, farmers pay rent (called *nyaule* in local terms) to the person having khoria rights if they want to grow maize or other cereal crops for a season. In short, paying nyaule means acceptance of ownership of the forest land. Plate 4.1 illustrates this type of khoria.

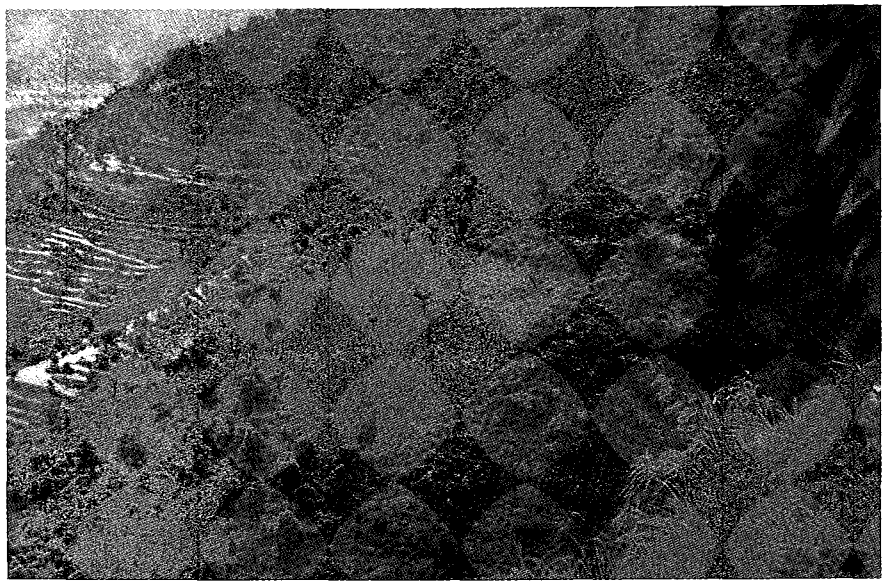


Plate 4.1 Khoria in Jaalbhanjyang

b. Community *khoria*

In Jhargaon, local residents have put aside a large block of forests for '*khoria*' where almost every household in the village owns a piece of land (Plate 4.2). Of the total 106 households in this village, only 14 households have no land in community *Khoria*. These farmers were in fact migrants to this village, and they pay nyaule if they want to rent khoria land for a season to grow maize. They said that *nyaule* is very minimal, sometimes limited to a just few liters of wine. For them finding *khoria* land for a season was not a problem.

Plate 4.2 Khoria in Jhargaon

c. Uncontrolled khoria

The third type of *khoria*' is an uncontrolled one where some farmers slash and burn trees and plants in the forests to grow crops for one to two years and move on to other parts of the forests as they wish. In neither of the villages was this type of *khoria* was widespread, but field observation revealed that it is increasing slowly. In some places, farmers have begun to slice into forest lands adjoining private farms to expand cultivated land.

Table 4.4 provides number of households practicing these three types of khoria in the two villages.

Table 4.4 Households practicing khoria in study villages, June 1991

	Type of khoria	Number of Households		Remark
		Jhargaon	Jaalbhanjyang	
1.	Khoria in forest lands bordering private land	-	15 (34.8 %)	
2.	Community khoria	92 (86.7 %)	-	
3.	Uncontrolled khoria	-	6 (13.9 %)	

Source: Field study

The Terai farming system in Tallopratappur and Bhumahi

The rice-based farming system, the typical main Terai Farming System, is also the most common farming system found in Tallopratappur and Bhumahi (Ramnagar VDC). The climate is conducive to year-round cropping. Of the many cropping patterns found in the Terai, the following are widely practiced in Ramnagar.

i.	Rice - Wheat	ii.	Rice - Maize	iii.	Rice - Potatoes
iv.	Rice - Linseed	v.	Rice - Mustard + Lentils	vi.	Rice - Vegetables

The rice-wheat pattern is the dominant one, followed by rice-mustard+lentils and rice-maize. As well, sugar cane has become increasingly popular among large farmers since the establishment of a sugar mill in Sunwal, Parasi (about 7 km from Ramnagar).

Among fruits, mango, papaya and litchi are locally grown. Livestock keeping is an integral part of the farming systems. Although the farming systems throughout the country are dependent on resources from the forest, dependency seems low in Tallopratappur as compared to that in the hills- consistent with the Terai farming systems in general.

In summary, the farming systems in six studied villages are agriculturally different from each other in several aspects. Externally the farming systems in the hills seem more complex than the Terai farming systems. But the latter are also as diverse as other farming systems, at least in terms of cropping patterns. As seen in Jhargaon and Jaalbhanjyang, the farming systems in the hills vary from place to place even though they might be located near to each other.

4.2 Research method and respondents

As stated earlier the research was exploratory, qualitative and the purpose was to learn about problem situations in sustainable agriculture. For this research, data were collected through participatory techniques that included direct field observation, focused group discussions, key informant interviews etc. Table 4.5 shows the distribution of respondents by sex, although during group discussions respondents were not grouped by sex. The purpose of giving respondents' sex is to demonstrate that the findings of this research include the views of both sexes.

Following group discussions, local residents were met individually. Some of these had also participated in earlier group discussions. The purpose was to triangulate the issues and findings of discussions, fill in missing information and identify further issues for subsequent group discussions. Discussions were usually started by asking participants to draw a map of their village on the floor with the help of materials found in the village such as maize, stones, beans and red soil. Figure 4.2 presents a map of Jaalbhanjyang drawn by farmers during the group discussions. Farmers often changed the sketch after two or three sessions.

Table 4.5 Distribution of farmer respondents

Village	HH No	Group Discussion			Individual Meeting		
		M	F	Total	M	F	Total
Sirdibas	74	32	13	35	13	12	25
Maskichhap	42	22	7	29	7	8	15
Jhargaon	106	40	23	63	15	15	30
Jaalbhanjyang	43	16	8	24	6	7	13
Tallo Pratappur	68	38	4	42	10	12	22
Bhumahi	32	18	3	21	4	8	12

Note: HH- Households,
M- Male
F- Female

The above table reveals that participation of women was interestingly low in the Terai setting as compared to the hills. One reason for this might be sociocultural factors, where women are usually kept inside the house and not allowed to talk with other people. Hence, attempts were made to contact more women farmer individually, even though responses were not encouraging.

All women participating in group discussions in Tallopratappur and Bhumahi were migrants to the area. In addition to farmer respondents some local officials available during the field research period were also contacted. These included those GOs and NGOs and local government unit (VDC) officials.

Having described research sites and method, the remainder of this section discusses findings from the field. For better comprehension of the research findings, evidence gathered during the field study is described under the following:

- Perceptions of sustainability/ unsustainability of agriculture
- Responses to sustainability/ unsustainability of agriculture

After assessing perceptions and responses this chapter will attempt to assess problem situations in sustainable development of agriculture.

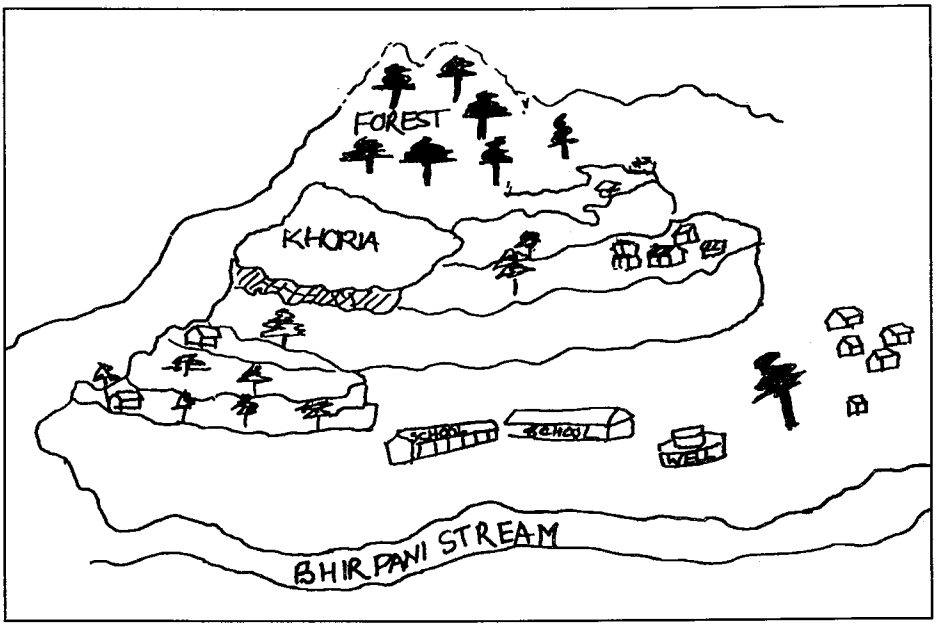


Figure 4.1 Village map of Jaalbhanjyang as drawn by farmers

4.3 Farmers' perceptions of the sustainability of agriculture

To facilitate two way communication between me as the researcher and farmers on the one hand, and among farmers on the other hand, a focused group discussion was carried out in all six study villages, starting with Jhargaon and Jaalbhanjyang of Tanahu district. In this section I have used the word 'farmers' to mean those farmers who participated in group discussions. And they include men and women.

Exploring perceptions of the sustainability of agriculture turned out to be a difficult task. The main problem for me was to find a word in the Nepali language that corresponds to the meaning of sustainability as increasingly used in contemporary development thinking and literature. "Digo", "Tikau", "Nirantarata" and "Esthai" are some words found in Nepali, that are often used interchangeably and more or less connote sustainability. Since the meaning of these words varies from person to person, in this study I consistently used "*Digo*" for sustainability and "*Digo Krishi*" for sustainable agriculture, as they are often used in government papers and documents (For example, NPC's document on the Eighth Plan).

To begin the discussion, an issue raising the definition of sustainable agriculture was given to a group of participating farmers. The method, which is essentially soft, appeared very interesting and useful in understanding how the farmers perceived the present status

of agriculture, and in defining the indicators for unsustainability/sustainability. The researcher's definition was as follows:

> "sustainable agriculture (*Digo Krishi in Nepali*) means obtaining production of maize and finger millet from a unit of land in such a way that the land continues to remain productive for the longterm".

Interestingly, in Jhargaon and Jaalbhanjyang farmers raised questions concerning issues such as productivity and longterm. This made me realize that to understand farmers' perceptions of "Digo Krishi", it is firstly necessary to understand how they view the present state of their agriculture. Hence the entry point for my study in all six villages became the state of agriculture as perceived by the farmers. The farmers were not very interested in the word "Digo". This issue will be discussed further in the following sections. However, the major lesson for me was to not jump on the sustainability issue first.

Not only did the farmers in different localities (hills or Terai, different village) perceive the present state of agriculture differently as related to market opportunities, local constraints, availability of agricultural infrastructure, on-going developmental program s or personal resources. They were also concerned about the state of their agriculture and/or farming as a totality- taking into consideration the production of all crops, animals, vegetables, fruits, etc. Since farmers did not look beyond their farms, coming to a general conclusion on sustainable agriculture in Nepal seemed a herculean task to me.

In the beginning I asked the group how they viewed the present state of agriculture in the *village* (note my italics) in comparison to 10 years ago. The farmers had hard time to define the present state of agriculture and so to conclude for the last ten years was yet further difficult. Almost all the respondents in all the study areas were hesitant to state whether production was increasing or decreasing. They said that fluctuations in production depended on the timing and the amount of rainfall, and other weather conditions. That is, the present state of agriculture was itself a debatable issue. This required me to throw another question to the group in order to decide on factors that they considered important for the betterment of their life in the village. After long discussions they came up with the following items (Table 4.6). In some villages, for example Maskichhap, the discussion took about two hours just to identify the indicators.

Table 4.6 shows that the needs of farmers are not many, but are different in different places. Harvest and income are their major concerns and sustainability is included within these concerns.

Even after coming to consensus on indicators for the present state of agriculture, the farmers were far from reaching a consensus on the condition itself of agriculture in the village. They were divided, and based their perceptions on different ways of reasoning. Finally, at my suggestion they divided themselves into three groups according to their opinions (Table 4.7).

Table 4.6 Farmers' indicators for determining present status of agriculture

S.N	Name of Village	Indicators
1.	Sirdibas	total farm income; availability of grasses in the pasture; number of animals; off-farm work; permanent migration
2.	Maskichhap	harvest from the orange trees, availability of fodder, grasses and litter in the forest; harvest from khet land
3.	Jhargaon	crop harvest; availability of fodder, grasses, fuelwood and tubers in the forest; seasonal migration
4.	Jaalbhanjyang	crop harvest; availability of fodder, grasses, fuelwood and tubers in the forest, drinking water; permanent and seasonal migration
5.	Tallopratappur	Farm income
6.	Bhumahi	Farm income

Source : Field study

Table 4.7 Farmers' responses concerning the present state of agriculture at time of study compared to 10 years ago

	Study Village	Farmers' Responses			Total
		Improving	No Difference	Deteriorating	
1	Sirdibas	3 (14 %)	4 (19 %)	14 (67 %)	21 (100 %)
2	Maskichhap	12 (67 %)	4 (22 %)	2 (11 %)	18 (100 %)
3	Jhargaon	0 (0 %)	2 (9 %)	21 (91 %)	23 (100 %)
4	Jaalbhanjyang	1 (5 %)	2 (9 %)	18 (86 %)	21 (100 %)
5	Tallopratappur	2 (12 %)	1 (6 %)	14 (82 %)	17 (100 %)
6	Bhumahi	1 (12 %)	2 (25 %)	5 (63 %)	8 (100 %)
	Total	**19 (18 %)**	**15 (13 %)**	**74 (69 %)**	**108 (100%)**

Source: Field study

Table 4.7 reveals that the majority of farmers in five villages (69%) except in Maskichhap, perceive the present state of agriculture as worsening. This could be further inferred from the following responses of the farmers:

> *"We do agriculture not because it is profitable but because we have no other alternatives. To have land is to have prestige and wealth, as you know."*
>
> *"The price of rice has not changed considerably for the last three years but the price of urea has increased three-fold."*
>
> *"We know for sure that we will be defeated economically in farming but we cannot leave it uncultivated for ...."*
>
> *"It would be a source of shame for my parent".*
>
> *"The God will not forgive us".*
>
> *"Outside of farming we have no work. We cannot sell our labour".*

In a very heartsending manner, a respondent wanted to reverse the old Nepali saying, ***"Uttam kheti, madhyam byapar, chuthho service".*** Among the professions agriculture is the best, business is in the middle and service the least. Central to this argument is that for them doing agriculture is the last option. The farmers are in a dilemma: to farm or not to farm. Interestingly, in Dandaswara (a village in Gorkha district I stopped at on the way to Maskichhap while walking from Tanahu's Jhargaon), farmers said that they could hardly imagine the continuation of agriculture in the village after their generation. They had the following reasons:

- decreased interest of their sons in agriculture soon after they went to school; they became reluctant to work on the farm.
- lack of valid reasons to motivate their sons to work in agriculture or on the farms.
- no incentives to remain in farming, or in the village, that might balance the pull factors from town.

They have been doing agriculture not because it is economic but because they have no alternative. As there are not enough jobs outside agriculture, richer and larger farmers have taken the opportunity to (informally) rent out land to poor and small farmers, even though the country's Land Administration Act has specifically discouraged this practice by giving security to tenants. However, the landowners would never sign contracts or give receipts for the rent- the conditions set by the law to protect tenants. This makes tenants too weak to defend their rights. Indeed, poor people are powerless everywhere. During discussions many farmers said that they are staying in agriculture so that they can send their sons and daughters to school so that they need not depend on agriculture or farming any more in the future.

In Maskichhap, farmers viewed the present status of agriculture as improving because of the expanding market for oranges. Many farmers recalled that, in the past, oranges were only for home consumption for them. They had no market. Currently, oranges are their rice, maize, wheat, cloth, and money for sending children to school.

Table 4.8 documents farmers' perceptions of the deteriorating state of agriculture, further substantiating our earlier conclusions.

Table 4.8 Reasons that farmers see agriculture as deteriorating

Mountains (Gorkha)	Hills (Tanahu and Gorkha)	Terai (Nawalparasi)
a. Soil losses/decreased soil depth	a. Increased stones and sands in the field	a. Lack of compost
b. Lack of compost	b. Yield of crops in bari and khet land decreasing over time	b. Increased price of agricultural inputs, especially chemical fertilizers
c. Lack of market for produce	c. Shortage of fodder, firewood and forest tubers in forests	c. Increased pest and diseases
d. Increased land slides	d. Lack of irrigation and drinking water	d. Lack of improved varieties
e. Decreased size of livestock holdings per farm	e. Increased diseases in fruit crops (oranges)	e. Waterlogging
	f. Land fragmentation	f. Low prices for produce
		g. Formation of white crusts on the top layer of soil

Source: Field study

When the perception of farmers concerning agriculture were clear, they were asked to rank the five most pressing problems. Table 4.9 shows the responses by agroecological zones, although the responses of small, medium and large farmers were different, .

Table 4.9 Five important problems faced by farmers in the study areas

S.N	Problems	Agroecological Zones			Remark
		Mountain	Hill	Terai	
1.	Lack of money for buying inputs	-	3	1	
2.	Shortage of fodder and grasses	3	2	-	
3.	Lack of irrigation and drinking water	2	1	4	
4.	Infertile and stony soils	4	4	-	
5.	Distance from market	1	5	-	
6.	Crop pests and diseases	-	-	3	
7.	Low price for the produce	-	-	2	
8.	Waterlogging in the fields	-	-	5	
9.	Inadequate arable land	5	-	-	
10.	Formation of white layer on and around top soil	-	-	2	

Note: Farmers ranked 1 for the most pressing problem and 5 for the least

Source: Field study

Although the findings presented in Table 4.9 cannot be generalized across the agro-ecological zones they clearly reveal that the problems of farmers in the zones are different and that farmers have different priorities. Interestingly, neither lack of technologies nor lack of extension services were among the priority problems in all three areas.

Likewise, when the local leaders in all three districts were asked how they perceive the present state of agriculture, they seemed more concerned with the contemporary problems of agriculture such as the need to use more chemical fertilizers, the unavailability of fertilizers and other plant protection chemicals when needed, the harmful effects of fertilizers and the increased price of fertilizers. As well, they were specifically not happy with the performance of agricultural extension in the district; they were not happy with the performance of most governmental agencies in the district in general, but they were highly critical of the agricultural extension service. Most of them complained that JTAs (village-based extension agent of the Ministry of Agriculture) do not come often to the villages, have nothing to tell, offer or give to the farmers and show little concern for farmers' problems.

In Tanahu, the local leaders said that the productivity of agricultural land in the district has been declining over time. They seemed very concerned over the condition of soil in the field, which according to them has become compacted and saline as a result of the increased amount of chemical fertilizer. They said that the soil has become nearly barren and they need to increase the amount of fertilizer every year, while at the same time its price escalates every year. The issue of the increased price of chemical fertilizer was raised by the local leaders in Nawalparasi district too.

4.4 Responses (activities) to sustainability/unsustainability of agriculture

In all study villages farmers responded to sustainability problems differently according to how they perceived the problem. However, it would not be possible for me to list all these activities, nor would it be necessary to do so. Hence, this section presents some more important responses of farmers. Differences in responses of the farmers in the Terai, hills and mountains have been taken into consideration as necessary.

Terracing

Although the farmers in all study villages could not recall when their lands were terraced, they clearly understood the value of terracing and even today they do so whenever necessary. For farmers terracing is a technology that they have inherited from their ancestors to prevent soils from eroding/sliding. Planting fodder trees in terrace ridges is another method that prevents them from eroding.

Altering farm products

In Maskichhap, farmers have started to increase the size of orange orchards. Although it may be advantageous to increase the number of livestock in the short term, farmers' preference for orange trees suggests their long-term vision on the one hand, and on the other hand it also suggests that shortage of fodder and litter in the forest may have prompted farmers to alter production.

Use of local varieties of cereal crops

In Jhargaon and Jaalbhanjyang in Tanahu district, all the farmers who responded said that they had not yet used research-recommended varieties of upland rice as they are afraid of importing diseases and insects. A farmer grows several varieties in a season and often change variety so as to minimize the chances of breeding diseases and pests. Mirkote, Purke, Taule, Knajani, Gorkhali, Nepali, Bhangeri and Aampjuthia were among the popular upland rice varieties grown in the area.

Likewise, in Tallopratappur, all farmers grow several improved and imported varieties of rice (see below) in a season and do not limit themselves to a single variety. Every household grows at least two varieties, regardless of how small the field is. It was found that farmers frequently changed a particular variety, even though its performance was not bad in previous years. This suggested farmers' concern over searching better varieties of rice. Exchange of varieties among neighbours was very common. The farmers have learned very well that if they want to be sure of a harvest they need to grow more than one variety in a season.

Interestingly, in Tallopratappur, local or indigenous varieties of rice such as Kanakjira, Gauria, Tulsi Prasad, Mansara and Kalanamak are now history. However, not all the presently adopted varieties are always released by the National Rice Improvement Program (NRIP) of the Nepal Agricultural Research Council (NARC). For example, Sarju 49 and Sarju 52 are Indian varieties grown widely in bordering areas of western

Nepal. The farmers say that Makarkaddu and Lahure are the varieties that they have brought from India. Besides these Indian varieties, farmers grow other improved varieties released by NARC, namely, Savitri, Radha-9 and Radha-7. Kanchi-masuli, Mana-muri, Bijaya-70 and BG-44 are other rice varieties widely grown in the area. Neither Kanchi masuli, Mana-muri, nor Lahure are released by the NARC; farmers coined their name. Although farmers could not tell the history of Lahure, Mana-muri, Kanchi-masuli rice varieties exactly, they have Nepali meanings indicating either the origin or production capacities.

- Some Rice Varieties Grown in Ramnagar VDC, Nawalparasi District

  Lahure: In Nepal, Lahure generally refers to a person who serves either in the Indian Army or the British Army. It is very likely that people named the variety after the Lahure, who would have brought the seeds from India or elsewhere upon returning to the country either on vacation or after retirement. Perhaps this variety has different names in different places.

  Mana muri: Mana and muri are the most common units of measurement in Nepal for cereal grains, although the kilogram system is used officially. Using mana and muri to describe a rice variety suggests that this particular variety can yield a muri (approximately 48 kgs) from a mana (approx. 0.3 kg) seed. This means that this variety can yield 8.5 MT per hectare.

  Kanchi-masuli: Masuli is a very popular variety of rice, released by the National Rice Improvement Program in 1974. Following increasing susceptibility to blast disease and continual decrease in yield, its popularity decreased, but it is still widely accepted and grown in the Terai and Inner Terai areas of Nepal. In the Nepali language **kanchi** means junior or new. Therefore, for some farmers the kanchi-masuli variety of rice is that variety of rice comparable to Masuli but slightly inferior to it in yield and grain quality. And for other farmers Kanchi-masuli is better than the original Masuli because to the term "kanchi" means young, healthy, new, liked, full of promise. In Nepal, if people have two wives, the second will be called Kanchi- the beloved one, in general. Whatever be the reason behind its name, Kanchi-masuli has now become a very popular variety. The people do not really know where the variety came from or who brought it.

Adjusting the amount of chemical fertilizers

In Maskichhap, all farmers apply chemical fertilizers for all crops including maize, upland paddy and finger millet. However, they don't apply the quantity as recommended by research. They know that if they apply as recommended by research, the crop can't support the amount and crops are likely to lodge. Responses of 18 farmers in Maskichhap shows that on an average they apply 12.1 kg Nitrogen per hectare for rice crop, far below the research recommendation (60 kg Nitrogen per hectare).

In Tallopratappur, respondent farmers said that they have been using chemical fertilizers continually since they started to grow wheat in the 1960s. Although the use of chemical

fertilizers in the village has increased along with the increased use of modern varieties of rice and increased cropping intensities, farmers decide the amount of chemical fertilizer themselves, based on the amount of compost that they give to the crops, the condition of the soil in the field and the price of fertilizers.

Interestingly, when farmers were asked to state the amount of fertilizers that they give to different crops, responses of the farmers did not vary significantly either by farmers' size large, medium or small- or whether the farmer was owner or tenant. Table 4.10 gives the farmers' responses to questions on fertilizer application.

Table 4.10 Average use of chemical fertilizers by nutrients in Tallopratappur

Unit: kg/ha

S.N	Crop	Farmers' Practice			Research Recommend.			Remark
		N	P	K	N	P	K	
1	Rice	69	34	-	75	20	20	
2	Wheat	69	34	-	80	40	30	

N- Nitrogen
P- Phosphorous
K- Potassium

Source: Field study

In general, farmers said that they apply chemical fertilizer at the rate of 1 quintal (50 kg urea and 50 kg diammonium phosphate) per bigha (1.5 bigha is roughly 1 ha of land). None of the respondent farmers reported that they apply potassium fertilizers. And the farmers stated that in some years they lower the amount of fertilizers if they are not available in the local market. Some farmers said that they have sometimes smuggled fertilizers from India if they were not available in the local market or neighbouring towns (Butwal and Bhairahawa).

Since farmers' practices do not correspond with the research and extension recommendations (Table 4.10), they were asked if they know the amount of fertilizer recommended by research for their district or area. Interestingly, all respondent farmers admitted that they had no idea of it. During the interview farmers said that they have been fertilizing crops according to their own experiences or as recommended by their seniors and neighbours. When asked if they had contacted JT/JTAs earlier to find nutrient deficiencies in the soil, or to ask research recommendations, they replied negatively despite the fact that nearly three out of four respondents in the village said that these days soil in their fields has become compacted and that they have noticed hard white crusts developing in the upper layer. The more importantly, the office of agricultural service centre is in the centre of the village.

The use of chemical fertilizers seemed virtually nonexistent in both study villages of Tanahu district. Very few farmers said that they had applied 1-2 kgs of urea for preparing seedlings of finger millet, and the majority of them have never applied fertilizer to any crops.

Decreased use of compost manure

These days, in Tallopratappur and Bhumahi farmers have been increasingly using dried dung cakes as fuel. However, increased use of dung cakes for burning purposes means less organic manure in the field. In Sirdibas, Maskichhap and Jaalbhanjyang farmers have reduced the number of animals. This also means less compost for the crops. In Maskichhap, farmers said that the forest has thinned and they have no common grazing land in the village, as a result of which the numbers of livestock has decreased in the village. Because compost has become a problem, the farmers' response has been to apply it selectively. The priority is on (from top down): rice seed beds, cash crops grown in upland or bari, fields where declining productivity has been noted, and other rice or wheat fields. In Ramnagar farmers usually did not apply compost manure in wheat. They had several reasons for doing so. First, rice is their main crop and its failure means starvation for a year. Secondly, rice is grown in the rainy season. The urea is likely to leach along with rain water.

Planting fodder and fuelwood trees on terrace backs

Planting of fodder and fuelwood trees in terrace ridges seemed one of the major strategies of the farmers to respond to scarcity of fodder and fuelwood. Farmers are very careful not to cut seedlings of fodder and fuelwood trees on terrace backs and they protect them. In Maskichhap, the majority of the respondents said that their village would not have become so green if they had not protected those trees. This clearly shows a direct link between community forestry and agroforestry. This issue will be discussed while dealing with the cases of community forestry and agroforestry projects. When asked how they became aware of the need to protect the trees that germinated in risers, a farmer said with pride, "Necessity is the mother of invention".

Besides, planting of fodder tree seedlings on terrace backs has become a common practice in Maskichhap, Sirdibas, and Jhargaon but not in Jaalbhanjyang. In Jaalbhanjyang farmers fear further decline in yield due to shading.

In Maskichhap, the majority of the respondents said that these days they have to go forest to collect fodder, firewood and bedding for only about two to three months in the dry season (April to June). They seemed convinced of the need to reduce dependency on public forests. In Tallopratappur and Bhumahi planting of fodder trees in terrace backs was not common. However, some large and rich farmers were starting to plant Sissau (*Dulbergia sissoo*) in and around house in terrace risers and other lands for commercial purposes.

Migration

Migration was a major response of the farmers to resource shortages in Jaalbhanjyang and Sirdibas. In Jaalbhanjyang the farmers said that the extent of migration from the village has increased during the last five years. In the last year only, four families had left the village permanently. And there was no one in the village who could buy the land and houses. Villagers were likely to leave the house abandoned and rent the land informally at a very low price, just to continue to keep the ownership of the land among themselves and sell afterwards. Indeed, migration, as Shrestha (1992) remarked, is the strategy that the people use as a last resort to cope with economic stress after exhausting all other strategies. Hence migration from the hills to the Terai is common, but not vice versa. An old woman whose family had recently migrated to Tallopratappur in 1992 said, " Had I known earlier that it would be so hot here and the life as difficult as in the *Pahaad* (hills), I would not have come and preferred to die there". In Tallopratappur, local residents said that it has become very difficult for them to know all villagers as they could in the past; in 1992-93 alone, seven families migrated to this village. Mostly people from Syanja, Gulmi and Arghakanchi districts come to Tallopratappur.

Avoiding land fragmentation

In Jhargaon and Jaalbhanjyang it appeared that farmers avoid land fragmentation through seasonal migration or leave the village in search of other sources of employment. In Jhargaon and Jaalbhanjyang, it would be difficult to find a family where at least one member was not currently out of the village, either serving in the British Army, the Indian Army, or working as a labourer in big cities such as Pokhara and Kathmandu. The story in Maskichhap is also not much different. This phenomenon of migration from the hills is not new. It can be traced back several hundred years (Sill and Kirkby 1991).

In Sirdibas, Bihi and other mountainous regions, there are traditions typical to people of Tibetan origin, who are native to the area. For example, a woman automatically becomes wife to all sons in a family when she marries the eldest one. This means that all sons are required to share one wife. In other words, a woman would have more than one husband. Among many other social implications of this custom, one is that there would be no need to divide land among brothers since they would have only one wife and their children a common mother. The lands in mountainous areas are less fertile, and if divided, they would hardly be able to sustain the livelihood. Although this custom is rapidly vanishing these days, it still exists. A young man (about 25 year old) says, "I do not want to go to my village because it is not possible for me then to take the wife of my elder brother as my wife too". As well, it seems that this process directly favoured the family planning process in the past, further decreasing the chances of land fragmentation.

Avoidance of land fragmentation is further facilitated by other traditions in the village, under which the middle son is not allowed to marry and settle in the village but has to work as a Lama (a monk who lives in a monastery, away from the rest of the society). The Lama would naturally have no right to family land. And the youngest son is usually encouraged towards business sector. In short, if a man has three sons, the eldest would be

a farmer, the middle son would be the Lama and the youngest one would be a business-man.

However, land fragmentation has now emerged as a real problem in Tallopratappur and Bhumahi, partly as a result of migration to these areas and partly as a result of equal division of parental land among brothers. The price of land in these villages nearly doubles every year, a good investment for any one having money.

Response to water shortage

In Jhargaon, the collection of rain water during rainy season by making an artificial pond is a response of the farmers to water shortage and soil erosion problems. The farmers provide water for the animals through water collected in the pond.

Khoria practice: a means to safeguard a natural resource base

Several types of khoria practices found in study areas are discussed earlier. Questions were concerned with why farmers practiced khoria in the past, and why they continue to suggest that khoria practice is not necessarily unfriendly to the environment, rather a way or mechanism innovated by farmers to restrict/control themselves to move here and there in the forests in search of fodder, litter and fuelwood. As they have been allocated a piece of land, they are to use only that. Through this process they have protected forests in the past and continue to do so presently. The farmers had several reasons for practising *khoria*. These include:

Supply of fuelwood and fodder

For the farmers *khoria* is the source of fuelwood, fodder and grasses. As forest lands are individually owned, farmers cannot enter forests other than their own as they wish. They further argue that *khoria* land is not good for forests. This further implies that in the past the farmers had innovated a way to protect other, good forests in the area by making the provision of personal "khoria" and at the same time fulfil the need for fodder and fuelwood.

Economics of crop production

In both the villages all respondents reported that the amount of cereal crops harvested per unit area from *khoria* lands is nearly double or more as compared to that from permanent agriculture (upland fields). However, in terms of labour, *khoria* is more demanding than upland fields. Since farmers do not consider family labour as an expense, they see farming in khoria as profitable and economic. And many respondents reported the declining yields of major cereal crops on permanently cultivated lands (*numbari jamin*). When asked to compare the economics of cereal crop production in *khoria* land and in the upland fields, all respondents said that the two cannot be compared. Farming in the forest seems very economical to them.

Claiming the ownership

Of the many reasons for continued khoria practice among the farmers, the ownership factor appeared a crucial one in my study area. The respondent farmers reported that they have been practising khoria for three generations. Many respondents said that if they do not practise khoria or take *'nyaule'* from the people renting their *khoria* lands, they are afraid that they will be lose the ownership of the lands. However, forests in Nepal belong to the government, per the Private Forest Nationalization Act 1957. As in many other areas (Carter 1992, Gilmour and Fisher 1991), the residents in these areas seemed not really concerned with the Forest Act, but adhered to the traditional right to practise khoria in the forest. They say that the forest is their khoria.

Environmental problems

In both the villages all respondents said that to date they have experienced neither land slides, soil erosion nor unnecessary forest burning as a result of *khoria*. They claimed that the people practicing *'khoria'* burn forests without harming other *khoria* lands and forests. Since there is a definite and permanent place for khoria in Jhargaon, the villagers strictly observe that no portion of other forest land is burnt. The community imposes a fine of Rs. 500.00 (Approximately US$ 10) on some one who violates the rule by attempting to burn forest elsewhere for khoria or other purposes. In addition, the community fines those who carelessly burn their own personal khoria and endangering others' lands.

In response to a question concerning confrontations with forest authorities, all respondent farmers reported that they can recall no such events to date. This was confirmed by the forest authorities working in the district. Apart from that, respondent farmers gave the following explanations to support the claim that *khoria* practice does not harm the environment.

- Almost all the respondent farmers said that if they do not burn the forests when the soil is mature (*chipeko mato*), many undesirable weeds emerge and there would be a shortage of grasses for animals. When asked how they know when the soil is mature, they said that they determine it by digging down a few inches in the top soil. Depending on the colour of the soil, farmers select crops. For example, farmers sow upland paddy if the soil is red, and maize if the soil is black. In addition to this, they look at vegetation in the forest area. According to them, they would not practice khoria if the forest consisted of Sal (*Shorea robusta*) bushes in large numbers. This means that the land is of poor quality; but an abundance of plants such as Titepati, Dhurseli and Bhogati means the soil is good for growing crops.

- Many respondent farmers also reported that for them the fallow period in khoria land is important. All respondents claimed, "We know that it takes about eight to nine years for forest soils to mature, and we keep the fields fallow for this period". Although they say that decreasing fallow periods means risking crops, field observation clearly indicated that in many instances, farmers have started to reduce fallow periods.

- All the respondent farmers argued that they make maximum efforts not to disturb soils in khoria lands.

When the same question was asked to the farmer respondents not currently practising *Khoria*, almost all respondents (except three), said that they practiced it a few years ago and did not experienced any damage or negative consequences. However, three respondents said, "One *khoria* destroys seven forests".

Poverty, Ethnicity and Khoria

The khoria practice in Jhargaon does not appear directly related to ethnicity or poverty. Most, if not all of the households, own a portion of forest land for *khoria,* and the local residents are economically better off there as many of them are either pensioners or serving in Nepalese, Indian, or British Armies. Furthermore, Jhargaon appears homogenous in terms of ethnic composition of the village. On the other hand, Jaalbhanjyang suggests a direct relationship between poverty and khoria practice (Table 4.11).

Thus this study reveals that in Jhargaon and Jaalbhanjyang, peasant farmers had started *khoria* practice as it was necessary to conserving natural resource base from haphazard cutting and burning of forests in the area. The *community khoria* is an example. The system of '*nyaule*' serves systematically to facilitate the process and avoid confrontations in the community. Interestingly, in Jhargaon, community *khoria* land is located just above the *khet* land (low land suitable for rice) suggesting that the fertile soils and ashes washed from *khoria* would get deposited there. This process thus helps maintaining the fertility of the rice field, too.

Table 4.11 Relations among ethnicity, poverty and khoria in Jaalbhanjyang

Ethnic Group	Number of Households (HH)	Poorest HH NO	Households Khoria	Remark
Bhujel	10	7	7 (100 %)	Percent for
Magar	23	4	3 (75 %)	poorest HHs
Gurung	8	1	1 (100 %)	
Kami	1	1	1 (100 %)	
Damai	1	1	1 (100 %)	
Total	43	14	13 (92.8)	

* The poorest households refer to those households whose farm does not support for more than three months (farmers' criteria in the field).

Source: Field study

When asked about burning of forests in the area, farmers said that they do not deliberately burn forests. In general, the cause of forest fires is smoking. People carelessly throw

matches after lighting cigarettes which leads to forest fires in the dry season. Farmers went on to say that although they often extinguished fires if they saw them, the problem itself is not bad. The process facilitates flushes in the plants, increasing availability of fodder and grasses for the animals in the next season. "And we are very careful to see that big trees are not burnt. The rangers (field staff of the Forest Department) do not work to protect the forest well.

4.5 Assessing problem situations in sustainable agriculture

Although the farmers in all six villages were divided when describing the present state of agriculture, in Maskichhap, farmers perceived the present state of agriculture as improving, this study has provided evidence suggesting that Nepalese agriculture is threatened by unsustainability. If resource degradation is a major problem for agriculture in the mountains and hills, the Terai has a problem of post-Green Revolution agriculture. In addition to this, the study indicated that the notion of sustainability or **Digo Krishi** would not attract or motivate farmers to participate voluntarily in any program of change or innovation, unless productivity concerns are adequately addressed in them. In other words, improving net farm income with increased total harvest per unit area or animal unit should be a part of the definition of sustainability. For the farmers, sustainability and productivity are two sides of a coin and cannot be separated from each other.

But, as remarked by Antholt (1994), future increases in agricultural production are apt to be more incremental and come from technological improvements derived from identifying, developing, and applying more efficient practices. Such practices include better plant stands, minimum tillage, improved weed control, better land and water conservation, integrated pest management, improved soil fertility management, better use of irrigation, and/or switching to crops or livestock options which take better advantage of emerging market demands and the natural resource base. In view of the finite and fragile nature of the natural resource base, the issue of sustainability today is more obvious and urgent than ever. This means that, for farming to become profitable and productive, the issue of sustainable management of natural resources should receive top priority.

4.6 Summary and conclusions

This chapter studied farmers' perceptions of and responses to sustainable agriculture. This revealed an opportunity for interventions for sustainable agriculture. Farmers' dissatisfaction with the present state of agriculture means forthcoming cooperation and support for the changes or interventions, if taken or introduced appropriately. Farmers have recognized a need for change. And, indeed, farmers know their problems well (the wearer knows where the shoes pinches), and have been making various responses. If some activities of the farmers seemed directly supportive to enhance sustainability of agriculture, some seemed to affect negatively; the use of dung for fuel is one example, although it is not widespread in the study areas. And some responses of the farmers were directed towards survival strategies, as for example, shifting cultivation and migration.

Some people often blame farmers for their tendency to seek solutions at the farm level whereas the solutions remain at the community or other levels. However, the findings presented in this chapter seemed not to support this opinion. Examples such as the community khoria practice, provision of "nyaule" and the sharing a wife among brothers in a family suggest that in many instances, farmers, in the past, sought and constructed solutions at the societal level too. This shows an interrelatedness of agriculture and culture. Hence, while introducing any programs for change, adequate understanding of socio-cultural contexts is crucial.

PART II

TOWARDS THEORY AND METHODS

CHAPTER 5

APPROACHING SUSTAINABLE AGRICULTURE: EMERGING ISSUES

> *"... sustainability, after all, is an enormously powerful symbol. In terms of its emotional meanings, it probably ranks alongside such concepts as freedom, liberty, and democracy. Indeed, while these latter American political icons may or may not be essential to the continuation of life itself, the very thought of an unsustainable agriculture immediately conjures up images of massive human deprivation and suffering and, ultimately, mass starvation. What could be more important than sustainability? It is difficult to imagine a more powerful symbol".*
>
> *Youngberg et.al. (1993)*

As evident from the above statement, in recent years 'sustainability' has become as normal a part of the language of almost all development projects as the word 'participation' is. The word invariably appears if the project is externally funded. Although, in many instances, it has been oversold, overused and misused, attaining sustainability is always one of our concerns whether we or not use it explicitly. It applies equally to our homes, farms, agriculture, projects and/or institutions. Besides, the value of the concept has increased due to its ability to overcome the old dichotomy that people support either economic progress or environmental protection (Murdoch, Ward and Lowe 1994). Indeed, the concept is so encompassing that professionals from different schools of thoughts (e.g. economists, ecologists, sociologists, natural scientists) have found easy shelter in it. But, as Rivera (1991) said, conflict exists in and around the subject of agriculture. The concept of sustainable agriculture is one of the central issues in such conflicts.

This chapter intends to elaborate some emerging issues of sustainability and sustainable agriculture. The purpose is to set the area of discourse for research and provide the background for the next chapter, which attempts to provide a framework for studying intervention processes.

5.1 Crisis of definition

The widespread adoption of the term "sustainable agriculture" has exploded into people's awareness and interest, and into the efforts of many projects in both the governmental and private sectors.

Many scholars working in the field of sustainable agriculture have now begun to express deep concern over current contradictions and conflicts surrounding its meaning. Allen (1993) argues for reformulating theory and practice for sustainable agriculture so as to prevent it from reproducing the ecological and social problems of current food agricultural systems. Offering a similar viewpoint, Castillo (1992) warns that people are

likely to be as disillusioned with sustainable agriculture as they have been with the Green Revolution; people are asking too much of it by seeking in it societal goals such as social justice, equity, and poverty alleviation. For example, Altieri (1993: 200) suggests making the following top priorities while formulating strategies for a sustainable agricultural development in the South:

- Reduction of poverty;
- Ecological management of productive resources located in fragile ecosystems;
- Food security and self-sufficiency; and
- Transforming rural poor communities into social actors capable of determining their own development.

On the other hand, upon finding conventional Green Revolution experts selling their old wine in the new bottle of "sustainable agriculture", Lele (1991) expresses her concern "for the lack of a clear definition of and agenda for sustainable agriculture". However, as noted by Hart and Sands (1990), a commonly accepted definition is not likely to emerge in the near future. This is so not only because the concept has emerged from the synthesis of different perspectives (economic, sociological, biological, ecological, etc) (Gips 1988), but also because people tend to define it in different ways to conform to their orientations, philosophies and interests. In this period of agricultural change, people, by nature, tend to define sustainability differently as guided by different philosophies and varied interests (Francis and Youngberg 1990).

In view of the above, authors such as Conway and Barbier (1990) have made an appeal for defining sustainable agriculture as clearly as possible in terms of what it means in both theory and practice. Otherwise, they argue, it is very likely that the very purpose of sustainable agriculture will eventually be defeated and destined to become one of the slogans of the post-Green Revolution era, much like the "basic needs program".

Quite differently, Pretty (1994) says, "Any attempt precisely to define sustainability is flawed". Stressing that sustainability represents neither a fixed set of practices or technologies, nor a model to describe or impose on the world, he argues that the question of defining what we are trying to achieve is *part* of the problem, as each individual has different objectives.

Having highlighted definitional issues facing sustainable agriculture, the remainder of this chapter focuses on the following two issues:

- The meaning of sustainability; and
- Approaches suggested to achieve the goal of "sustainable agriculture".

5.2 The meaning of sustainability

Although "sustainability" has been defined in numerous ways, at least two different views can be distinguished. The first view, advanced by Conway and his colleagues, defines sustainability in terms of system resilience, or the property of an agricultural system.

Unlike the first, the second view argues that sustainability is an emergent property of a "soft" system, the human activity system[1].

5.2.1 Sustainability as a property of the agroecosystem

Authors such as Conway (1985, 1994), Conway and Barbier (1990), Marten (1988) and Beets (1990) view sustainability as one of the properties of agroecosystems. The other properties are stability, equity, productivity and autonomy. Emphasizing that each agroecosystem, at each level of the hierarchy, has a social value, they define the social value of an agroecosystem as the product of the levels of the four different system properties (Conway 1994).

They define sustainability as the ability of an agroecosystem to maintain productivity, whether of a field or farm or nation, when subject to a major disturbing force such as stress and shock. A stress may be increasing salinity, or erosion, or debt; each is frequent, sometimes continuous, relatively small, predictable force having a large cumulative effect. Large and unpredictable events such as a new pest, a sudden massive increase in input prices, or a rare draught also constitute a shock.

Two major problems could come with this view. They are as follows:

- Defining sustainability with such a view implies that the sustainability of agriculture can be improved by increasing system diversity and by fostering nutrient and energy cycling (and thereby reducing the use of external inputs) through the development of suitable farming systems. This view tends to portray the farm as a "closed box" ecosystem, as used in natural ecosystem modelling, whereas farms are actually open systems and the interactions (or flows) between the "outside" and "inside" of farming systems are highly influential on production. In the agricultural context, the notion of "hierarchies" and "boundaries" are artificial as well (Thrupp 1991). This view, thus, overvalues the instrumental role or ability of people to manage the agroecosystem.

- Designing a modern agriculture that simultaneously satisfies Conway's criteria of productivity and sustainability appears a good theory but with little value for practice.

On the other hand, an agroecosystem is a system that probably might never be fully described or comprehended. Ecological processes tying people, crops, animals, micro-organisms, soil and water together into a functioning, on-going ecosystem are numerous and highly intricate (Marten 1988) and the whole system is dominated by the consequences of human goals and economic cooperation and competition (Conway and Barbier 1990). Hence, attaining a trade-off between these properties is difficult, because objectives such as productivity and sustainability are objectives of people. This requires intersubjective understanding among different actors, given the characteristic situations of conflict and competition among different people, organizations and institutions in attaining their private and public goals. This leads us to look the other school of thought on

sustainability, which not only rejects the idea of the farmer as a "rational" manager of purposeful plant/animal relationships but also the notion of a purposeful agroecosystem moving around in a field of environmental forces like some ideological tectonic plate, in its attempt to be more productive, stable, sustainable and equitable (Bawden and Packham 1991).

5.2.2 Sustainability as an emergent property of a soft system

The other school of thought, advanced by Sriskandarajah et.al. (1989), Röling (1992), and Bawden and Packham (1991), argues that sustainability should be looked at as an emergent property of a soft system. Central to this view is the recognition that sustainability is a complex, constructed, negotiated and contextual concept. To comprehend the meaning of sustainability, it is necessary then to understand the meaning of two key concepts, emergent properties and soft systems. "Emergent property" means that, in systems, the whole is different from the sum of its parts, with the difference being the emergent property. Some of the key ideas of soft systems, summarized by Naughton (1984), are the following:

- "Problems" do not exist independently of observers; they are constructs of the concerned mind.
- Just as problems are intellectual constructs, so too are "solutions".
- People have different appreciations of problem-situations, because they see them in genuinely different ways. It is often difficult, and sometimes impossible, to adjudicate between the merits of these different "ways of seeing".

Central to this view is, therefore, to stress that goals such as productivity and sustainability are objectives of people and emerge from soft systems, human activity systems, not from natural (e.g. plants) or designed systems (e.g. computers). To this view, defining sustainability is a part of the problem. Hence, it becomes necessary to understand not only how the entity or the system is formed or who its actors are, but also how people give meaning to a system and how they define the problem situation, i.e., problems of sustainable agriculture, and work synergistically to attain sustainability. This implies that sustainability is the outcome of people's behavior and actions.

5.3 Approaching sustainability of agriculture: rethinking means and ends

Despite wide disagreement over the meaning of sustainability in recent years, the question being asked is no longer is sustainable agriculture desirable but, how can sustainable agriculture be achieved? Not surprisingly, different people and organizations have therefore advanced different approaches to sustainable agriculture. Needless to say, these approaches depend on how the notion of sustainability is interpreted. For example, showing discontentment with the way sustainable agriculture is defined, Chambers (1988) says satirically, it is the enlightened rich who give priority to sustainability, the poor are

largely concerned with their immediate livelihoods. He goes on in the same vein saying that we are in a better position than the poor to recognize what is good for them. In line with this perspective, he advances the concept of "sustainable livelihood security". To him environment and development are means, not ends in themselves.

Two different approaches to sustainable agriculture can be currently distinguished:

- Promoting changes in the land use systems and other technological options;
- Shifting the paradigm of farming.

5.3.1 Promoting changes in the land use systems

Land use systems, e.g. agroforestry, permaculture and low input sustainable agriculture, and technological options such as integrated pest management and integrated nutrient management, are often proposed and promoted as approaches to achieving sustainability of agriculture. Although these approaches vary in terms of technologies and other criteria, their common concern is to bring about changes in the existing land use systems, agriculture and farming practices. They advocate a more ecologically balanced agriculture with a focus on both permanence and productivity. These approaches are often advocated as potential options to reverse emerging trends towards unsustainability in mountain agriculture. In terms of intervention strategy, Jodha's scheme is a good example of this approach.

Arguing that the sustainability/ unsustainability is an outcome of the match/mismatch between development thinking and actions, Jodha (1990, 1992) suggests to view mountain agriculture from a mountain perspective, and fragile area agriculture from a fragile area-perspective. To this end, he provides a practical framework to identify indicators of unsustainability relating to resource base, production flows and resource use/management practices, although most of the changes are inter-related and could fit into more than one block (Table 5.1). The essence of this approach is to identify the factors and processes underlying the negative trends in resource productivity, resource use patterns and health status of natural resource base in an area, and reorient research and development strategies accordingly.

Not only is the inadequacy of the conventional development paradigm the concern of these approaches, but they also oppose technological determinism- claiming that if the right technologies were developed, sustainability would result. Since some of these approaches will be examined in greater detail later, I move on now to the next approach, which calls for shifting the paradigm of farming as consistent and coherent with the logic of sustainability. I discuss the second approach in some detail because it seemed more appealing and convincing for interventionists, such as myself- who have completed not less than two decades as an extensionist with the Ministry of Agriculture in Nepal.

Table 5.1 Negative changes as indicators of the unsustainability of agriculture (mountain agriculture)

Visibility of Change	Changes Related to:		
	Resource Base	Production Flows	Resource Use/Management
Directly visible Changes	Increased land slides and other forms of land degradation; abandoned terraces; per capita reduced availability and fragmentation of land; changed botanical composition of forest/pasture. Reduced water-flows for irrigation, domestic uses, and grinding mills.	Prolonged negative trend in yields of crop, livestock, etc; increased input need per unit production; increased time and distance involved in food, fodder, fuel gathering; reduced capacity and period of grinding/saw mills operated on water flow; lower per capita availability of agricultural products; etc.	Reduced extent of: fallowing, crop rotation, intercropping, diversified resource management practices; extension of plough to sub-marginal lands; replacement of social sanctions for resource use by legal measures; unbalanced and high intensity of input use etc.
Changes concealed by responses to changes	Substitution of: cattle by sheep/goat; deep rooted crops by shallow rooted ones; shift to non-local inputs. Substitution of water flow by fossil fuel for grinding mills; manure by chemical fertilizer	Increased seasonal migration; introduction of externally supported public distribution systems (food, inputs) intensive cash cropping on limited areas.	Shifts in cropping pattern and composition of livestock; reduced diversity, increased specialization in monocropping; promotion of policies/programs with successful outside record, without evaluation.
Development initiatives etc.- potentially negative changes	New systems without linkages to other diversified activities; generating excessive dependence on outside resources (Fertilizer/ pesticide-based technologies); ignoring traditional adaptation experiences (new irrigation structures)	Agricultural measures directed to short term quick results; primarily product- (as against resource) centred approaches to agricultural development etc.	Indifference of programs and policies to mountain specificities, focus on short term gains, high centralization, excessive, crucial dependence on external advice ignoring wisdom.

Note: Most of the changes are interrelated and could fit into more than one block

Source: Jodha (1990)

5.3.2 Shifting the paradigm of farming

Unlike Jodha's approach to sustainability through unsustainability, the second perspective, suggested by Röling and Jiggins (1994) and Röling (1994, 1994a, 1994b), calls for a fundamental "paradigm" shift in the way we think about and practice agriculture, and then for adjusting, adapting and expanding knowledge systems[2] accordingly for sustainable agriculture as consistent and coherent with its logic. Based on the practical experiences of programs such as the facilitation of land care in Australia, farmers' field schools in Indonesia and the installation of a local network among Adja farmers in Benin, this approach rests on two intertwined emerging issues, recognition of differences between conventional and sustainable agriculture, and the changing conception of agriculture

In view of the above, it is first necessary to understand some fundamental differences between conventional agriculture and sustainable forms of agriculture (Table 5.2). This table clearly illustrates two things. Firstly, it reveals how the conception of agriculture changes from production concerns to the management of natural resources. Secondly and more importantly, it illustrates corresponding, important implications for farmers, researchers and extensionists.

Based on the concerns outlined in sustainable agriculture, the key issues of this second perspective can be briefly described as follows:

Need for a coupled system

For sustainable natural resource management, a coupled system is required between a "hard" agroecosystem constructed according to biophysical science and managed on the basis of instrumental reasoning, and a "soft" platform constructed according to social insight and managed on the basis of strategic and communicative reasoning. This also means that sustainability should be viewed as an emergent property of such a coupled system.

System level of aggregation (agroecosystem)

The approach emphasizes that some of the key variables for the sustainable management of natural resources at the farm level can be controlled only by managing ecosystems at higher levels of aggregation such as the irrigation block and water catchment. This requires ability on the part of all relevant stakeholders to decide and act at higher levels of aggregation. Moving up the level of aggregation means in turn that diverse and conflicting objectives must be assembled into rich pictures and mutually accommodated to shared perspectives and values.

Tasks for research and extension

Instead of transferring technologies, research and extension support farmers to be experts in managing complex systems and facilitate their learning, experimentation and manage farms and learning groups; facilitate platform processes, make visible the effects of human activity, and search for ways to accommodate and involve stakeholders.

Table 5.2 Conventional agriculture and sustainable agriculture contrasted

	Conventional agriculture	Sustainable agriculture
Major emphasis	Developing profitable production techniques and systems through science	Managing natural resource sustainably
Solution to agricultural problems	Technology development	Nature of agricultural development is determined much more by prevailing economic, political and social relations than by the requirements of technologies
Focus (system level)	Farm	Farm and higher level ecosystem
Nature of farming	Routine application of inputs	Management of natural processes and fine tuning of input application based on observation and inference
Nature of technologies	Calendar-based, use of inputs, external-input-intensive	Observation-scouting, knowledge-intensive use of natural problems
Strategies for voluntary change	Transfer of technologies	Making things visible Fostering policy acceptance Facilitating platform processes

Source: Adapted from Röling (1993), Röling and Jiggins (1994), Röling (1994a, Röling 1994b) and Altieri (1993)

Finally, I would like to highlight some key issues of the facilitation of platform processes, leaving aside the conventional Transfer of Technology (TOT) process which will be adequately discussed in the next chapter.

Facilitation of platform processes is a strategy proposed for promoting sustainable natural resource management (Fig 5.1). It focuses on creating and/or strengthening platforms of stakeholders in a threatened natural resource by creating 'rich pictures' of the diversity of interests and life worlds of the stakeholders. This concerns not only the interface between

platform and natural resources, but also the stakeholders themselves. And making interdependence of actors visible in a natural resource use is a key area for active facilitation at all levels of aggregation.

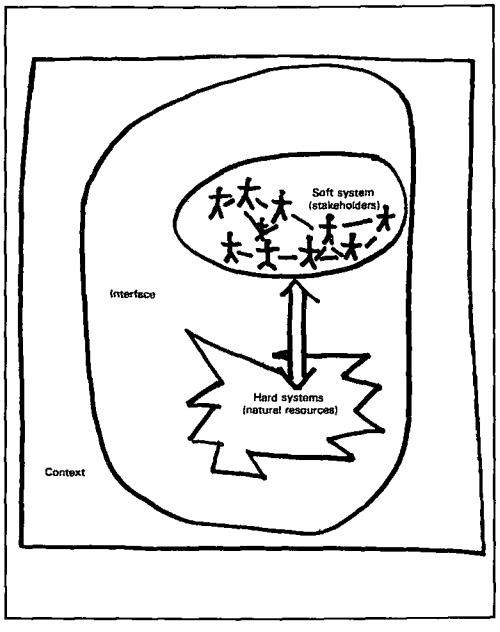


Figure 5.1 Platform-ecosystem perspective on sustainable natural resource management

Source: Röling (1994b: 393)

Regardless of whatever has been said about facilitation platform processes, it is a fact that we presently know very little about such platforms. Existing units for collective decision making, such as the household, village, district and farmer associations, have not been set up for natural resource management and/or do not correspond to the system to be managed (Röling 1994).

In sum, this chapter argued that the shift to more sustainable farm practices is not a question of adopting new technologies but a shift in the entire paradigm of farming (van de Fliert 1993, Röling and Jiggins 1994, Pretty 1994). This requires fundamental changes in extension practices, institutions, contexts and models. Making a shift from production focused agriculture to sustainable agriculture poses fundamental challenges to all, farmers, researchers, extensionists and other relevant stakeholders.

5.4 Summary

This chapter first discussed some emerging issues facing sustainability and sustainable agriculture. It argued that sustainability neither represents a fixed set of practices or technologies. As sustainability and productivity are objectives of people, they emerge from human activity systems, not from natural (e.g. plants) or designed systems (e.g. computers). Hence, viewing sustainability as an emergent property of a soft system, this chapter took the side of the school of thought which opted for a fundamental "paradigm" shift in the way we think about and practise sustainable agriculture, and for adjusting, adapting and expanding knowledge systems as consistent and coherent with the logic of sustainable agriculture. The need is to loosen the grip of the dominant view that sustainability is a goal which can be attained through making some adjustments to the standard development models.

Notes

1. The concept of "system" is used differently by different people. These different uses of the notion "system" collectively constitute systems thinking, which encompasses any use of the core idea of an adaptive whole to understand or intervene in the complexities of human affairs (Checkland and Haynes 1994).

   To Checkland (1981), to accept that a system has carefully defined goals is "hard system thinking", and this implies that the myths and meanings by means of which human beings make sense of their world are in place, and static, and the effort can focus on facts and logic. The "soft system" regards system as models relevant to arguing about world, not models of the world; this leads to "learning" replacing "optimizing" or "satisfying"; this tradition talks the language of "issues" and "accommodations" rather than "solutions". "Soft system" are mental constructs or figments of the imagination. They are used to initiate and structure debate about complex issues (Bawden and Packham, 1989). In contrast to hard systems thinking, soft systems thinkers consider reality as a mental construct of human actors.

2. Röling (1991) defines the agricultural knowledge systems as the articulated set of actors (including networks and organizations) who are expected, or managed, to work synergically, in order to support the knowledge processes which could improve the correspondence between knowledge and the environment; and possibly tc support the use of technology in any domain of human activity.

CHAPTER 6

ON INTERVENTION: CONCEPTS AND THEORY

While the last chapter attempted to loosen the grip of the dominant view that sustainability is a goal which can be attained through making some adjustments to the standard development models, in this chapter, I review concepts and theories with respect to intervention, more particularly to planned intervention. The purpose is to establish a preliminary conceptual framework to study intervention. In the present situation, searching for a practical approach to study intervention has become crucial, at least for three reasons. Firstly, ideas about intervention have changed much in recent years in response to the frequent failure of planned interventions in having a substantial impact on the lives of those to whom they were supposedly directed. Secondly, the assumptions and procedures of the blueprint approach[1] to development interventions, such as the conventional Transfer of Technology model (TOT), continue to dominate most rural development programming (Röling 1991, Chambers 1993, Scoones and Thompson 1994, Antholt 1994) despite widespread awareness that such an approach is an inadequate response to the rural development problem (Chambers and Jiggins 1986, Long and Van der Ploeg 1989, Röling 1988, Russel and Ison 1991) and facilitating sustainable agriculture (Röling 1992, Gibbon 1994). Lastly and most importantly, dominant sustainability discourses manifest a tendency towards technological determinism, which, in my view, is not only a partial view, but also one of the most likely cause to further aggravate problem situations. Particularly, this applies to most of the developing countries and Nepal is not an exception. Indeed, a strong technology transfer bias exists in Nepal's agricultural development process (Compton 1993, Basnyat 1990, Baral 1989, Pradhan and Sinha 1988).

This chapter first looks at the broad question of the meaning of intervention. In doing so, I intend to bring in multiple viewpoints. The focus of this chapter then gradually narrows from the meaning to intervention models. The chapter expands again, looking at the concept of systems thinking and concludes by identifying consequences of viewing intervention as a soft system, where soft system is used as a perspective.

6.1 Exploring the meanings of intervention

Intervention, a derivative of "intervene" has a variety of meanings in ordinary usage: interference, mediation, negotiation and so forth. However, for our purposes, van Woerkum's typology of intervention (Figure 1) seems useful to start a discourse on intervention. According to this typology, intervention is a purposeful act that intends to offer some kind of solution to a problem (that exists in a specific situation) so as to change human behaviour compulsorily or voluntarily (Van Woerkum 1991).

Central to this typology is finding an appropriate "intervention mix", which means a specific combination of the possible interventions (laws, facilities, social pressure, money and extension) to be used while addressing problems in a particular situation.

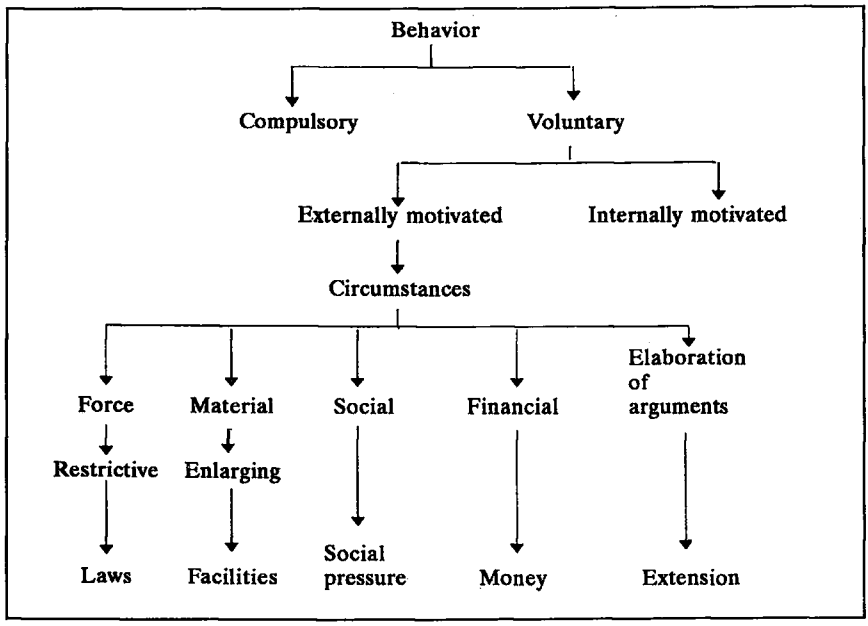


Figure 6.1: Van Woerkum's typology of intervention

Not only is fine tuning the concern of this typology, but also it maintains that interventions such as extension could be given a role of its own, and/or used to support other interventions (e.g laws, facilities). In short, this view considers intervention as an external activity. Although this typology emphasizes simultaneous interventions at different levels and the need to create linkages between these levels, one of the crucial problems with this typology is that it puts target groups or clients behind the screen. Hence target groups appear as an instrument to be intervened upon. As well, putting together a scheme for adequate intervention mixes is a difficult task.

The other definition of intervention comes from Röling and De Zeeuw (1983). They define intervention as follows:

> *Intervention is a systematic effort to strategically apply resources to manipulate seemingly causal elements in an ongoing social process, so as to permanently reorient that process in directions deemed desirable by the intervening party. (Röling and De Zeeuw 1983: 32).*

Criticizing the above definition, Long and Van der Ploeg (1989) argue that such definitions slip into a top-down, externalist and managerialist view of intervention. Specifically,

they remark that such a vision runs counter to other parts of Röling's discussion of extension strategies that emphasize the importance of farmers as active in developing and adapting information and in asking for the kinds of information that they find useful.

In addition, this definition ignores the role of other actors in the intervention situation - whose interests and interference might alter the direction of the intervention process and its desired outcome (Grimble and Man-kwun 1994). Thus, it failed to recognize not only the diversity of actors who are likely to have a stake in the outcome, but also the need for cooperation across a wide range of organizations. Röling (1994: 284-285) has himself raised this issue of actors and stakeholders[2] while discussing the interface between agroecosystems and platforms for decision making. He says:

> *".. the examples show that sustainable natural resource management is not only a question of biophysical information and technical intervention[3]. It requires accommodation among human actors (Long 1984, Long and Long 1992) who use the same natural environment with different purposes. These stakeholders are interdependent in that each affects the desired outcomes of the others. Therefore, environmental management involves collective 'agency' (the capacity to make a difference) at a platform of decision making which includes all stakeholders."*

The above view also implies that what any "development project" eventually intervenes in are not just "logical sequences of events" and "interrelationships between processes", but social relationships between social actors (Van Oppen 1990). This requires us to examine the meaning of intervention through an actor-oriented perspective[4].

An actor-oriented perspective views intervention as an on-going transformational process in which different actors' interests and struggles are located, rather than viewing it as the implementation of a plan of action with expected outcomes. Integral to this type of approach are two other crucial aspects: an understanding of the processes by which knowledge is negotiated and jointly created through various types of social encounters, and an understanding of the power dynamics involved (Long 1992). Thus this perspective views intervention as a "multiple reality" made up of differing cultural perceptions and social interests, and constituted by the on-going social and political struggles that take place between the social actors involved (Long and Van der Ploeg 1989). Hence, it argues that an analysis of a "development" endeavour cannot avoid an examination of the complex power processes and battles over images and meanings that take place at the interface between "outsiders" and "local groups" in the arena of "intervention situations" (Villarreal 1992). The concept "interface[5]" functions as metaphor for depicting areas of structural discontinuity inherent in social life generally salient in "intervening" situations (Long 1989).

Crediting the actor-oriented perspective for bringing out a number of seemingly important "guiding analytical concepts" such as agency, social actor, multiple realities, arena's of struggle, life-worlds, discourses, interfaces, discontinuities of interest, values, knowledge, power, structural heterogeneity, strategies, interlocking projects, organizational fields, networks of knowledge and power, and processes of negotiation and accommodation, Leeuwis (1993: 90) nevertheless could not find how these concepts are theoretically

connected to each other. In addition, he cited some critics who had argued that the actor approach provided a better language for dealing with struggles and conflicts that emerge at particular social interfaces, than with the cooperation, accommodation, and collective agency which is also implicit in such interface situations. Finally, he concluded that the understanding of these latter phenomena too is crucial for achieving non-accidental social change. And Drinkwater (1992) is not content with the conceptualization of interface. Further elaboration of his concern is important here as this is relevant to this study.

Drinkwater (1992: 371-372) points an inconsistency in the way "structure" is conceived in actor oriented perspective. He argued that any face-to-face encounter is a *local* encounter, even if the participants might represent in an abstract sense different structural levels (themselves, the family, the village, district level government, national level government, international institutions). Thus structure may be present in any encounter, and interface encounters might be between people from various structural levels, but they are not an articulation of "the local" and "structural context". Nor, therefore, does the analysis of interface encounters represent the combination of actor-oriented and structuralist sociological approaches. To this situation, he argued that the key distinction between agency and structure is not one of structural levels but of perspective. An actor-oriented perspective, whether or not it focuses on interface encounters, forces us to look at what people are doing and understand their actions from *their* point of view. On the other hand, a structuralist perspective is an overview account of the subject of study. Thus it is not *what* we study but *how* we study it that is all important. The following example further clarifies this point.

> *If one investigates why a government agricultural extension agency continues to pursue policies unpopular with farmers and to operate in a 'top-down', didactic manner, despite an ostensible shift to a more participatory, 'bottom-up' approach, then certainly one will look at the nature of interaction between extension agents and farmers. Nevertheless, one will also need to focus on intra-agency interactions to furnish an explanation. Obviously, how actor-oriented the approach is will depend on how richly and sensitively one is able to display these interactions. Similarly, if the work is depicted as providing insights into how the extension agency functions as an organization, then one would also expect the researcher to use the actor material in the provision of an incisive overview analysis (1992: 373).*

In short, as put by Van der Ploeg (1989), one has to go **beyond** interface, and try to decipher how the rules of the game are defined and reinforced elsewhere, if one needs to understand what is happening in interface situations, and especially to understand why things happen the way they do.

Contrary to the above actor-oriented views on intervention, Dusseldorp (1990) asserts that man is a *homo planicus*: individuals are constantly engaged in a complex whole of basic, communal and/or formalized linking loops, making assessments, identifying problems in relation to objectives, and assessing and allocating resources. Dusseldorp (1990) not only argued that it is not realistic to say that planned intervention should wait till the sociologists know what is going on, as appeared to be suggested by the actor-oriented perspective. He also claimed that wholly successful planned development, in the sense that the

outcomes predicted are realized within the time span indicated and with the means allocated, is only possible when the following four prerequisites are fulfilled:

- There must be general agreement among all actors involved on the consistency of the objectives;
- There is knowledge of the functioning of all relevant processes and their interrelationships, as well as the ways in which they can be manipulated;
- There is the power and means needed to manipulate these processes; and
- There is a political will to use the power and the means available.

However, based on their empirical research on computer-supported enterprise comparisons among Dutch horticulturists, Leeuwis and Arkesteyn (1991) questioned the usefulness of the prerequisites Van Dusseldorp formulated. To them, this perspective is inadequate to improve the state of affairs when the objectives of the participants change and consensus crumbles during the development project. In view of this, they assert that the nature of formal projects as understood by Van Dusseldorp, as well as planners' perceptions of development, needs to be altered.

In short, intervention is a problematic concept which means different things to different people according to their orientations. It can be thought of as a problem situation in which human perceptions, behaviour or action are the dominating factors and where goals, objectives and even the interpretation of events are all problematic. Partly, this explains why people-oriented projects like community forestry very seldom follow the course that was indicated in the plans.

6.2 Intervention models/approaches

Since knowledge transfer and utilization processes in the agricultural sector cannot remain untouched by contemporary development thinking and paradigms and vice versa, first of all, this section briefly discusses two contrasting approaches to rural development, namely the blueprint and learning-process approaches, and then examines three models /approaches of agricultural knowledge system[6] namely the transfer of technology, farmer first approach and the recent 'beyond farmer first'.

6.2.1 Approaches to rural development

The paradigm of intervention that dominated the 1960s and 1970s is popularly known as the blueprint approach. However, this does not mean that it is now history. As noted by Korten (1984) and others, its assumptions and procedures continue to dominate most rural development programming and to provide the core content of most training courses in development management. The approach, built around production-centered development, favours the command-system forms of organization, which respond to formal central

plans based on the decision rules and methodologies of rational decision analysis. It is a programming approach quite appropriate to certain types of development projects- most notably physical infrastructure projects- where the tasks and outcomes are defined, environment stable, and cost predictable.

The 1980s, in contrast, was a decade marked by a search of alternative strategies; a search led "by a number of Third World governments, by social movements of various kinds, by small groups of researchers and planners, as well as by people in different international organizations" (Stavenhagen 1986). The search implied rejection of externally imposed models, more emphasis on the needs of the poor (the very poor, especially), greater respect for the physical environment, a better appreciation of social forces, more awareness that development efforts must be sustainable and based on policies that are participatory rather than technocratic. Of these alternatives, the learning-process approach is a significant one.

As opposed to the blueprint approach, the learning-process approach characterizes the performance of a development program as a function of the fit achieved between beneficiaries, programs, and assisting organizations. Central to this people-centred approach is facilitation of learning throughout the system that assigns to the individual the role not of subject, but of actor. The actor defines the goals, controls the resources, and directs the processes affecting his or her life. It places substantial value on local initiative and diversity. Chambers (1993) has contrasted the two approaches comprehensively (Table 6.1).

6.2.2 Transfer of technology

In agricultural research and extension, the most dominant model worldwide can be described as the conventional Transfer of Technology (TOT) model which best fits with the blueprint approach described earlier. In this model, agricultural research priorities are determined by scientists and by funding agencies; scientists then experiment in the laboratory and on-station to generate new technologies; and then hand them over to extension to transfer to farmers. The idea is seriously misleading because it implies that farmers have such inadequate knowledge about agriculture that they must depend upon professionals to provide them with the information and ideas to improve their situation (Whyte 1990).

Right from the beginning of the 1980s, the model came under heavy criticism, especially following the classic work of Chambers and Jiggins (1986). As stated by Röling (1989) it accepts only the supremacy of science-based technologies, and considers farmers as an instrument through which resource use is made more efficient and effective. As a consequence, millions of resource-poor farmers living in undervalued marginal areas are left behind. Russel and Ison (1991) argue that the model is neither good practice nor good theory. It blinds us to the actual knowledge processes and ignores as well important aspects of innovation processes (Röling 1991).

Table 6.1 The blueprint and learning-process approaches contrasted

	Blueprint	Learning Process
Idea originates in	capital city	village
First steps	data collection and plan	awareness and action
Design	static, by experts	evolving, people involved
Supporting organization	existing, or built top down	built bottom-up, with lateral spread
Main resources	central funds and technicians	local people and their assets
Staff training and development	classroom, didactic	field-based learning through action
Implementation	rapid, widespread	gradual, local, at people's pace
Management focus	spending budgets, completing projects on time	sustained improvement and performance
Content of action	standardized	diverse
Communication	vertical: orders down, reports up	lateral: mutual learning
Leadership	positional, changing	personal, sustained
Evaluation	external, intermittent	internal, continuous
Error	buried	embraced
Effects	dependency-creating	empowering
Associated with	normal professionalism	new professionalism

Source: Chambers (1993: 12)

The Nepalese experience with the TOT model is not different from the above. Many professionals and practitioners have time and again urged the Ministry of Agriculture to review its public sector agricultural research and extension processes, upon finding the bad fit between the TOT model and the country's agricultural system in practice (Pradhan and Sinha 1988, Baral 1989, Baral et. al. 1989, Basnyat 1990, 1991).

Furthermore, two externally funded agricultural research stations (Lumle Agricultural Research Centre and Pakhribas Agricultural Centres, funded through the Overseas Development Administration of the British Government) developed an informal research methodology for initiating, prioritizing and replanning research, named Samuhik Bhraman (Nepali for 'travelling together'). It is a form of rapid rural appraisal developed in response to Nepalese field conditions. It brings scientists, farmers and district officials together in order to understand farmers' environments and needs (Mathema and Galt 1990, Chand and Gibbon 1990).

Nevertheless, the TOT model is deeply embedded in normal professional thinking, as is the blueprint approach (Oakley 1989, Röling 1989, Chambers 1993). Blaikie and Röling give reasons for this. According to Blaikie (1985), it is easy to induce innovation along the biases that favour big over small farmers, cash crops over subsistence crop, maximum yields over maximum yields in bad years, irrigable over dry land crops, and higher yields per unit area over higher yields per worker; but not along biases enabling small farmers and pastoralists to maintain their livelihoods in areas of highest environmental vulnerability. To Röling (1992) the pervasiveness of this model is unavoidable since strong incentives and political dynamics keep it alive.

6.2.3 Farmer first

As said earlier, the TOT crisis encouraged a number of Third World governments, researchers and planners, as well as people in different international organizations, to search for alternative strategies. As Jiggins (1994) said, there has been in recent years an explosion of interest in development of methods and exploration of processes for working with farmers and other members of rural communities. As a result, a new paradigm for agricultural research and extension (Farmer first) evolved with many variants: Farmer-first-and-last model (Chambers and Jiggins 1986); Farmer-back-to farmer (Rhoades and Booth 1982); Farmer-first Approach (Lightfoot 1987); Approach Development (Scheuermeier 1988); Farmer Participatory Research (Farrington and Martin 1987); Participatory Technology Development (ILEIA 1989). The essence of the Farmer First (FF) approaches is a reversal of areas of TOT that had tended to go unquestioned. In all of them, farmers' priorities and participation are the key concerns. And these approaches fit in with the learning process approach described earlier.

The basic premise underlying the FF approaches is that much of the problem with conventional agricultural research and extension has been in the processes of generating and transferring technology, and much of the solution lies in farmers' own capacities and priorities (Scoones and Thompson 1994). However, as noted by Gibbon (1994a: 8), the incorporation of farmers into the research planning and priority-setting process has proved to be very difficult in many national research systems, and the major decisions concerning the strategy and direction of most research programs remain in the hands of researchers. Gills (1992a: 24) then rightly comments: it has become fashionable in agricultural research circles to speak of adopting a "client-oriented" approach. This terminology is dangerous because, while purporting to be more responsive to farmers' needs, it actually reinforces the classical top-down, "scientist-knows-best" set of attitudes.

6.2.4 Beyond farmer first

Although there are many who hail the Farmer First variants as achieving early successes in correcting many shortcomings and weaknesses of the conventional research and extension process and therefore as a step in the right direction, there are other critics who charge that these farmer first variants encounter many of the same problems as conventional TOT. They have begun to loose their lustre for failing:

- to confront the impact of power on relations between different groups within farming communities or between local people and outside change agents adequately; and

- to capture the complex sociocultural and political economic dimensions of knowledge creation, innovation, transmission and application within rural societies and scientific organizations.

In addition to the above, I agree with Stolzenbach (press) who argued that the literature on Farmer First has primarily focused on advocating *what should be done* to promote FF as an alternative to, or at least complement to, the paradigm of TOT. To him, the weak point of FF is that there is too little effort to provide a supporting theory of explanation, which analyzes what *is being done* within a conceptual framework that helps to identify the necessary and sufficient conditions for the emergence of the FF paradigm. Long's scepticism about the issue of empowerment, indeed, seems no exaggeration (Long 1992a: 275). He says :

> *"Although the word 'empowerment' has become wedded to a discourse that stresses the need to 'listen to the people' and to understand the alternatives 'from below', it is difficult to deny the connotation it carries of an 'injection of power' from outside aimed at changing the balance of forces. It is not surprising therefore that, when applied, empowerment strategies encounter roughly the same kinds of dilemma as any other intervention program. No matter how firm the commitment to good intentions, the notion of 'powerful outsiders' helping 'powerless insiders' slips constantly in."*

In view of the above, recently, there has been a call to move "beyond farmer first", a prime concern of a workshop held jointly by the University of Sussex, UK and the Sustainable Agriculture Program of the International Institute for Environment and Development (IIED) in 1992. Keeping the Farmer First agenda such as participation, empowerment and poverty alleviation in mind, it pointed to where the farmer-first approach lacks a certain analytical depth, and presents a more radical program that incorporates a socio-politically differentiated view of development- where factors such as gender, equity, institutional issues, ethnicity, class and religion are highlighted- with important implications for research and extension practice (Scoones and Thompson 1994).

Table 6.2 compares farmer First and Beyond Farmer First approaches in terms of their basic assumptions, processes of interaction, the roles assigned to the various actors, and their styles of investigation. However, at the outset, it must be said that these perspectives

or schools of thoughts should not be seen as polar opposites, but rather as representations of points on a continuum.

Table 6.2 Beyond farmer first: challenging the populist view

	Farmer First	Beyond Farmer First
Assumptions	Common goals, interests and power among "farmers" and communities	Differentiated interests and goals, power, access to resources between "actors" and "networks"
	"Stock" of uniform, systematized, local knowledge available for assimilation and incorporation	Multi-layered, fragmentary, diffuse knowledge with complex, inequitable, discontinuous interactions between (local and external) actors and networks
Process	"Farmer" or "community" consensus solutions to identified problems	Bridging, accommodation, negotiation and conflict mediation between different interest groups
Role of outsider	Invisible information collector, documenter of RPK; Planner of interventions; Manager of implementation; More recently, facilitator, initiator, catalyst.	Facilitator, initiator, catalyst, provider of occasions; Visible actor in process learning and action
Role of insider	Reactive respondent; passive participant	Creative investigator and analyst; active participant.
Styles of investigation	Positivist, hard systems research (FSR, AEA, RRA, PM & E, FPR & PTD)	Post-positivist, soft systems learning and action research; PAR; increasingly FPR, PRA & PTD

Source: Scoones and Thompson (1993)

With this brief review of the three approaches to knowledge transfer and utilization in the agricultural sector, Table 6.3 summarizes their basic concepts.

Table 6.3 The three approaches to agricultural knowledge systems summarized

	Transfer of Technology	Farmer First	Beyond Farmer First
Concept of development	Modernization	Basic needs, participation, equity	Empowerment, livelihood systems, sustainability
Rural people knowledge (RPK)	Primitive, unscientific, wrong	Valuable and underutilized resource	Neither RPK nor formal western science can be regarded as unitary "bodies" or stocks of knowledge
Model of farmers	Adopters, adapters or rejectors, client and target	Originators of technical knowledge or improved practices	Independent, strategic actor, capable of expertise (indigenous knowledge), knowledge generation, and exchange, local group process
Role of research and extension	Educator, directing and transforming rural people	Planner, manager, catalyst, initiator facilitator	Visible actor in process of learning and action

Source: Adapted from Scoones and Thompson (1993), Chambers (1993), Röling (1992)

From the material reviewed, the following key issues for intervention arise:

- it is social process and purposeful action, that are likely to affect the local power structures and higher levels;
- it requires creating correspondence between the constructed reality of actors and the environment;
- it is part of a learning process;
- projects (instruments of intervention or intervening agencies) should take into account not only the target groups (directly intervened people) but all other actors and stakeholders;

- projects require recognition of diversity of actors who are likely to have a stake in the outcome;
- intervention might not necessarily mean searching for scientifically "best" solution but accommodating the views and interests of those involved or affected by them;
- the key to intervention is participation, although participation is in itself a problematic concept; and
- the focus must be on agreement and not only technical control, not instrumental but double hermeneutic (this will be discussed later on).

6.3 Intervention viewed as a system: towards a conceptual framework

Having brought in multiple viewpoints about intervention and models for intervention, my aim is now to propose a framework for studying intervention using the metaphor "system". Issues such as the management of agriculture and natural resources can be understood better within a "system" perspective. To support my argument, I first introduce systems thinking and then describe the consequences of viewing intervention in terms of a soft system.

6.3.1 Systems thinking

Pre-systems thinking was characterized by disputes between mechanists and vitalist. With the belief that everything that occurred was completely determined by something which preceded it, mechanists adhered to analysis and reductionism, claiming that all objects and events, and their properties, can be understood in terms of ultimate elements. On contrary to it, vitalists believed that a mysterious force inhabited complex entities such as organisms.

Later on, vitalism was effectively refuted in biology, by scientific developments that led to explanations of some previously inexplicable experimental results and it looked as though the way was open for the triumph of mechanism. However, when the mechanistic thinking continued to dominate, it was applied from universe to the organization and development processes. The need for systems thinking was realized when organizations failed to perform well as a whole, even after the parts were all independently optimised (Flood and Jackson 1991).

Systems thinking is different from mechanistic thinking in the sense that to the latter, "system" is an aggregate of parts in which the whole is equal to the sum of the parts. In systems thinking, a "system" is a complex and highly interlinked network of parts exhibiting synergistic properties- the whole is greater than the sum of its parts. The "system" concept, which was ruled out following the Scientific Revolution of the seventeenth century, began to receive wider attention and was finally accepted as an emerging concept in the 1940s as a response to the failure of mechanistic thinking to explain

biological phenomena. The early development of systems thought, especially that of General Systems Theory, is associated with the biologist Ludwig von Bertalanffy

"System" has now become one of the commonest and most overused terms in social science. The term has been variously defined by various writers. Regardless, the metaphor "system" is a very rich concept. Systems can be real or conceptual. These different uses of the notion "system" collectively constitute systems thinking, which encompasses any use of the core idea of an adaptive whole to understand or intervene in the complexities of human affairs (Checkland and Haynes 1994). Systems thinking developed as an alternative to mechanistic thinking, has thus proved itself more satisfactory for explaining not only complex biological but also social phenomena (Flood and Jackson 1991) such as intervention.

In recent years, the concept "systems" has been used not to refer to things in the world but to a way of organizing our thoughts about the world (problem situations), as a way of viewing the world, and entities are treated as analytic constructs. Using systems thinking is a way of imposing meaning on and shaping inquiry about experience (Wilson and Morren 1990). Hence, the essence of systems thinking is learning to think holistically.

On examining more than 50 accounts of basic system ideas, Atkinson and Checkland (1988) found that the most fundamental idea behind the notion "system" is 'an entity constituted by connected parts'. They further, noted **emergence and hierarchy, communication and control** in two pairs as the four fundamental systems ideas. Among them "emergence" is the only property of the whole that is one entity. The major tenets of the systems thinking can be delineated as follows:

- everything is or can be connected to everything else;
- multifarious interactions can be recognized between all the elements making up a complex situation;
- how things interact, interconnect, interrelate, or, in some sense, control each other is to be examined;
- in systems, the whole is greater than the sum of its parts.

Prior to discussing the consequences of viewing intervention as a system, it is necessary to recognize Checkland's distinction between "hard" and "soft" systems as it will determine the course of my discussion.

6.3.2 Emergence of soft systems: paradigm shift in systems thinking

As the methodology of system engineering was based on defining goals or objectives, and simply did not work when applied to messy[7], ill-structured[8], real-world problems, the concept of soft systems thinking was developed (Checkland 1981). To Checkland, accepting that a system has a carefully defined goal is "hard systems thinking". "Hard"

systems are those involving industrial plants characterized by easy-to-define objectives, clearly defined decision-making procedures and quantitative measures of performance. The more intimately people are involved as part of a system, however, the less appropriate this view becomes (Spedding 1994).

"Soft" systems are, by contrast, those in which the objectives are hard to define. Soft systems are mental constructs of a whole for which it is possible to establish a set of interrelated parts that make it up the perceived whole (Espejo 1994). This regards system models as models relevant to arguing about the world, not models of the world. This views the social world as the creative construction of human beings. Hence, the need is to subjectively understand the points of view and intentions of the human beings who construct the social systems.

Although soft system thinking challenges the hegemony of hard system thinking (Bawden and Packham 1991, Checkland 1985), the two lines of thought are not antithetic to each other. The hard tradition takes the world to be systemic while the soft intends to create the process of enquiry as a system. Shifting of systemicity from the world to processes of inquiry into the world is a paradigm shift within systems thinking. Nevertheless, as Checkland (1985) says, difference between the hard and soft systems thinking is not like that between apples and pears: it is like that between apples and fruit. Hard and soft are not wrong and right (respectively), they are different, and have different virtues and strengths (Gibbon and Bell 1994). Table 6.4 differentiates the two systems.

6.3.3 Consequences of viewing intervention as a soft system

Viewing intervention[9] as a soft system implies that its performance can only be realized through shared learning and collective decision making by its constituent actors with respect to problem situations. Hence, the following are key issues that need to be examined when it is viewed from a soft system perspective.

- looking at problematic situations, appreciated as such by various stakeholders;
- identification of stakeholders in a particular problem situation;
- understanding perspectives of different actors in a particular context or problem situation;
- studying how different actors relate to each other and how they interact with each other (accommodating different viewpoints, reasoning, negotiating with each other);
- studying how one can bring a heterogeneous group of actors, such as academics, agricultural extension agents and farmers to consensus, agreement and accommodation (mutual articulation, functional differentiation, integration and linkage and coordination);

- looking for "solutions" at multiple levels of agency other than those at which the "problem" is experienced; and

- looking for synergy, when the combined efforts of the actors become more than the sum of individual contributions.

- intervention is focused on a shared/collective reconstruction of reality

Having placed intervention within a soft system perspective, finally, I found useful to conceptualize and explain the meaning of intervention within hermeneutical science [10] , more particularly, double hermeneutic characterization of social scientific knowledge by Giddins (1976) was very illuminating and convincing for its practical relevance to the intervention. Central to this is to stress possibility of a complex interaction between the way in which 'ordinary' human agents interpret the world, and the way social scientists think, write and speak about it in time and space (Leeuwis 1993).

Since human ideas, experiences, and intentions are not objective things like molecules and atoms, attempt to change human behaviour through instrumental reasoning or technical intervention would be short or of temporary nature, even if we succeed at all.

In my view, projects and organizations exist through people's practices and their interaction. And through interactions people produce meanings (production of knowledge and information) and negotiate them. As argued by (Leeuwis 1993: 108), the assessment that meanings are socially negotiated implies that both natural triggers and human 'information products' like books and journals in themselves have no unambiguous meaning. They only become meaningful in particular interaction contexts, in which actors simultaneously draw upon rules of interpretation, and create new ones. Double hermeneutic then implies that how people give meaning to a thing can be influenced by the way other give meaning to it. This could be understood better in terms of informational influence. By informational influence, I mean the way how logically, rationally and consistently the information is provided so as to influence the other party (ies) in interaction. This means that the social science is now increasingly relying on constructivistic reasoning. Reasoning evolves through a process of interaction, negotiation and renegotiation with other actors in various arena. Leeuwis (1993: 109) puts this issue in the following way:

> *"...my argument does not imply that it is useless for social scientists to generate knowledge. Quite the contrary; the creation of knowledge is an inherently political activity, and if one wishes to contribute to societal change, it is crucial to be able to put forward (and defend) new rules of interpretation in specific micro-contexts".*

In short, intervention can be viewed as an interaction or a negotiation process where intervening agency (ies), intervened party (ies) and other actors bring in different (rather than a different level of) expertise and analytical capacity to facilitate mutual learning, joint action, negotiation, accommodation, consensus building and so on. This means intervention is a social process which inherently is a negotiation or a learning process.

Table 6.4 Hard and soft systems compared

	Hard Systems	Soft Systems
Origin	scientific view of the world, integrally related to engineering concepts and quantitative methods	action research, the unspecified nature of most problem situations, and that both researcher and client are part of the problem context
Inquiry process	uses systems concepts and thinking during the problem identification stage; starts with a systems model.	focus is on problematic situations; defer modelling to a much later stage.
Epistemology	systems exist (e.g. systems such as agricultural and natural resource systems exist in the real world.	system is a construct, way of knowing at things
Using system images	used to construct models to represent (parts of) the world...	emphasize the heuristic value of looking at proposals for improvement, as if systems such as agricultural and natural systems were a system parts interacting with each other, and describes them as such.
Recognizing goals /desired ends	focus on defining the desired goals, and assumes that there is little or no dispute about goals. processes functionally articulated into a goal-seeking whole... goals are inherent to the whole	concerned with social actors, their activities and relationships. goals or desired end states are often ambiguous, conflicting, and constantly shifting social actors might behave as a systemic whole if they wish to and know how to do it... boundaries and goals are permanently (re)negotiated.

Source: Adapted from Checkland (1981), Wilson and Morren (1990), Gibbon and Bell (1994), and Engel (1995).

Notes

1. Blueprinting means to devise a design for the future that is carried out by a central authority according to a specific program (Friedmann 1984: 189). In this approach, researchers are supposed to provide data from pilot projects and other studies from which project designers will choose the most cost-effective designs for achieving given outcomes. Administrators of the implementing organizations are supposed to execute the project plan faithfully, much as a building contractor would follow construction blueprints, specifications, and schedules. Once implementation is complete an evaluation researcher is supposed to measure actual changes in the target population and report actual versus planned changes at the end of the project cycle so that blueprints can be revised (Korten 1984: 177).

2. According to Grimble (1994), 'stakeholders' means to all those who affect, and/or are affected by intervention process (policies, decisions, programs, activities and/or actions of the system)

3. Röling (1988) characterized intervention into two types, technical intervention and communication intervention. By technical intervention he means intervening directly in a physical process. Communication intervention means intervening through people, e.g. extension.

4. Actor-oriented perspective refers here to the works of Norman Long and his colleagues. This perspectives places which places actors at the centre of the stage and rejects linear, determinist and simple empiricist thinking and practice. It recognizes the 'multiple realities' and diverse social practices of various actors, and requires working out methodologically how to get to grips with these different and often incompatible social worlds Long 1992).

5. Contrasting with the general usages of the word "interface", that are, the image of two surfaces coming into contact or of a modern computer system whose central processing unit is linked to auxiliary equipment through a mechanism called the interface, Long (1989) defined it as a critical point of intersection or linkage between different social systems, fields or levels of social order where structural discontinuities, based upon differences of normative value and social interest, are most likely to be found.

6. Röling (1991) defined knowledge systems as the articulated set of actors, networks and/ or organisations, expected or managed to work synergically to support knowledge processes which improve the correspondence between knowledge and environment, and/or the control provided through technology use, in a given domain of human activity.

7. Messy means that the parties involved in a situation do not agree on either the definition of problems or on what technological and management improvements should be developed, or both (Wilson and Morren 1990).

8. Ill structured problems are those problems in which there is considerable doubt about what the problem is, what its part are, and what the relationships among them are (Franks 1994).

9. In 1993, a group of academic practitioners working primarily in the areas of environmental management, agricultural extension and rural development gathered with Peter Checkland of Lancaster University, UK, in the Netherlands to explore wider application of Soft Systems Methodology. Based on the outcome of this workshop, Woodhill (1993) suggested following examples where this methodology could be used:

   - in integrated and participatory ecosystem or catchment management
   - in the operation of the peak organization of an alliance of environmental groups
   - in the coordination of a knowledge system for a particular industry

- by the local community Landcare groups planning and undertaking land conservation projects
- in setting a national agenda for the development of "science as a system" in support of the Landcare movement

10. According to Habermas (1972), hermeneutical science serve a practical interest, that is an interest in guiding, informing, educating by interpreting our understandings of the world, by distilling experience. Hermeneutics is concerned with the understanding and interpretation of human action, either directly, or indirectly through textual analysis. These two hermeneutic forms lead to what Giddins has described as the "double hermeneutic" that is involved in all sociological interpretation (Drinkwater 1992).

CHAPTER 7

RESEARCH METHODOLOGY

Having defined intervention as a social process and defended studying it within a soft systems perspective, this study now focuses on the research methodology. Firstly, this chapter introduces the knowledge system perspective which provided me with a way to look at things. The chapter then narrows down to describe why and how the case study approach was chosen and designed as a general method of data collection and analysis. It goes on to discuss research methods, data collection procedures, methods of data analysis and presentation. Finally, the chapter ends by elucidating some practical problems encountered by the researcher during the field work.

7.1 The knowledge system perspective, a diagnostic tool

For this research, the knowledge systems perspective provided important concepts to look at how intervention as a process has operated in practice. Of the several reasons which convinced me to use this perspective, the following are particularly important and directly concerned with the purpose of my research.

- The knowledge system perspective has emerged as a result of a large number of "formative experiences" (Röling 1992) of applied social scientists who tried to come to grips with the complex phenomena of facilitating innovation, mostly in agriculture (Engel 1995). The most recent definition of the knowledge system given by Röling (1992) is as follows:

  "the articulated set of actors, networks and/or organizations expected or managed to work synergically to support knowledge processes which improve the correspondence between knowledge and environment, and/or the control provided through technology use in a given domain of human activity." (Röling 1992).

- Although the concept of knowledge system had emerged earlier in reaction to the inadequacies of the dominant Transfer of Technology (TOT) model, it has now moved beyond it, and become a diagnostic tool, a "way to look at things" (Röling and Engel 1991). It is increasingly used as an analytical and diagnostic framework for studying real world problem situations in that it adopts a soft systems thinking. The most pivotal idea in knowledge system theory is the recognition of the levels of mutual interdependence among actors in the agricultural development scene. This perspective recognizes that agricultural development cannot come about as a result of the efforts of a single group, institution or firm. It requires combined contributions of actors that amount to more than the sum of their individual contributions (synergy). It becomes necessary then to examine how and when autonomous actors (e.g. farmers, school teachers, traders, producers of inputs and services, policy

makers and planners) begin to view themselves as interdependent and part of a system and work as one. Its assertion that agricultural development cannot come about as a result of the efforts of a single actor, group, institution or firm is both illuminating and convincing.

- As evident from earlier discussions in previous chapters, problems of agricultural development in Nepal are messy and there is no clear view on what "constitutes the problem" (Sharma and Anderson 1985). To such types of problem contexts, Engel et. al. (1994) advise using the knowledge systems perspective. They argue that it can assist in the comprehensive analysis of phenomena beyond the boundaries of conventional extension and provide a practical contribution to knowledge management and policy. Very recently, Coutts (1994) used this perspective to study the process of extension policy development in Queensland, Australia, and found it highly useful in developing a framework for thinking about and acting upon the policy element of public sector agricultural extension. By defining extension policy as attempts by organizations and governments to formally influence on the operation of extension, he viewed extension policy as an intervention process. Thus it is clearly an effort to improve an agricultural knowledge and information system through intervention.

- By accepting actors as autonomous, intentional beings with divergent realities, goals and interests, knowing subjects in their own practices, the knowledge system perspective would agree with the actor-oriented view of intervention as comprising "multiple realities" made up of differing cultural perceptions and social interests, and constituted by the on-going social and political struggles that take place between the social actors involved. However, taking an interventionist position, it moves beyond the former. It focuses attention on subjective boundary judgment and deliberate consideration of the relevant actors in the perceived system, the integration, linkages and articulations between them, the forces that explain their coordination, the emergent properties of the system in terms of (failed) innovation and learning and finally the extent to which the relevant actors have been able to establish a joint mission (Röling 1994). In short, it reconstructs intervention processes as deconstructed by the actor-oriented perspective. In other words, the knowledge systems perspective serves the purpose of joint reflection and intervention design (Engel 1995).

7.2 Case study approach

Since the purpose of the knowledge systems perspective is to provide a point of view that makes better sense of the complex world and provide concepts and tools to study intervention processes, but not theory or theories to explain the process or phenomenon under investigation, the case study method was my obvious choice. Bradshaw and Wallace (1991) claimed that the case study is the best research method when researchers do not have sufficient knowledge of a case to place it in a theoretical perspective or if the case does not fit any extant theory. To them, the case study approach is thus indispensable when investigating Third World anomalies with appropriate sensitivity and accuracy,

as many theories have been formulated in advanced Western societies reflecting an (often unintended) ethnocentric bias against underdeveloped and other less studied regions of the world. Explaining when to use the case study approach, Yin (1984) argued that it is the most appropriate method if the purpose of the research is to seek answers to "why" and "how" types of questions, as is the purpose of my research.

In social science, using the case study method has become increasingly popular for inductive and qualitative research. Hypothetical deductive methods are not likely to be adequate while examining difficult research issues such as human behavior and actions. Likewise, many doubt the practical value of the questionnaire-based socio-economic surveys for research related to policy analysis in agriculture and resource management (Gill 1992a). In qualitative research, questions and problems come most often from real-world observations, dilemmas, and questions (Marshall and Rossman 1989)

Keeping those things in mind, I have selected a qualitative method, not merely because of increased interest in it, but as the nature of the research problem has dictated:

- understanding problem situations in sustainable agriculture, rather than making hard assessments of the sustainability of the agricultural system;
- searching for a social synergy in the system;
- understanding intervention processes for sustainable agriculture where sustainability is socially constructed.

7.2.1 Unit and levels of analysis

As described earlier, this study has sought to study "the intervention process". To this end, projects that seek to introduce sustainable agriculture are examined by viewing them as concrete development efforts or as instruments of intervention in development (Cernea 1994). "Project" connotes purposefulness, some minimum size, a specific location, the introduction of something qualitatively new, and the expectation that a sequence of further development moves will be set in motion (Hirschman, cited in Cernea 1994). Adapting Ackoff's view of organization (Flood and Jackson 1991), this study viewed projects as purposeful systems, containing other "purposeful systems" and being part of "wider purposeful systems". And intervention is defined as follows:

> *Intervention is viewed as an interaction or a negotiation process where intervening agency (ies), intervened party (ies) and other actors bring in different (rather than a different level of) expertise and analytical capacity to facilitate mutual learning, joint action, negotiation, accommodation, consensus building and so on.*

7.2.2 Multiple case design

In view of the objectives of the research and given the changing conception of agriculture (see Chapter 5), a multiple case study design was used. As stated earlier the purpose of this research was to examine the functioning of multiple projects that seek to introduce sustainable agriculture; this study happens to be multiple case study research (Yin 1984). Multiple case studies follow a replication rather than a sampling logic. This can be compared to multiple experiments wherein an individual case would be equivalent to a single experiment, and analysis follows cross-experiment rather than within-experiment design and logic.

7.3 Research phases and selection of projects

The research was carried out in two phases. Phase one, which was conducted from May to August 1992, was confined to two villages each, in three districts representing the mountains, hills and Terai regions of Nepal (farm and community analysis). The purpose was two-fold. Firstly, it was to explore problematic situations in sustainable agriculture and understand perceptions of and responses to sustainability/unsustainability of agriculture at village level. Secondly and more importantly, it was to gain insights into the selection of projects that could fit in better with the purpose of the research. In phase two, which was carried out from September 1992 to April 1994, a more detailed study was conducted of the projects. The purpose of project analysis was to:

- study concrete development efforts that seek to introduce sustainable agriculture;
- understand the factors associated with the effects of those efforts;
- examine how autonomous actors begin to view themselves as interdependent and part of a system and to behave as one.

The decision with respect to the selection of projects was made after the completion of the first phase. Thus, the farm/community level study, described earlier in chapter 4, complements the second and the main phase of the research. The following paragraphs describe how the projects were selected for the purpose of this study.

In the first place, finding wide scale practice of khoria (a form of shifting cultivation, which is essentially a type of agroforestry system), and observing crop-livestock-forestry linkages in the study villages led me to select community forestry and agroforestry projects. What was evident from the village level study (farm and community analysis) was that several negative trends relating to the resource base, productivity and resource management systems in the villages could be linked (directly or indirectly) to trees or forests (Jodha 1992). This implies that the sustainability of the hill farming systems is contingent upon the management, protection and utilization of forests. Taking into account the crucial role of forests, the two projects related to forestry sector development, namely the community forestry and agroforestry, were selected. These two components of the forestry development process are interrelated. Studying only one of them would be

likely to lose the focus of the study and make the study incomplete, and in turn, likely to influence the research results accordingly. Furthermore, community forestry provided a good example of an innovation about which most of the decisions need to be taken beyond the household or farm level, while in agroforestry, most of the decisions need to be made at the farm or household level. The other reason for selecting the agroforestry project was that it provided the opportunity to study institutional linkage and cooperation between the ministries of Agriculture and Forestry.

Having selected the two projects, I then decided to select a project involved in promotion of permaculture design. For this, the study in Ramnagar (Nawalparasi district) provided me an insight. In Ramnagar, the use of chemical fertilizers and pesticides was the most common practice. Although farmers realized the potential disadvantages of using these chemicals, they did not or could not abandon them for several reasons. This motivated me to study permaculture practice, which was being promoted by a NGO, the Institute for Sustainable Agriculture Nepal (INSAN), in Sunsari district. Nawalparasi and Sunsari have similar agricultural environments as both of them lie in the Terai region.

After selecting the three projects for case studies, I selected the fourth project which concerned agricultural extension, not only because of my professional and emotional attachment to it, but because the Ministry of Agriculture had been operating the World Bank-funded Agricultural Extension Project in all three districts for more than a decade. It is interesting to note here that the upcoming third phase of this project is likely to influence the functioning of Nepal's public sector agricultural development organization greatly. Furthermore, the selection of the agricultural extension project provided me the opportunity to study institutional linkages between the ministries of agriculture and forestry, and linkages between research and extension.

In sum, the following four projects have provided the settings for the research:

- Nepal Agroforestry Foundation (NAF)
- Institute for Sustainable Agriculture Nepal (INSAN)
- Community Forestry (CF)
- Agricultural Extension Project (AEP II)

The nature of the four cases is briefly discussed below.

7.4 The nature of the four cases

The four cases dealt with in this research are both diverse and unique for several reasons such as the nature of innovation, level of aggregation and implementing organization. However, they were not intended as a comparative assessment, but to understand intervention processes used by different agencies for different purposes.

The other reason for selecting four cases of a different nature was to understand the nature, extent and processes of inter-institutional coordination and linkages, cooperation, communication, mutual learning and negotiation which occur among different actors.

Agroforestry

The farming systems in Nepal make heavy demands on forests. They are based on strategies to manage forest, pasture, and arable lands simultaneously and in an integrated fashion to obtain food, shelter, and clothing. Growing trees on and around farm land, terrace risers, *kharbari*, and *khet* is vital for Nepalese farmers who farm the smallest arable land area per capita on the globe. Thus, farmers have combined agriculture and forestry into one which is of diverse forms, types and systems. Some maintain that agriculture throughout Nepal is sustained by "forestry"; in particular, the whole agricultural system in the middle hills and mountains is dependent on a sizeable reserve of forest for maintaining land fertility. In addition, some researchers maintain that agroforestry, as a technology, offers one of the most promising options of reversing emerging unsustainability trends in agriculture.

Hence agroforestry has presently emerged as a primary focus of rural development efforts, both in governmental organizations and at non-governmental level. This case relates to the efforts of the Nepal Agroforestry Foundation (NAF), a non-governmental organization, which was established with the objective of promoting agroforestry action research and training. This organization aims to establish networking with various NGOs and user groups involved in agroforestry system development for resource-poor people, through their participatory "bottom-up" activities, and promotion of agroforestry research, extension and training.

Permaculture

The second case is about permaculture technology. Although the term "permaculture" was coined by the Australian ecologist Bill Mollison in 1975, it is not a new invention or concept for farmers living in Nepal and India. The two great Hindu epics- the *Ramayana* and *Mahabharat*, written between 4,000 and 5,000 years ago, have time and again preached to people of the present era that they should work with and honor nature, and care for the earth and people. These epics have described well how the hermits of those days, **Vasistha and Vishwamitra,** operated self-sustainable farms.

Permaculture is now gradually spreading around the world, among those people who are concerned with the rate at which non-renewable fossil-fuel/chemical-based monocultural agricultural systems are leading to deforestation, desertification, salination, the drying out of watersheds, and what is happening of the water we drink- the poisoning of the earth. It aims to restore a sustainable, humane and socially just system.

As a case of permaculture, the efforts of the Institute for Sustainable Agriculture Nepal (INSAN) are studied. The INSAN is also a non-governmental organization which implements its activities directly through its Permaculture Development Farms. The objective of these farms is to demonstrate permanent agriculture techniques to local farmers, to help them see how they can diversify their crops and increase the value of their land. The PCD farm shows how agriculture can be carried on in a permanent way, working with nature rather than against it. Thus, it combines permaculture with appropriate aspects of

Low External Input Sustainable Agriculture, and the Fukuoka Method of No-Tillage Natural Farming.
The study was conducted in the village of Amaduwa, Amaduwa VDC, Sunsari district, eastern Nepal. Amaduwa lies in the Terai region where Green Revolution agriculture is said to have made some impact (of some magnitude or other) in terms of the adoption of modern varieties and chemicals.

Community forestry

The community forestry program is one of the national priority programs of His Majesty's Government of Nepal. The program was first initiated in 1978 following the realization that watersheds were deteriorating due to rapid deforestation and environmental degradation in the hills. Currently, almost all donors operating in Nepal are involved in this program. By 1987, of Nepal's 75 districts, 67 districts had the community forestry program. Not only the donors, but most of the NGOs operating in rural areas are actively supporting community forestry activities. Thus, the involvement of several donors and NGOs demonstrates both the perceived forestry crisis and the realization of the importance of forests for meeting subsistence needs. The role of forests in sustaining agriculture has been already discussed. Many argue that the operation of community forestry in Nepal has demonstrated that Nepal's hill farmers can control and manage their forests in a sustainable fashion.

Keeping all these things in mind, community forestry was selected as the third case for this research. The case covers the following three community forests.

- Bhaluban Forest Committee- Dhuwankot VDC, Gorkha District.
- Lohi Forest Committee- Ward 7, Bandipur VDC, Tanahu District.
- Manekapur Forest Committee- Ward 1,2 and 3, Latikoili VDC, Surkhet District.

Agricultural extension

The fourth case is about agricultural extension and differs from other earlier three cases. While those related to some forms or types of farming systems, land use systems or management of natural resources, extension does not. Extension is not a farming or land use system in itself.

As communication intervention, extension is likely to contribute to systematic thinking about interventions for accomplishing voluntary behavior change. Regardless of the fact that it means different things to different people, it is a component included in almost all development efforts to help realize the potential benefits of other project investments. It is viewed in different ways. Some prefer to use extension as a tool to transfer the products of scientific research to farmers. For others, extension is a part of an *agricultural technology system* which looks at research, extension, farmers and other relevant actors as one whole which requires system management for optimal effect. Some take it to mean "the work of government village level extension workers and the institutions employing them". Likewise, some take it to mean "the communication interventions required for

agricultural development". This means, it has two interconnected challenges: to promote agricultural development that is sustainable, and to develop sustainable extension systems.

In view of the above, a case on agricultural extension was selected for this research. The World Bank-funded Ministry of Agriculture's project, the Agricultural Extension Project II (AEP) provided the setting for this case.

Table 7.1 summarizes the cases.

Table 7.1 The nature of the four cases

	Agroforestry	Permaculture	Community forestry	Agricultural extension
Project	NAF	INSAN	Ministry of Forests	AEP-II
Organization	Non-government	Non-government	Government	Government
Coverage	Few VDCs, 4 districts	Few VDCs, 3 districts	Nationwide	23 districts
Study location	Judigaon, Kavre	Amaduwa, Sunsari	Dhuwankot- Gorkha Jhargaon- Tanahu Manekapur- Surkhet	Tanahu Nawalparasi

Of the four projects, the Nepal Agroforestry Foundation was selected as a pilot case study to refine data collection plans in terms of both the content of the data and procedures to be followed. The pilot case study was meant to develop relevant lines of questioning and further conceptual clarification. The pilot case study was further useful since it allowed observation of different phenomena from multiple perspectives. As suggested by Yin (1984), convenience, access, and geographical proximity were the major criteria for selecting the pilot case.

Location of the study sites and other relevant information about these projects are given in the respective chapters in which they are described. Figure 7.1 shows the locations of the selected projects on a map of Nepal.

7.5 Data collection procedures

A multi-method data collection approach was used. Apart from primary data collected through several techniques, all available secondary data (progress and evaluation reports), reports of related research and studies, recently held seminar reports and proceedings) were reviewed and analyzed. This means that the data were collected at multiple sources to ensure the reliability of the research. Throughout the period of field work detailed notes were maintained on observations and conversations pertinent to the study. Triangulation of data was always the prime concern of the researcher.

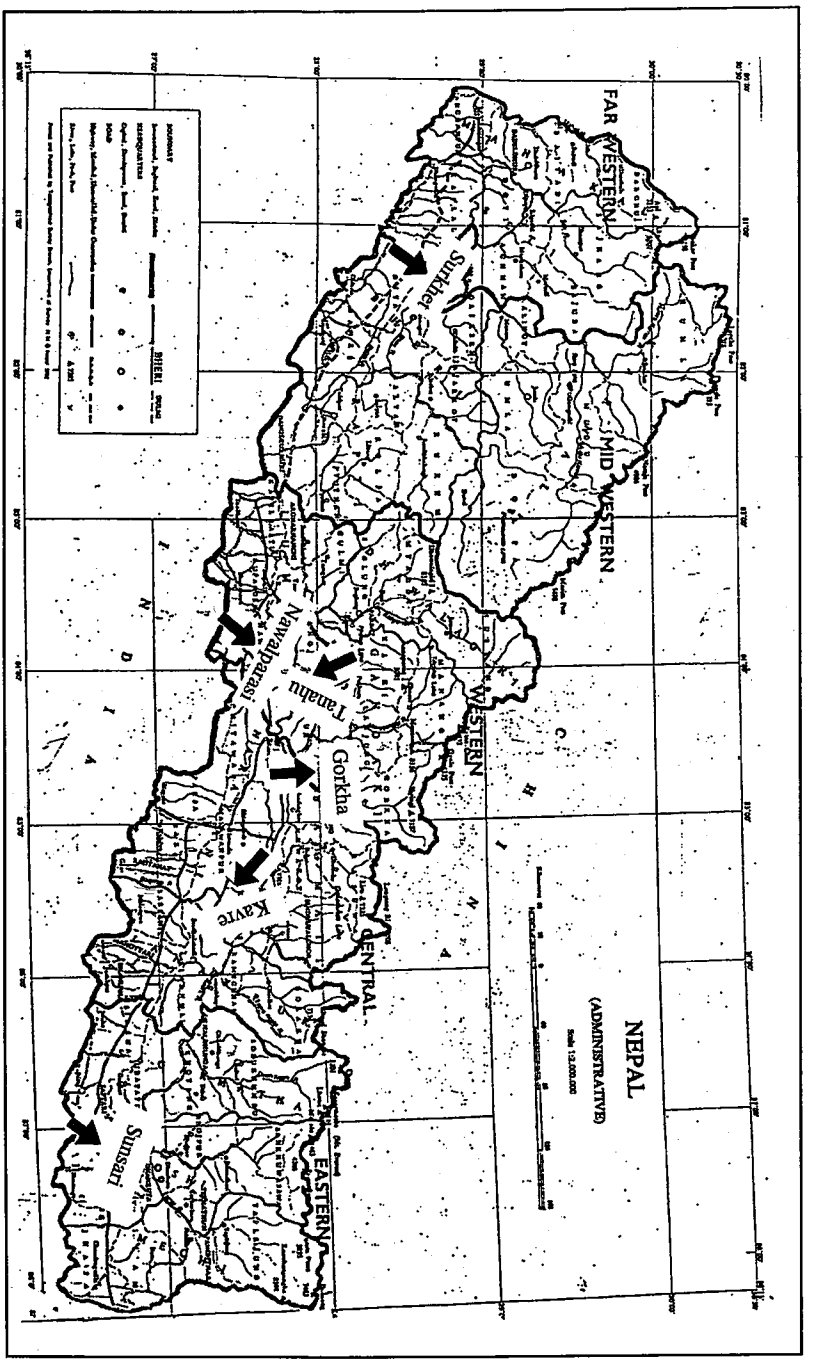


Figure 7.1 Map of Nepal showing study districts

7.5.1 Primary data collection

As has been stated earlier, the research is qualitative. Keeping in mind of the objectives of the research study and the nature of data required, the following tools were used.

Key informant interviews

Key informants were selected among individuals able to describe the broader system, beyond their own direct participation. They included district officials, project officials, village based development workers (GOs and NGOs) and local leaders (formal and informal). Willingness to cooperate and expected ability to provide interesting and factual information were major factors considered while selecting respondents.

Village mapping

The drawing of a rough free-hand map of the study area (the village) by the local people on the floor, with the help of local materials such as stones, black and red soils, wheat floors, beans etc., was a good entry point for understanding farming problems, constraints and opportunities, and for preparing checklists for focused group discussions, informal interviews, etc.

Focused group discussions

In the village, focused group discussions were conducted based on a checklist of topics prepared earlier. Maximum time was spent conducting in-depth participatory discussions with the members of the community. Group interviews were useful in collecting information and finding important subject areas for further investigation. Many topics covered in group discussions were also covered later on in individual interviews to see whether the responses of the participants had been influenced by the presence of others during group sessions. The purpose of individual interviews was to cross-check information during the group discussions. The very purpose of selecting only one village in a VDC was that the researcher would be able to include a maximum number of farmers in group discussions and speak with as many households as possible, irrespective of ethnic group and sex.

Direct observation

The researcher observed farming practices, events, projects and other ongoing processes such as khoria (shifting cultivation), terracing, landslides, burning of forests in the summer and community forests alone, and then went around the village with respondents (group of farmers). This direct observation had two purposes. Firstly, it was to learn about rural living, farming systems, farming practices and other important aspects or issues. Secondly and more importantly, it was to facilitate two-way interaction with the people and also to triangulate the data.

Informal interviews

In general, some farmers (which include men and women) were informally interviewed outside the presence of others. Such interviews lasted for about one to two hours per person. It was a relaxed activity. As most of the questions were not designed or phrased ahead of time, but emerged during the interview, it facilitated probing for more detail and a better understanding of the local situation. Efforts were made not to ask closed questions (yes/no type). The questions directed to the farmers were loosely based on a short checklist or on guidelines.

7.5.2 Supplementary data collection

In the previous section, I discussed some primary data collection tools used in this research. To supplement and triangulate or validate the data collected through the above sources, I used other qualitative and quantitative means of data collection. These include:

Reviewing of available records and documents

The research reports, studies and working documents published by the Lumle Agricultural Research Centre (LRARC) were very helpful for validating findings obtained from the above exercises. The LRARC provided both library facilities and publications to the researcher. As well, the Gorkha Development Project, a German government-funded project operating in Gorkha district, provided both logistic support and access to its published reports and documents during the study period. Likewise, the researcher had access to all official published and unpublished reports including memoranda, mission reports, project appraisal reports and evaluation reports of the Agricultural Extension Project operating in all three districts. These documents were very useful for cross-checking findings.

Furthermore, while conducting research at Gorkha and Tanahu, the International Centre for Integrated Mountain Development (ICIMOD) supported the researcher. As a result the researcher was provided with library and other facilities available at the ICIMOD which proved very useful for completing the research on time. In particular, the researcher learned there of Jodha's work on unsustainability indicators of agriculture.

Participation in seminar and studies

Furthermore, during the study period I participated in many seminars and study teams formed by the MOA which facilitated both the data collection and access to reliable data. These included:

- A workshop to produce an information kit on regenerative agriculture technologies for the hill farmers of Nepal, organized jointly by the Nepal Rural Reconstruction Association and the Philippines-based International Institute for Rural Reconstruction, in Kathmandu, April 16-25, 1992.

- An objective-oriented project planning (ZOPP V) seminar for the Manpower Development Agriculture Project, Kathmandu, November 30 to December 4, 1992.

- A task force team formed by the Ministry of Agriculture to formulate a National Agricultural Extension Strategy.

These activities were useful in several ways. First, they provided an opportunity for the researcher to collect secondary sources of information. Secondly, they helped in understanding the nature of ongoing projects (GO and NGO) in the area of sustainable agriculture. Last but not least, they provided general insights while selecting projects and information about location and contact persons.

Involvement of scientists from other disciplines

In view of the qualitative nature of the research, no enumerator was hired to assist in data collection. However, a few subject matter specialists were taken to the field to facilitate learning, understand problematic situations and study farmers' and their own perspectives. Also these officers acted as key informants for the study. The support of these officials was encouragingly high. Annex 7.1 gives the names of these subject matter specialists.

Finally, data collection was further facilitated when the researcher worked as a trainer in participatory rural appraisals given to the staff of projects. These activities were effective not only to establish rapport with the field staff of the projects but also to increase access to important project documents and reports, and to facilitate learning. These included:

- Training in Participatory Rural Appraisal techniques of the staff of the Nepal Agroforestry Foundation and its associates such as World Neighbors, Baudha-Bahunipati Project, Tamakoshi Sewa Samiti etc.

- Team Leader of a mission to evaluate community development construction approaches in drinking water and irrigation projects of the Karnali Bheri Integrated Rural Development Project.

During and after completion of the field study, some senior officials from the National Planning Commission, Ministry of Agriculture, Ministry of Forest and Environment, and the projects (semi-governmental, non-governmental) were informally interviewed with the help of checklists for two key reasons. Firstly, it was to understand their perspectives on agricultural sustainability, secondly to discuss the issues to be considered for the development of agriculture in general.

7.6 Method of data analysis and presentation

This is qualitative research. Keeping in mind the complexity of the data and the nature of the research, a descriptive approach was used in analyzing the data. Explanation building was the strategy followed. Where applicable, descriptive statistics like arithmetic means, percentage are utilized for data analysis.

In terms of maintaining objectivity of data collected, I have refrained from drawing conclusions except where I checked the findings from multiple sources. For example, when a farmer, who was supposed to be a member of a farmer group organized by a Junior Technical Assistant(JTA) of the District Agricultural Development Office, said that he neither knew about the formation of the group nór that he was a member of the group, I refrained from drawing a conclusion until I personally contacted the designated group leader, other farmers, officials from other local organizations and the JTA concerned.

The information and evidence collected during the field research are interpreted carefully using the knowledge system perspective, other relevant social theories and research results conducted elsewhere as applicable. To analyze data, agroecological differences are also dealt with as appropriate. Similarly, intervention strategies (responses of development actors) were analyzed within the framework of contemporary "models" or approaches of the supply and demand for agricultural innovations such as the Transfer of Technology (TOT) and Participatory Technology Development (PTD) processes. The findings are presented in a narrative form, because the qualitative data on the process of interaction were either collected through informal discussion, or emerged during informal interviews and other activities such as focused group discussions and village mapping.

7.7 More than just a researcher: a researcher's dilemma

Despite several strategies employed to maintain unbiased research procedures and findings, I found this very difficult, more particularly in deciding the extent to which a researcher should keep a distance from the researched groups (farmers, field staff, project officials and others). In this section I discuss what sort of problems a researcher is likely to face while conducting social research, when he does not or cannot conceal his research role. But, from the start, I should make it clear that the following problems are not typical only of qualitative research. They might equally apply to quantitative research too.

Between advantage and disadvantage

My role as researcher in the Ministry of Agriculture where I had happened to be an Agricultural Extensionist for more than two decades, was in the first place, an advantage for not only in getting office records, documents and reports, but also for material and moral support and facilitation during the data collection period. For example, it would have been very difficult for the researcher to go to the villages and live with the farmers, if field staff from the researched group or from the Ministry of Agriculture had not been supportive. Rapport building with the farmers and key informants was very easy. However, there were many disadvantages too. The real problem arose from the expectations of the groups researched. The following paragraphs provide a few examples.

In one village, an old lady was complaining about the loan distribution process of the Agricultural Development Bank operating in the area. She wanted me to intervene with the Bank and ask the Bank Manager to provide her credit to buy a buffalo. In Jhargaon and Jaalbhanjyang, farmers were expecting that I attract development projects. They

would talk among themselves wondering, "why was he there for so many days if he does not bring any projects for us". Some said, "He does not want to commit now". Apart from that, many thought my interest in *khoria* was because the government sent me to study it. They were expecting that the khoria land would be registered in their name as private property after the completion of my study report. In short, farmers seemed not prepared to accept me only in a researcher's role, even though I would say repeatedly that I was a student, conducting research for my own personal purposes.

If farmers' expectations were difficult enough, there was also the expectations of the projects' field staff. Having discovered the non-existence of farmers' groups and misreporting, the field staff often expected and requested that I would not report it to their supervisors. Many wanted me to tell their supervisors how active, effective and popular they were among the villagers. Some asked me to recommend them to their supervisors for transfer to another district or another village to other. Although I always endeavored to remain in marginal position. it was difficult task.

Between objectivity, honesty and friendship

Since this research was to take place within a formal institution, I needed permission from the authorities concerned before going into the field. Indeed, conducting research about a project without its support is likely to yield unnecessary problems and obstruct the research process in future. It also goes against research ethics (Nooij 1994). The commitment of a project's key officials to support the research is equally crucial for completing research on time and of quality. In this situation, without compromising the objectives of my research, I selected those projects in which I had a fair chance of getting access to project documents, reports and other needed facilities, together with opportunities such as moral support and professional discussions. Knowing project officials personally was a key factor.

Although project officials did not mention it explicitly, it was obvious from their concerns that they expected the findings of the study to improve their image, and to not damage them in the future. This was especially the case when the project belonged to a non-government organization. But objectivity and honesty in research is one thing, and friendship is another. How a researcher can balance honesty, objectivity and friendship is a real issue, and a dilemma.

PART III

EMPIRICAL INVESTIGATIONS

CHAPTER 8

ON AGROFORESTRY
(Case study 1)

Of the four projects selected for the research, agroforestry is the first in the series. The other projects selected for this research are on permaculture, community forestry and agricultural extension. This project is discussed first for two reasons. First, most of the decisions on adopting, adapting or rejecting agroforestry related technologies are usually made by the farmers at the household level, influenced minimally by the neighbours and community. Although the latter can affect the nature and type of decision, farming households, as decision making units, are relatively free to decide about the technologies. Secondly, as I stated earlier in the chapter on research methodology (Chapter 7), that agroforestry was my pilot case which provided further insights about the nature and types of inquiry to be made for subsequent cases.

Of the several reasons for the proliferation of agroforestry[1] related projects in Nepal, the indication of recent studies that fragmentation of landholding, coupled with a declining supply of tree fodder from forests, is motivating farmers to cultivate more trees on their farmland is crucial one. As a result, agroforestry has emerged as a primary focus of rural development efforts in Nepal, in particular by the non-government organizations (Denholm and Rayachhetri 1993). On the other hand, evaluation of these programs has repeatedly shown that success in terms of farmer participation in tree planting has generally been less than satisfactory (Gautam 1986, Forestry Services 1992, Thapa 1994). Nevertheless, some researchers do claim that irrespective of the ecological potentials, "agriculture" throughout Nepal is sustained by "forestry" (Bajracharya 1994). Likewise, many argue that agroforestry, as a technology, provides one of the most potential options to reverse the emerging unsustainability trend in mountain agriculture (Denholm 1991, Jodha 1992a). In view of this, in this chapter, I have looked into the innovation- intervention processes- institutional configurations on agroforestry, using the knowledge systems perspective. Besides this, as I discussed earlier in chapter 7, the selection of the agroforestry project was the consequence of the earlier study that I had carried out in three districts, namely Gorkha, Tanahu and Nawalparasi to understand farmers' and other development actors' perceptions of and responses to sustainability of agriculture (see Chapter 4).

For the purposes of my research, Nepal Agroforestry Foundation (hereafter NAF) a national NGO[2] devoted to promotion of agroforestry research, extension and training, provided an institutional setting. I have selected an NGO not to imply that NGOs are more likely to be effective in carrying out agroforestry development work than the public sector organizations, but for the two following specific reasons.

- *NGOs work constantly for their own survival. No donor supports a project for an indefinite period. This means that staff working in an NGO are not secure about their jobs, like their counterparts in GOs. A NGO's survival is determined by its performance, both in terms of quality and quantity.*

- *Studying the functioning of a national NGO offered better prospects for examining the nature of GO-NGO interactions/ partnerships at different levels, from policy making to field level.*

Selection of NAF for this research was coincidental. In 1991, while I was reviewing literature to develop the proposal for this study, I happened to learn about the World Neighbours-assisted Baudha-Bahunipati Project which, indeed, impressed me. The Boudha-Bahinipati Family Welfare Project (BBP) [3] was a local NGO which is said to be turned into a sustainable livelihood project and achieved earlier set targets of the family planning when it shifted its priorities from family planning to agroforestry (Arens and Nakarmi 1988). The concerns of my research and my interest to learn more about the present state of agroforestry works in the Bahunipati area, led me to study NAF [4]. It is one of the outcomes of approximately 15 years of tri-partite efforts and experiences of BBP the under Family Planning Association of Nepal (Nepali NGO), local people/user groups and World Neighbors (a US-based NGO) who financed the project (Baidya 1992).

However, at the outset of this chapter, I should mention that the purpose of my research is neither to generalize the importance of agroforestry in Nepal nor to describe different forms or systems of agroforestry found in the study area. In addition, the review of possible causes of success and failure of agroforestry is also outside the scope of this research. The contemporary literature is flooded with such subjects. Nevertheless, the case that I have examined here has, indeed, offered several valuable insights into the development of sustainable agriculture.

In this chapter, I have first briefly described Mathillo Judigaon of Mahadevasthan VDC of Kavrepalanchok district, which provided the setting for the research. The chapter moves on to examine innovation-intervention processes-institutional configurations on agroforestry. See Annex 8.1 for the profile of NAF.

8.1 A brief introduction to the study site, Mathillo Judigaon

Mahadevasthan VDC of Kavrepalanchok district of central Nepal is one of the few VDCs where NAF is currently involved. My research site, Mathillo Judigaon (Ward 1), is one of the villages comprising the Mahadevasthan VDC.

Mathillo Judigaon is located at an altitude of 840 m above sea level, and about 0.5 km west of Hinguapati Bajar, across the Judi khola. It has 58 households of which a majority (more than 90%) belong to a folk tribe called "Danuwar" (prestigiously called Rai). Professionally, Danuwars used to be fishermen. Culturally, they are a very simple people who commonly live and work together as a "social group", if described in sociological language. Based on the informal interviews and discussions with the local communities, I have sketched the following brief historical account of the village:

1885 - Eight households in the village

1950 - A hermit initiated to teach children under a tree in the village
(Please note that 1950 is the year when the Rana regime was overthrown by people's revolution and thereafter the common people were allowed to go to school)

1954 - Initiatives to construct a primary school building, people remembered, "despite the fact that throughout the year they did not have enough food to eat.

1955 - Construction of an irrigation channel (known locally as mathillo kulo)

1956 - Of the 30 households in the village, 10 households had enough food to eat

1959 - Government approved the school

1960 - Lal Singh Danuwar used brick (locally called Jhingati) for the first time in the village to roof the house

1961 - A large number of livestock died due to the outbreak of an epidemic disease
- People started to grow winter paddy
- Construction of Helambu road initiated (passes from the middle of Mahadevasthan VDC crossing Hinguapati)
- Started using chemical fertilizer
- Construction of another irrigation system (tallo kulo)

1968 - Spread of cholera disease
- Agriculture office established at Hinguapati

1970 - Megha Lal Shrestha initiated improved buffalo keeping

1973 - Post office established at Hinguapati

1978 - Through the efforts of Chabi Lal and Ram Das Shrestha, construction of a drinking water project, which remained in operation for only a year

1979 - Pharmacy (Medical shop) established at Hinguapati

1979 - Received family planning services through the Kunta Nursery (BBP headquarter)
- Veterinary post established at Hinguapati

1983 - Uday Narayan Dahal initiated planting fodder trees

1989 - Vaccination against small pox disease

1990 - Gopi Lal used tin to roof the house

1991 - Health services available at Kunta Nursery
- Farmer group formed

1992 - Adult education initiated
- Women's group formed

From the above chronology of Judigaon, the following observations can be made about this village:

- Not only are people very receptive to the development process, but they have also responded positively to external influences such as those initiating the school and the growing of winter rice.

- Diverse responses of people to a livestock epidemic disease suggests the importance of livestock to the local economy.

- In most of the cases, new ideas or innovations have been introduced to the village either by the minor community (other than Danuwar) or from external sources such as the hermit, Kunta Nursery, Samaj Sewa Samuha and the BBP.

The village map drawn by farmers during the field work is given in Figure 8.1. When farmers were drawing the map, some wanted to include the five houses of Chhetri community, and some did not want to. Although no Chhetri were present during this exercise (which I learnt afterward), the Danuwars finally decided to include them within the village boundary after being reminded by one of them that these Chhetris use the same grazing land (called *Charan* in Nepali). This revealed how a natural resource unit can bring people together in a common platform. It seemed that the Danuwars would have never included the latter in the community map, had these Chhetris not been sharing the "*Charan*".

The informal survey carried out in the village also illustrated the following features of Judigaon.

- Most of the households are extended families consisting of father, mother, sons, daughters-in-law, daughters (unmarried) and occasionally some close relatives.

- Most important household decisions are made by the head of the household in consultation with other household members, in particular sons (adult) and wives.

- Women usually attend to day-to-day household chores such as cooking foods, fetching water and fuelwood, child-care, home gardening, taking care of animals and participation in crop production activities according to season.

- Fodder is not considered a scarce resource by either farmers or farm women. The forest is near and many volunteer fodder trees are found in terrace risers.

- Farmers do not weed or apply compost to fodder trees. For them cereal crops and tomato crop are priority.

- Farmers have been encouraged to grow tomato crops, especially following the establishment of a United Nations Peace Keeping Force Training Centre at Panchkhal (Approximately 20 km southwest of the village on Kodari Rajmarg).

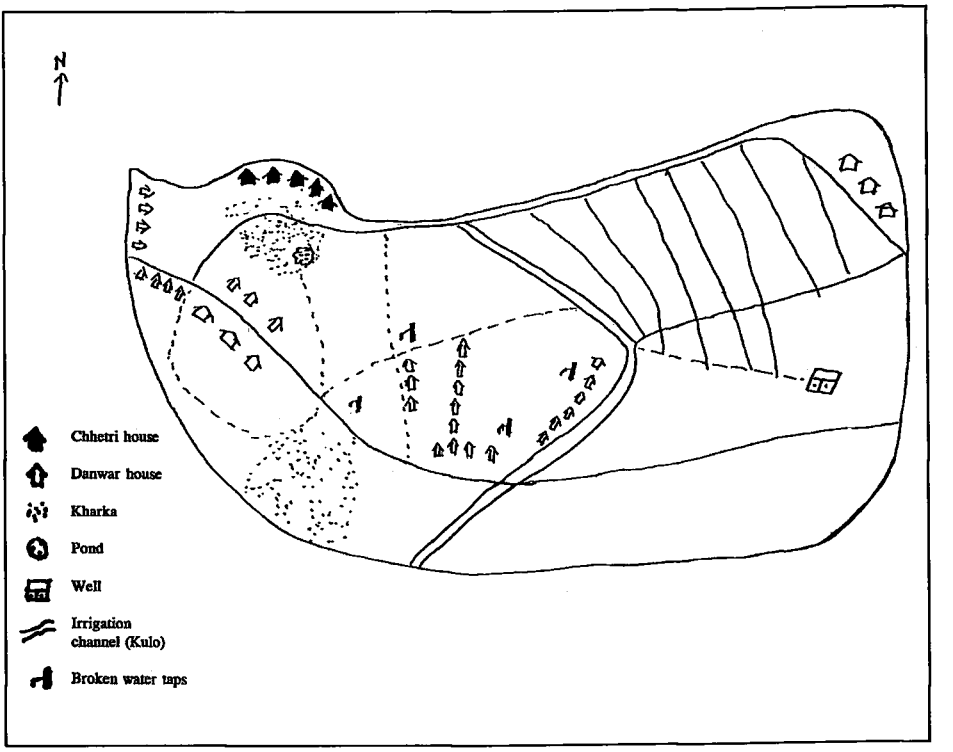


Figure 8.1 Village map of Mathillo Judigaon drawn by farmers

8.1.1 Agricultural activities

Agricultural activities of Judigaon comprise both cropping and livestock keeping. Crop production activities include cultivation of annual and perennial crops. Farming systems varied between *bari* and *khet*. Maize based farming systems dominate on *bari*. The general cropping patterns found on *khet* and *bari* are as follows:

Bari	**Khet**
Maize+ Millet- Fallow	Rice-Fallow
Maize+ Millet-Tomato	Rice-Wheat
	Rice-Potato

Maize, finger millet, tomatoes, chilies, egg plants and various pulse crops such as black gram and cowpea are exclusively *bari* crops. The growing of fodder trees on *bari* was not significant. Most of them are volunteer trees and are found mainly on terrace risers. Cows and buffaloes are kept as a source of draught power and manure rather than for milk. Goat keeping is very popular and a source of additional income. Poultry is free range and treated as a cost-free enterprise. Agricultural production is mainly for home consumption and the main source of household income is non-farm income, derived mainly from wage labor.

8.1.2 Assessing problem situations in Judigaon

This section assesses problem situations in the study village from farmers' perspectives and from the perspective of the intervening agency, NAF.

During informal discussions and interviews farmers were questioned on the present state of agriculture and problems in the village. In a group discussion session, they were also asked to prioritize village problems. Of the many problems that appear in Table 8.1, shortage of drinking water was the most important one. My research further indicated that planting of fodder trees was not among the main objectives of farmers in the area. Table 8.1 documents the problem situation in Judigaon as perceived by farmers and perceived by the project.

Table 8.1 Farmers' priorities in Judigaon

S.N	Problem Situation	Farmers Ranking	Project Ranking
1	Shortage of drinking water	1	2
2	Shortage of drinking water for animals	2	-
3	Lack of off-farm employment	3	-
4	Declining yield of cereal crops, especially maize	4	4
5	Shortage of grasses on Charan land (Grazing fields)	5	5
6	Outbreak of animal diseases (foot and mouth disease, rinderpest etc.)	5	3
7	Frequent breakage of irrigation system	5	-
8	Blight disease in potato	6	-
9	Fertilizer costly and not available on time	6	-
10	Selling milk and milk products	7	3
11	Lack of fruit trees	8	6
12	Shortage of fuelwood	9	7
13	Deteriorating soil fertility	10	2
14	Shortage of fodder trees	10	1

Ranking - 1 for the highest priority and 10 for the lowest

Source: Field study

The above table indicates that farmers have a complex set of problems and multiple objectives which are not shared by the project. Nevertheless, the above ranking suggests that the differences are in the way in which problem is perceived. Therefore, there is ample room for consensus and understanding between the two parties.

Farmers problems are interrelated and mostly concerned with natural resource management and problems of markets and marketing. Addressing these problems requires involvement, cooperation and coordination of many actors and stakeholders. Farmers and other actors need to view the above problem situation as a system. Grunig (1975) states that the chances for productive communication diminish when one person fails to recognize either that the other defines the problem differently or that the other faces constraints in acting on the problem -- i.e., when understanding is low.

Having assessed farmers' priorities and objectives, I asked NAF's staff and its associates to state the problems which they have been encountering while implementing agroforestry technologies in the field. They specifically mentioned the following:

- Farmers expected them to "hand out" ideas and material support;
- Farmers' participation in research and experimentation with respect to agroforestry activities was not encouraging.
- Farmers never say "no" but they do very "little".
- It is extremely difficult to work on fodder development activities when the agriculture extension machinery is geared to increasing grain yields and promoting external inputs such as improved seeds and fertilizers. To them, fodder is regarded as necessary but peripheral.

In view of the differences noted above between the objectives of NAF and farmers, the next section evaluates agroforestry technologies from NAF's perspectives and farmers' perspectives.

8.2 Agroforestry technologies

As has been stated earlier, Nepal's farmers practice several systems, forms and types of agroforestry. This study has limited itself to looking into those agroforestry technologies and practices with which NAF has been approaching rural communities.

8.2.1 On NAF's technologies

The NAF defines the term agroforestry as a land use system where trees for fuelwood, fodder, timber, horticultural crops, and grasses are cultivated in association with crops or livestock. This means that NAF's definition of agroforestry is no different from other popular definitions often advanced by many scientists in the developing and developed world. For

example, see Wiersum(1988), Nair(1989) and Baumer(1990). According to NAF, agroforestry is a traditional practice of Nepalese farmers and its productivity has declined over time due to resource degradation. The project launched its activities in the hills as the problem is severe and more visible in the hills and mountains than on the Terai plain. Presently, funding for the project comes from the World Neighbors and Ford Foundation.

When asked about the agroforestry technologies which NAF is currently promoting in its focus districts, the following technologies were specifically mentioned:

- Promotion of native fodder species, namely Kimbu *(Morus alba)*, Badhar (*Artocarpus lakoocha*), Kutmiro (*Litsea monopetala*), Rai khanyuo (*Ficus semicordata*), Tanki (*Bauhinia purpurea*), Bhote peepal (*Populas* species), Malingo Nigalo (*Arudinaria racemosa*), Gogan (*Saurauria nepalensis*).

- Introduction of exotic fodder species, namely ipil-ipil K-376 (*Leucaena pallida)*, ipil-ipil K-156 (*L. diversifolia*), Guazuma (*Guazuma ulmifolia*), Bhatmase (*Flemingia congesta*), Sesbania (*Sesbania sesban*).

- Introduction of exotic grasses, namely Napier NB-21 (*Pennisitum purpureum*), Molasses grass (*Melinis minutiflora*), Cocksfoot (*Dactylis glomerata*).

- Introduction of exotic legumes, namely Stylo (*Stylasantes guinensis*), White clover (*Trifolium repens*) and Velvet bean (*Stizolobium pruriens*).

The above technologies reveal NAF's current tendency to favor exotic species over local ones. When asked about specific reasons for its preference for exotic species, the following five reasons were given:

- Most of the local species are shady as they are of spreading type. Hence, they compete with cereal crops.

- Many farmers are interested in trying exotic species. They have already been growing local species on and around farm terrace risers.

- Our research base for fodder crops is poor. We have yet to know the quality and nutritional value of many indigenous fodder trees. Little work has been done to determine the yields of fodder trees in terms of total biomass.

- The exotic species are deliberately introduced to improve soil fertility for they are leguminous crops.

- Mixing exotic species with local species is essential because local species alone cannot meet the fodder demand during dry season nor do they provide nutrients to the soil as they are not legumes.

According to NAF sources, fodder species (indigenous and exotic) were selected based on farmers' criteria (Khan and Lai 1992). These included species that:

- can be grown easily from seed and cuttings;
- grow out of reach of grazing animals in 6 months;
- coppice well;
- provide high quality fodder during dry months; and
- are nitrogen fixing and multipurpose and the seeds are locally produced.

With NAF's sole focus found to be on the development of fodder and grasses in agroforestry, the executive director (the respondent) was asked if the project had studied relationships among and between fodder crops, fruit crops, cereal crops and livestock through a systems perspective within the different socio-economic contexts of farmers and community. The response was "not yet". To justify the activities of the project, he argued that the project intends to strengthen the weakest link in the farming system, e.g. disappearing naturally regenerated fodder trees in the field, by increasing availability of fodder within the farm system and by simultaneously improving the ecological base. The commodity oriented focus of the project could also be explained by the fact that the present Executive Director of this project is a well reputed fodder crop development specialist in Nepal.

In addition to the above technologies, NAF's other objective was to persuade farmers to discontinue their traditional practice of lopping trees. While lopping a tree, farmers cut side branches but keep the main trunk intact. Lopping makes a tree grow taller, with a large canopy. To replace this lopping practice, NAF has introduced coppicing[5] and polarding[6]. When asked why the two practices (coppicing and polarding) have been introduced simultaneously, the respondent stated that some fodder species such as Badhar, Kavro and Ficus do not favor coppicing. Polarding is necessary for these fodder trees. With regard to the fodder yield, I was told that the farmers would harvest a greater amount of fodder, should they follow techniques such as coppicing and polarding. The number of plants per unit area could be doubled or tripled with these techniques.

In summary, the above discussions reveal that NAF's present focus is on the following three technologies:

- Promoting plantations of indigenous and exotic fodder and grass species;
- Pushing coppicing and polarding techniques for fodder harvest; and
- Introducing leguminous trees to improve soil fertility.

Identification of technologies that NAF has been promoting raised a series of related questions:

- Are farmers aware of these technologies?
- How do they perceive these technologies and practices?
- What are their concerns about the exotic varieties of fodder trees and leguminous crops?
- Are coppicing and polarding new technologies? What do farmers say about these technologies?

These are some of the issues which the next section attempts to explore from farmers' perspectives.

8.2.2 Farmers' perspectives on NAF's technologies

To understand farmers' perspectives and practices of agroforestry technologies, they were asked the following three questions, relevant to NAF's technologies:

- Identification of major fodder species found in the area and criteria for their selection;
- Harvesting techniques; and
- Improvement of soil fertility through leguminous trees.

On fodder species

To understand farmers' preferences for fodder species, they were asked first to name the fodder species they liked and then state the reasons for their preferences. Farmers' choices for fodder tree species are described below:

Fodder species: Badhar (*Artocarpus lakoocha*), Kutmiro (*Litsea monopetala*), Tanki (*Bauhinia purpurea*), Dudhilo (*Ficus nerifolia*), Bhimal (*Grewia optiva*), Kavro (*Ficus virens*), Kimbu (*Morus alba*), Khaniyo (*Ficus semicordata*), Dabdabe (*Gaguga pinnata*), Koiralo (*Bauhinia variegata*).

Selection Criteria: Leaves liked by animals e.g. Kutmiro and Badhar; butter production, multiple uses e.g. Koiralo; excellent fuelwood e.g. Bhimal; biomass production, medicinal value e.g. Badhar; easy to harvest e.g. Dabdabe; available during dry months e.g. Dudhilo; natural regeneration e.g. Tanki and Koiralo.

Farmers were then asked to select five species which they liked most, and assess each of them based on their own criteria, in such a way that the most valued criterion would appear on the top of the list and the following criteria in ascending order. Farmers responses are summarized in Table 8.2.

Table 8.2 Farmers' ranking for fodder species and selection criteria

S.N	Farmers' Criteria	Fodder Crop Species				
		Khaniyo	Kutmiro	Gavo	Koiralo	Dabdabe
1	Liked by animals	2	1	4	2	3
2	Milk production	2	1	5	3	4
3	Butter production	3	3	5	5	4
4	Liked by calves	4	1	5	5	2
5	Easy to propagate	3	4	2	3	3
6	Easy to harvest	2	3	5	3	5
7	Biomass production	3	1	4	2	3
8	Others (Multiple uses)	2	1	5	1	4
Total		21	15	35	24	28

Note: Ranking 1 for most preferred and 5 for the least preferred

Source: Judigaon, PRA training cum practice, 16-20 December, 1993

This table shows that farmers prefer those fodder species which are liked most by animals, followed by their contributions to increased milk production and butter production. Biomass production was not an important criterion as compared to criteria such as milk and butter production, propagation and harvesting quality. Farmers' choices for fodder tree species reveal three things.

- Farmers invariably prefer local species to than exotic species.
- Farmers differ with NAF in the choice of a few species, such as Khaniyo, Badhar and Koiralo, although in principle most of the local or indigenous species promoted by NAF corresponded with farmers' preferences.
- Farmers differed with NAF in the criteria for selecting a fodder crop species.

Finding farmers' preferences to be different from NAF's earlier assumptions was a surprise for those NAF and Samaj Sewa Samuha staff who participated in the Participatory Rural

Appraisal training cum practice. Regardless, NAF persisted in claiming that the presently recommended fodder species are the joint venture of NAF and farmers.

Concerning exotic varieties, farmers were specifically asked about ipil-ipil (*Leucaena leucocephala*) as it was a widely publicized crop in the area. Surprisingly, farmers were not in favor of this crop primarily for two reasons. Firstly, it needs a kind of medicine (they were referring to inoculum). Secondly, crops get infested by insects (Psyllid insects). Farmers did not believe or seemed not prepared to accept that recently introduced hybrid varieties (e.g. K 256) are resistant to psyllid. Farmers said that the old varieties of ipil-ipil were also not infested by psyllids in the beginning. They got infested only after a few years. They suspected that the recent varieties would also be attacked in the future. Pandit (1992) confirmed that not only has the popularity of ipil-ipil been decreasing, but that farmers have also become suspicious of growing other exotic species due to attack of psyllids on older varieties of ipil-ipil. According to Baidya (1992), psyllid insects started moving from Florida in 1983 to Hawaii, the Philippines and Indonesia and then towards the Asian mainland, and appeared in Nepal in the summer of 1989 summer, as predicted. This means that controlling psyllids requires the integrated efforts of many actors, from farm level to international level.

Fodder harvesting techniques

In the study area, respondent farmers were invariably lopping tree branches to harvest fodder. Farmers did not know the English words: coppicing and polarding. However when told about these practices, farmers pretty much rejected them as discussed below:

Coppicing

To farmers, coppicing meant cutting tree in such a way as to encourage goats and cows to browse on them. They argued that after coppicing, plants would never return to their original vigor, as new shoots would be eaten by goats and cows. They said that they could not always be going after goats, especially during the fallow period when their neighbors would let animals free for grazing. Besides this, they said that the practice might be applicable in commercial plantations but not in small scale farming systems such as theirs. Furthermore, no one in the village would be likely to buy fodder in the village.

Polarding

In general, farmers agreed that polarding was a better idea than coppicing if the plants were kept above the height at which goats browse. However, for many of them, polarding meant further exacerbating the fuelwood problem.

Besides this, there was a general consensus among farmers that polarding and coppicing required a large landholding size. In Judigaon, many, if not all farmers, were small and did not have more than 0.75 hectare per household. For many of them, substituting food crops for fodder was not acceptable. In the past, the purpose of growing or protecting naturally regenerated fodder trees in terrace risers was solely to provide fodder to animals. At present, shortage of fuelwood has prompted them to grow more trees, but only those species which

are equally good for fodder and fuelwood. Farmers said that lopped fodder trees (for example Utis, Badhar and Kutmiro) grow taller and have larger diameters. This means more fuelwood, fodder and a better timber quality.

Arens and Nakarmi (1989) have provided an interesting example to illustrate how farmers in Bahunipati adjusted lopping technique to solve problems of goat grazing on ipil-ipil plants[7].

In sum, what NAF perceived as the disadvantage of lopping fodder trees was perceived by the farmers as an advantage.

Improving soil fertility

In Judigaon, farmers did not know about the potential role of fodder trees, especially leguminous trees, in improving soil fertility. Although farmers mentioned declining crop yields in *bari*, they have apparently not realized the relationship between planting leguminous fodder trees and soil fertility improvement. They are presently interested in the short-term aspects in tree plantations (mainly the immediate yield increase of associated crops) without recognizing long-term factors (maintenance or progressive increase of soil fertility). This is, indeed, a problematic situation. Unless the benefits are visible, farmers are not likely to plant trees for soil improvement purposes. Introducing exotic leguminous trees among marginal farmers seemed a challenge for NAF. For many farmers, growing trees in good *bari* meant further reduction in total harvest because trees would compete with crops.

Why are there differences between the perspectives of the intervening agency, such as NAF, and those who are the target of that intervention, the farmers? What are those factors or elements which potentially contribute to differences in the perspectives among different actors? How could such differences possibly be narrowed down? Examining such issues is crucial if our vision is to improve, enhance and develop sustainability of agriculture. Unless the gaps are narrowed down and differences sorted out, people are not likely to benefit from any planned intervention regardless of how nicely it is constructed. And, indeed, narrowing down the gap does not imply the withdrawal, or the submission, of either side. In view of this, the following sections firstly examine NAF's institutional framework, and secondly, the intervention approaches.

8.3 Institutional framework: working with and through NGOs, an example of NGOs' networking

As stated earlier, NAF supports other grassroots NGOs which aim, among other things, to undertake agroforestry related work, but lack needed technical expertise and skills for the development of agroforestry systems. This means its purpose is to work with and through NGOs for the benefit of farmers. The idea is that these different institutions will bring in different expertise, analytical capacities and material support to facilitate joint action for promoting agroforestry activities. In addition, the other advantage is that there will be minimal discontinuities in activities after the withdrawal of its support from the area, as the local organizations would have become capable to take over agroforestry activities by

themselves. Thus, strengthening local institutional capacity was one interesting benefit of NAF.

Presently, it focuses its activities in the following four districts, hereafter called "focus districts". In each focus district, it has first established working relationships and/partnerships with a leading NGO of the district so that the latter can perform as its lead NGO. Secondly, in consultation with the respective lead NGOs, it has identified a few other local NGOs or local voluntary organizations to work as its partner NGOs. Its scheme is as follows:

District	Lead NGO	Partner NGOs (NO)
Kavrepalanchok	Samaj Sewa Samuha (SSS)	4
Sindhupalchok	Baudha-Bahunipati Project (BBP)	3
Ramechhap	Tamakoshi Sewa Samiti (TSS)	4
Dhading	Dhusa Sewa Samiti (DSS)	1

NAF has fixed four-year time frame period for supporting a particular lead NGO. After this period, it expects that the lead NGO will be capable of providing necessary technical support services to its partner NGOs without further assistance.

8.3.1 Lead NGOs

To implement agroforestry activities, the role of the lead NGOs is crucial. They are expected to take a leadership role in initiating, promoting and implementing agroforestry technologies. NAF provides technical and financial support as they demand, depending on programs, resources and budgets. However, it should be stated here that agroforestry is not only the concern of the lead NGOs. They are autonomous organizations with multiple activities such as the promotion of adult literacy, promotion of hygiene and sanitation, construction and maintenance of drinking water and irrigation facilities. Because they are included with many programs, they have many donors. For example, TSS and SSS receive support of the World Bank through its NGO support program for drinking water (known as Jakpas) and the support of the World Neighbors for other community development activities, training support and so on.

Since Judigaon lies in the SSS area, it is of interest to state explain what Judigaon means to the SSS. Not only does this clarify the crucial role of lead NGOs, but also the probable relationship between the lead NGOs and the people. Let me put this in the following way.

The chairman of the SSS is also the elected chairman of Mahadevasthan VDC. Mathillo Judigaon is thus part of the electorate for the SSS chairman. The people in Mathillo Judigaon seemed very much hopeful that the SSS chairman would support (financially and politically) them in repairing the drinking water system which had been functional for a year. As I stated earlier, the SSS is actively working in drinking water projects, it had recently completed a project at Tallo Judigaon, only a 15 minute walk from Mathillo Judigaon. It formed a drinking water construction committee, which is now providing a forum for the farmers to discuss activities such as planting of fodder trees and using contraceptives for family

planning. This means that it is not illogical for people from Mathillo Judigaon to seek SSS support. But, it provided a dilemma for the SSS chairman, who did not want to displease the people of Mathillo Judigaon by saying that he could not help them. He also depends on votes from the upper village situated just above Mathillo Judigaon, which has always been opposed to any move allowing Mathillo Judigaon to use the water from their source. In fact, this was the reason why the earlier system had broken down after one year. They feel that the water source is insufficient for both villages. On the other hand, in Mathillo Judigaon, people have not yet removed their water taps so that whenever it will be repaired, the original positions would not be misplaced. In fact, when we went to the village, farmers initially thought that we came to survey the drinking water project. It was painfully disappointing for them to learn the purpose of our visit to the field.

8.3.2 Partner NGOs

NAF's partner NGOs are village-based voluntary organizations[8]. These VOs are also autonomous organizations which are usually registered with the respective District Offices. Similar to the lead NGOs, they are also engaged in multiple activities such as drinking water, literacy and agroforestry, but remain confined within the boundaries of a few villages in a VDC. They are small in size and have limited capacity in terms of manpower, budget, resources and technical expertise. Usually, a lead NGO helps them to find donors, and/or helps to carry out a project technically and financially.

Finally, these VDC based voluntary organizations form some four to six "perma" groups (working groups) to implement agroforestry activities. These perma groups are actually farmers' groups who take part in agroforestry activities at the farm or individual level. The following flow diagram describes the working relationships among these groups.

NAF→ Lead NGO (e.g. SSS)→ Partner NGO (e.g.VO)→ Perma group→ Farmers

In sum, NAF, lead NGOs and partner NGOS operating independently are dependent on each other. Although the sole purpose of NAF is to support farmers in undertaking agroforestry activities, its performance is determined by its relationships with other organizations, particularly its cooperating NGOs. How seriously these intermediary organizations (lead NGOs and partner NGOs) carry out agroforestry work in their respective areas would determine where the efforts of NAF would finally end up in a particular area.

Having discussed NAF's institutional framework, Table 8.3 presents the program implementation process. Table 8.4 depicts the roles of cooperating organizations and individuals. The purpose of these tables is to provide contexts for understanding the nature of networking and relationships among NAF, the lead NGOs and the partner NGOs.

Table 8.3 Implementing agroforestry

Step 1	Expose farmers to agroforestry (mobile photo exhibition, farmer field days etc), encourage testing new ideas, organize cross visits for motivated farmers.
Step 2	Organize home nursery training for leader farmers, provide on site plantation training and support to ensure success and sustain farmers' motivation.
Step 3	Farmers form their own groups, attend nearby quarterly group meetings, select their own farmer-trainer and demonstrator cum nursery man.
Step 4	Farmer-trainer trained in making observations and collecting relevant data for basic field level research and training. Farmer-trainer/demonstrator establish demonstration farm. Farmer - trainer receives quarterly training from NAF.
Step 5	Farmer-trainer/demonstrator improves research; training and extension cycle goes on. NAF provides a 3-day refresher training to farmers to complement the training given by farmer-trainer/demonstrator.

Source: Adapted from Khan and Lai (1992: 14)

Table 8.4 Roles and responsibilities of different organizations and individuals in implementing agroforestry programs

S.N	Activities	Responsibilities	Target group	Budget
1	Organizing photo exhibition, farmer field days	NGO (L), NAF	Farmers	NAF
2	Organizing visits to home nurseries and demonstration farms	NGO (L)	Farmers	NAF
3	Formation of farmer groups	Farmers, NGO (P)	Farmers	-
4	Selection of farmer trainer and demonstrators	Farmers, NGO (P)	Leader farmer	-
5	Home nursery training for demonstrators	NAF	Demonstrators	NAF
6	Training of trainers	NAF	Farmer trainers	NAF
7	Organizing quarterly meeting at demonstrators/ trainers' farms	NGO (P), farmers	Farmers	NAF
8	Establishing nursery/demonstration farms	Leader farmers	Farmer members	NAF
9	Monthly training	Farmer trainers	Farmer members	NAF
10	Annual farmers' refresher training	NAF	Farmer members	NAF
11	Exposure visits	NAF	Policy makers	NAF

Note: NGO (L)- Lead NGOs

NGO (P)- Partner NGOs

Source: Field study

The above table illustrates how different institutions have constructed a network among themselves to achieve their individual objectives, including survival as an institution. It also illustrates how they have coordinated their efforts, realizing the needs for mutual interdependence. However, the question now arises: do they behave as a system?

8.3.3 Examining networking: searching for synergy

While examining the nature of networking among these NGOs (NAF, lead NGOs and partner NGOs), it appeared that the lead NGOs had the power to control or direct NAF, as allowed by its composition. For example, the present chairman of NAF is also the chairman of the TSS. Two other board members belong to the SSS and the BBP. Hence, roles of lead NGOs are crucial for the success of NAF. Annex 8.2 lists the present and past board members of NAF. Not only were the chairman and board members of TSS, NAF, BBP and SSS interconnected, but they also have a common donor. The World Neighbors is presently supporting almost all of these organizations in their various activities and frequently provides opportunities for them to discuss and interact. Thus, the World Neighbors provides an environment for them to perform as a system.

Regardless of whatever is possible in theory, in practice NAF formulates its programs and activities without adequately consulting with the lead NGOs, partner NGOs, perma groups and farmers, as evident from the differences in the perspectives of these different actors. The role of the lead NGOs and partner NGOs seemed limited to providing village bases for NAF to implement its activities. They were least involved in program activities such as training. Although the lead NGOs and partner NGOs are directly responsible for NAF's activities in the field, these organizations seemed not prepared to accept their responsibility. On one hand, they viewed NAF as one of their technical wings, on the other hand, they indicated that NAF was not much transparent. They did complain that their voices were often unheard. This suggests the lack of effective sharing of ideas, experiences and information among network members.

In one of its recent reports, NAF itself mentioned the following problems:

- lack of initiatives on the part of farmers to carry out research or experiments
- insufficient cooperation from farmer researchers;
- inadequate coordination and understanding with lead NGOs.
- difficulties disseminating skills (technologies) to the extent desired by the project.

Interestingly, the lead NGO and the partner NGOs seemed not aware of NAF's problem situation and concerns. The lead NGO and partner NGOs did not consider themselves part of NAF system. In addition, there seemed a lack of efforts on the part of both NAF and the lead NGO to improve coordination among themselves.

Likewise, the people in Judigaon did not view themselves as part of NAF or the SSS system. For them, the SSS was a donor and which could support them in repairing a broken drinking water system. They did not know the relationship between NAF and the SSS. And NAF had yet to realize that improving access to drinking water in Mathillo Judigaon meant increased opportunities for agroforestry activities there. This further indicated lack of an emergent property. An emergent property arises when a complex interconnected network exhibits synergy, such that "the whole is greater than the sum of the parts".

In short, it appeared that the networking of these organizations is simply a collection of legally separate units. To Röling and Engel (1991), this type of arrangement is a heap of spare parts.

8.4 Examining intervention approaches: identifying missing links

This section has examined NAF's intervention approach. Of the several key elements in planned intervention, training, demonstration and visits are crucial, and involvement of many actors with multiple and set roles in it is a reality. How these actors perform their roles and how those elements are used and combined make a system linear, top down, uni-directional, participatory or people centered. Taking these things into account, this section compares NAF's intervention process with that of the linear model, and the farmer first approach.

8.4.1 Comparison with the "transfer of technology" model

NAF's intervention approach initially appears to be innovation-centered. As I discussed earlier, what makes an intervention approach innovation-centered is the way it is brought to the community. For example, Table 8.4 revealed that NAF and its cooperating organizations firstly demonstrate to the farmers the advantages of using agroforestry technologies through photo exhibitions and farmers' field days without assessing their circumstances, problems, needs and potential. Finding and utilizing their knowledge seemed far from their minds. Farmers, if they are convinced of the demonstrated technologies, are expected to form a group on their own initiative (a perma group), and approach local NGOs concerned (lead NGOs or partner NGOs) for possible assistance and support. The group leader is then given a chance to visit demonstration sites (visits). Finally, NAF expects that he will set up a demonstration cum nursery farm for the members of his group within six months of the initial cross visit. In the meantime, NAF will train him so that he can train his counterparts. Indeed, this suggests that NAF's focus is on ready-made and outside packaged innovations which are to be grafted onto the socio-economic context of a farm. This has resulted in insufficient appreciation of the farmers' circumstances and the community's socio-economic contexts.

Secondly, the demonstrator farmer is required to grow 300 plants successfully within three years and establish a home nursery to produce at least 500 plants per year. This means a demonstrator has to put aside approximately half a of hectare land for a fodder tree plantation. This is a lot of land for farmers in the hills. By using polarding and coppicing techniques, he can cut the land use by nearly half or so. But, this also means replacing food

crops with fodder, which, in general, is not acceptable to small and marginal farmers. The large farmers might bear the risk, but not the small farmers in Judigaon. This implies that a demonstrator farmer is likely to be a rich farmer and, in general, different from rest of the farmers in the hills. This approach seemed merely a copy of the single-species ipil-ipil approach[9] previously used by the BBP in 1970s. The progressive farmer strategy assumes that an innovative farmer or progressive farmer, if trained and supervised properly, trains his neighbors, and technologies trickles down to other farmers in the area. To achieve its purpose, NAF trains these farmers to enable them to train their fellow farmers.

Thirdly, according to NAF's design, NAF first trains the farmer-trainers once in every four months, and then expects that they train other group members once a month. However, in the field, I could not find any monthly training being conducted by the farmer for the farmers. Some farmers reported that in the beginning they conducted some training, but stopped after farmers' participation decreased. Farmers rightly questioned the relevancy and necessity of such training by a farmer for farmers. When asked the reason behind the decreasing interest, they said that it was probably due to the lack of subject matter for training. Farmers did not feel that they need such extensive training on fodder crop plantations every month.

Lastly and most importantly, the approach seemed biased as it viewed agroforestry only in terms of planting fodder trees species, regardless of how agroforestry was defined by the project. Although, NAF has recently started to conduct training courses on the formation of livestock user groups, it still fails to view agroforestry practice or problem situations through a systems perspective.

8.4.2 On comparing with farmer first approach

Although NAF's present approach appears to be based on "TOT" as discussed earlier, it has used several concepts from the other school- the farmer first approach- such as experimenting with farmers and facilitating farmers in farmer extension (Table 8.4). And, Figure 8.2 presents the concept of the user centered agroforestry program (Baidya 1992).

Experimenting with farmers

NAF carries out research and trials with farmers in farmers' field. Demonstrator farmers are its researchers. The following are the two major research studies presently being undertaken by NAF with the help of demonstrator farmers.

- Lopping height and harvest interval for Kimbu fodder tree at Hinguapati, Danuwargaon.

- Lopping interval for *Flemingia congsta* (Bhatmase), *Sesbania sesban* (Sesbania)

Since these studies were conducted recently, farmers had no comment on them. However, the cooperating farmer reported that he was not consulted prior to selecting the topics or problems for the research.

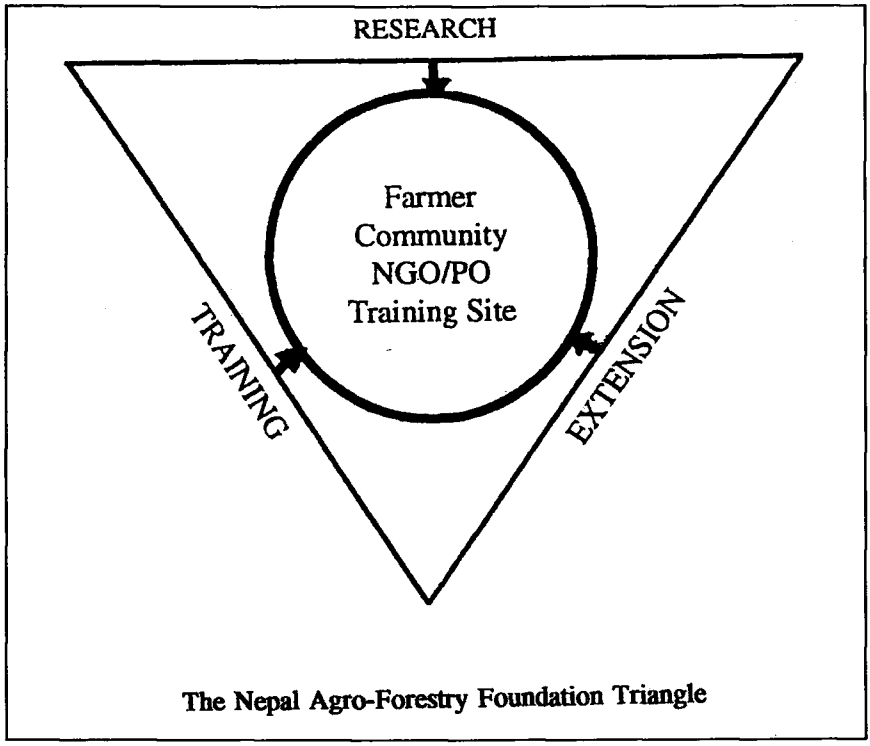


Figure 8.2 Concept of user centered agroforestry program (NAF Triangle)

Source: Baidya (1992: 101)

Facilitating farmer to farmer extension

The interesting part of NAF's intervention approach is its effort to develop farmers' capabilities to train their fellow farmers. Developing farmer-to-farmer links for reporting individual solutions to production problems is one interesting aspect. Table 8.3 showed that NAF's present focus is on mobilizing farmers to provide training and extension services to other farmers. Its extension agents are leader farmers. For this, NAF has initiated three mechanisms, namely encouraging farmers to establish home nurseries, facilitating farmers' cross visits and training to farmers by farmers.

Shifting from community nursery to home nursery

In the beginning, NAF placed a heavy emphasis on support in establishing community nurseries. However, it soon learned that the community nursery was not an appropriate emphasis, as community property was both everybody's property and nobody's property. It realized that the nursery would be terminated along with the withdrawal or termination of the project from the area, as there would be no funding to pay the salary of the nurseryman

(Neupane 1992). As a result, it has shifted its focus from the community nursery to the farm nursery. This makes NAF a learning organization which learns from its past mistakes and activities. This factor is very critical and is likely to contribute towards its success and sustainability in the future.

Private property always has a fair chance of sustainability. Establishing a home nursery at the farm level means private ownership of the nursery, and business for the nursery owner. Obviously, the nurseryman will make every possible effort to sell his plants, producing only those plants in heavy demand and will share his knowledge, skills and experiences with other farmers for managing fodder plants in the field. This requires that the nurseryman visit new plantation sites, and provide technical support and advice to other farmers. Thus the promotion of the home nursery has offered good prospects for farmer-to-farmer extension. Since the demonstrator is usually a nurseryman, farmers can complain of poor plant quality directly to him.

Facilitating farmers' cross visits

The purpose of organizing cross visits to a demonstrator's farm for the farmers intending to establish fodder tree plantations is to build confidence among farmers in selecting fodder species and to facilitate such work on their farms too. Regardless of some shortcomings in the demonstrator farmer approach indicated earlier, the cross visit is a mode of farmer-to-farmer extension which facilitates developing farmer-to-farmer links. Indeed, this appears to be a promising strategy. NAF bears the cost of cross visits, but seldom participates in the program. The idea is not to influence visiting farmers through its involvement.

Facilitating farmer-to-farmer training

The third and most important aspect of farmer-to-farmer extension is organizing training for farmers by a farmer. A farmer trainer for a group is to be selected by respective groups based on criteria given by NAF. The farmer trainer is a person who:

- is selected by the group;
- has free time to teach farmers at least four to five days a month;
- has a sufficient number of source plants;
- is ready to teach other farmers;
- is capable of organizing farmer meetings once in a month;
- will organize cross visits for the farmers to other areas once a year, as requested by the farmers;
- is a demonstrator of new technologies and also a nurseryman

In summary, this study found NAF's intervention approach to be a mix of the innovation-centered "transfer of technology" model of knowledge system and the farmer first approach, even though its architects argue it to be farmer-based, farmer-centered, and farmer-led (Khan and Lai 1992, Baidya 1992). Some basic notions of the farmer first are used to persuade farmers to follow agroforestry technologies. Indeed, NAF appears to be making serious efforts to move along the farmer first approach. The problem is that it fails to identify problem situations in the village together with the farmers or to learn and benefit from

farmers' local knowledge and skills. Needless to say, the importance of farmers' knowledge in agroforestry and natural resource management has been well recognized. As a result, NAF faces problems in making people understand agroforestry technologies (Baidya 1992).

In addition to that, the project has also overlooked the other reality, which is that there are important differences between the various categories of farmers in respect to access to resources. As a result, it fails to create a shared perspective on the problem situation and to help develop the decision making capacity of the farmers to deal with it. Hence, it seems that organizing farmers' cross visits can turn into a sponsored activity. Had the project researched why the community nursery could not function properly, it might at least have some understanding of its deficiencies. Instead of shifted hastily from its original emphasis on the community nursery process to a home nursery process. Even the best of ideas are not accepted if not understood, or relevant to solving a problem[10].

8.5 Coordination and linkages

When agroforestry is viewed as a planned intervention it requires bringing efforts of multiple actors (individuals and institutions) together towards creating a synergy. This consists of farmers; the Ministry of Agriculture and the Ministry of Forests and their representatives at different levels of administration; international NGOs, national and local NGOs and local government authorities. Presently, more than 35 government and non-government organizations and projects are involved in natural resource research and development in Nepal (Paudel and Tiwari 1992). The lack of coordination and linkages among them are the source of confusion, misunderstanding, duplication of efforts and resources, and project failure. Realizing this, Rajbhandary and Pradhan (1991) point out that coordination is the greatest problem in the Nepalese system of administration. If this problem could be resolved, more than half the problems of development work would be solved. However, solving coordination and linkage problems is not an easy task because these essentially involve people who are goal-directed and intentional by nature. While implementing agroforestry it is crucial that the components of agriculture and forestry be combined together at different levels for different purposes with clear vision and objectives. The following provides an example:

	Level	Purpose
a.	Ministry	Legislation, policy integration, evaluation
b.	Departmental	Policy interpretation, program planning, monitoring and evaluation
c.	Regional	Program support and monitoring
d.	District	Program planning, implementation, monitoring and evaluation
e.	VDC	Activities and efforts of VDC based GO and NGO field staff
f.	Community/Village	Integration of community resources such as irrigation facilities, forests and drinking water

8.5.1 Ensuring policy level support

The NAF has recognized how crucial the support of people positioned at policy making levels is for its survival. To ensure continual policy level support, NAF's strategy has been to organize policy maker field visit program for personnel from the National Planning Commission, the Ministry of Forests, the Ministry of Agriculture, international donor agencies, the World Bank and the FAO. The objectives of these exposure visits are to facilitate information sharing, seek solutions arising from communication gaps, and lobby for the support of agroforestry at the higher levels. According to NAF, these exposure visits have proven very beneficial because the different government agencies and donor agencies have acquired a common forum to discuss agroforestry development related issues, at least for a day. This one day trip has facilitated the participants in updating their knowledge of agroforestry and in learning the field situation and problems, although the program is short and directed towards one particular farm, usually a successful one. As a result strong links have been developed between NAF and other NGOs, the Ministry of Forests, and the Ministry of Agriculture.

Not only have policy makers benefitted by this process, but NAF equally is benefitted by it. It has benefitted in at least the following four ways. Firstly, the exposure visit has become a market for NAF to sell its expertise and programs among donors and government agencies and other NGOs. Many institutions and people become aware of its activities and potential. Secondly, NAF has created for itself a good opportunity to learn by interacting with other people with a wide range of international exposure and knowledge. Obviously, people participating in this activity would be those who are already involved in agroforestry development activities, and have a stake in the process. Thirdly, NAF has been able to create a space for itself at the policy making level. It has now been appointed as a member in a field implementation working group formed under the Forestry Sector Co-ordination Committee of HMG Nepal. This group consists of 27 NGOs and GOs. Finally, due to good coordination with the Ministry of Agriculture, particularly the Division of Entomology, it has been able to release the psyllid predators *Curinus coeruleus* and *Olla abdominalis*, the Coccinellid beetles, into Nepal from Thailand (Pandit 1993). The Nepal Agricultural Research Council is even seriously considering providing research support and a budget for NAF to conduct agroforestry related research and studies, more particularly on fodder crop development. And the International Union for Conservation of Nature has considered providing it grant assistance to improve its training process.

8.5.2 Working with implementation level

Although policy level support has created a better working environment for NAF and found donors for it, it has experienced severe gaps, as a result of the lack of coordination and integration of activities among GOs, especially the field staff of the ministries of Agriculture and Forests. Besides inter-ministerial coordination, the problem is further aggravated due to the lack of intra-ministry or department level coordination. It feels that, as an NGO, it has weak influence over both organizations unless they themselves decide to try to work together or unless pressured to do so from the above. Although it has found exposure visit programs useful and effective in solving many small field-level problems that emerged due to such lack

of coordination, it felt that the objectives of such exposure visits would eventually be defeated, with too many such field problems. Finding it very difficult to integrate the activities of agriculture and forestry, but crucial if agroforestry is to be integrated into the development planning process, Tom Arens, the present country director of the World Neighbors, argued for the need to initiate the Ministry of Agroforestry in Nepal.

At the field level, surprisingly, the Junior Technician of the Ministry of Agriculture who resides at Hinguapati, Mahadevasthan VDC in front of NAF's training establishment and Kunta Nursery, and who has been working in the VDC for more than two years was not fully aware of not only activities of NAF and the SSS about agroforestry development works but also the name of the fodder species presently being promoted by NAF. When asked whether he had ever visited the demonstration cum nurseries established by NAF, he answered that he did not know where these nurseries were. On the other hand, the JTAs of the agricultural service and livestock service were practically invisible to NAF and SSS. Although neither side can be held responsible for this situation, this reflects the extent of coordination and integration of activities at the field level. The NAF and its cooperating agencies have made little effort to provide opportunities for farmers in their focus area to visit and learn from the agroforestry activities of other NGOs , GOs and farmers in areas other than those serviced by NAF.

In short, my research indicated that NAF, as an NGO, has fully realized the importance of policy level support and accordingly created a spot for itself at the higher level. But, at the same time, it overlooked the field staff, as they were less likely to affect its activities. The importance of coordination of efforts and activities among different actors at the field or operational level are yet to be realized.

8.6 Summary and conclusions

In summary, in Judigaon, growing fodder trees is not a priority of farmers, and they do not grow trees solely for fodder. They plant or allow trees to regenerate for many purposes: fuelwood, fruit, shade, live fencing, protection against wind, honey production and timber. As farmers viewed trees more than a source of fodder to animals, they did not favor coppicing and polarding, in general. Historically, they have been growing trees where crops usually cannot grow (terrace risers) or where have little effect on the crops. Growing trees in terrace risers and making efforts to avoid shading to the crops imply that farmers are not prepared to replace food crops with fodder trees. As the majority of farmers are small and subsistence, their first priority is food for themselves, and not for animals. In general, the farmers' negative attitude towards coppicing and polarding reveals that farmers want to maximize fodder yield per tree as opposed to NAF's intention to maximize fodder production per unit area, suggesting differences between farmers' perspectives and NAF's perspectives. Farmers need to consider not only their goats but also neighbours' goats, and consider prevailing social customs such as "letting animals free for grazing during crop fallow periods" while making management decisions on what to plant, where to plant and how to lop trees. This implies that for farmers agroforestry does not mean only fodder crops but also trees of multiple uses, their own goats, neighbours' goats, crops, livestock, the market and social customs.

Despite the establishment of agroforestry as a means to develop sustainable land use and a potential option, if unsustainability trends in agriculture are to be reversed, the present case provides empirical evidence to suggest no such things are likely to happen unless the social aspects of innovation, that is, people-to-people relations, are taken seriously. Deficiencies in institutional configurations, intervention processes, coordination and integration, etc. indicate shortcomings in social aspects centered on innovation. If the merits of innovation are one aspect, the other crucial aspect is how people perceive it and how close it is to the needs, problems and priorities of the people.

Notes

1. According to Baumer (1990), agroforestry is a term which first appeared around 1960 in English, and then in French, although the practice is found all over the world in different forms and types. This means two things. Firstly, the word is new but the art is an ancient one, perhaps as old as the history of mankind. Secondly, it suggests a lack of precision surrounding what is conveniently called agroforestry. Indeed, various definitions of agroforestry have been given by many authors. In view of this, the following definition of agroforestry given by Baumer has been borrowed in this research:

   "Agroforestry is a collective term for systems and technologies of land use where perennial woody plants (trees, bushes, shrub and, by assimilation, palms and bamboos) are deliberately cultivated on ground otherwise used for crops and/or stock rearing in a spatial or temporal arrangement, and where there are interactions at once ecological and economic between the woody plants and the other components of the system".

2. For this research, "National NGO" refers to an NGO whose origin could be traced within Nepal and which is established in accordance with the Association Act of 1977 with the objective of providing development support technical services to other grassroots NGOs. In addition, a national NGO should operate in more than one district.

3. The Boudha-Bahinipati Project (BBP), a local NGO, was established in 1973 as a health and family planning project with the assistance from the International Planned Parenthood Federation. In 1975 the project requested World Neighbours to provide supplementary assistance for agricultural development and expansion of health work after realizing that only an integrated approach in this rural, remote area could increase family planning adoption. Then the project was successful in achieving one of the largest contraceptive use figures in Nepal, an average of 28 percent of fertile couples (twice the national average), and as a result average birth rate went well below the national average. Interestingly, in spite of a 40% increase in livestock numbers (between 1983 and 1986), pressure on fodder and fuelwood in the nearby forest was reported to be reduced. Terraces have been stabilized by extensive planting of ipil-ipil grass. Soil erosion is reduced (Arens and Nakarmi 1988).

4. The Nepal Agroforestry Foundation, as a non-governmental organization, was registered in 1991 with the aim to achieve balanced and sustainable development through appropriate ways of managing complex interactions among various components of the ecosystem: agriculture, livestock and forestry. The NAF intends to expand the initial work started through World Neighbors and to develop a local self-supporting institution with the capacity to support and replicate proven agroforestry extension work in Nepal.

5. Coppicing is a practice in which side branches and main branches of a tree are cut from 15-30 cm above the ground level. After coppicing a tree looks like a stump.

6. Polarding is a practice in which the main trunk, side branches and tips of main trunk shoots are cut 1.5 to 2 meters above the ground level.

7. In the beginning, the Baudha Bahunipati Project advised Bahunipati's farmers to cut ipil-ipil trees at 0.75 m from above the ground when the project observed controlled grazing as a result of large scale ipil-ipil plantations. However, ignoring its recommendation, ipil growers lopped trees above 1.75 to 2 m from the ground by allowing branching of trees above the reach of cows or goats. The reason was that ipil growers could control their animals but not neighbors' animals, which were left free for grazing during the crop fallow period months. Finding this farmers' modification on lopping height led the BBP subsequently to revise its earlier recommendation and suggest farmers to lop the plant at a height of 1.75 to 2 m from the ground.

8. In Nepal, in recent years, voluntary organizations have mushroomed, particularly in response to the present initiatives of the government which has made it possible to allocate central government budgets to projects managed jointly with local people. Following the restoration of the multiparty democracy in 1990, the number of VOs has multiplied exponentially every month.

9. In 1975, following the supplementary assistance of the World Neighbors for agriculture development and expansion of health work, the BBP planned an extension program to demonstrate to farmers that ipil-ipil could be grown in large numbers on terraces along with crops, and without competing for moisture or sun, unlike most local fodder trees. The project then selected five farmers who had to plant a minimum of 400 trees each. Extension work focused on these few farmers, who were followed up at least once a month. Of the five farmers, three were successful and the follow-up services were accordingly intensified to these three farmers.

10. In a very big kingdom, there lived a big and powerful king. In his kingdom, there were more poor than rich people. He alone could not study the problems of all his subjects and help them. One official tried to provide potable drinking water by digging wells all over the kingdom and felt that the people would be happy. He went a year later to a village and found the villagers saying that they did not want wells, because a stream nearby supplied all their needs. However, they were using wells to immerse their deities after *puja* (worship). Another official distributed a pest-killing powder to farmers. But, the poor farmers in locust-infested villages did not understand the link between the powder and locusts, and did not use it (Ramanamma 1993).

CHAPTER 9

ON PERMACULTURE
(Case study 2)

As compared to my first case (agroforestry), this case on permaculture is more complex. Permaculture advocates a totally different system of farming in which farmers require to unlearn the modern technologies which they learned since the beginning of the Green Revolution. Likewise, while making decisions concerning adoption, adaptation or rejection of permaculture practices, farmers need to look beyond their farms and the activities of their neighbours. In addition to this, they need to seriously consider the nature and magnitude of the support and facilities available through different sources, both governmental and non-governmental agencies, and the consequences of using these technologies.

For this part of my research, the Institute for Sustainable Agriculture Nepal (hereafter INSAN) provides the setting. In Nepal, it has been one of the pioneer organizations for promoting the philosophies, principles and practices of permaculture, right from its inception in 1986. Although INSAN has three farm sites, Amaduwa (Sunsari), Kiratichhap (Dolakha) and Dadhikot (Bhaktapur), representing the conditions of the Terai, mid hills and the Kathmandu valley, the focus of this case study is only on Amaduwa village in Sunsari district in the Terai.

The following methods were used in conducting the investigation: content analysis; semi-structured, open-ended interviews; focused group discussions and direct observation. The specific approach taken in the investigation was to:

- *review and analyze published plans, workshop reports, organization and functional charts, legal documents and other written material as background;*
- *conduct a series of face-to-face interviews with individuals ranging from the MOA administrators to INSAN staff to farmers;*
- *make field visits to observe directly the activities of INSAN's Permaculture Development Farm (PCD farm), farmers and extension at multiple levels such as district, village and farms.*

In this chapter, I will first introduce the village and then examine innovation- intervention processes and institutional configurations.

9.1 Amaduwa, the case study area

Amaduwa is situated in the Sunsari district of eastern Nepal. Sunsari district lies in the Terai region. As I already stated in previous chapters, in Nepal, we can count only the

Terai as a region where Green Revolution agriculture has taken hold with any extent and magnitude of such modern technologies.

According to the population census of 1991, Amaduwa has 857 households, with an average household size of 5.6. The total population in 1991 was 4,715. Of the population 53 percent were economically active. The above census further indicated that in Amaduwa 76 percent of males were economically active while the corresponding figure for females was only 28 percent. This is probably an indication that females are involved mostly in "household chores" such as cooking, child-care and home gardening, which is often regarded as "economically in active" in the statistical sense.

In a baseline study, INSAN reported that in Amaduwa, large farms (2 hectares and above) substantially out-numbered small (up to 1.0 ha) and medium farmers (1 to 2 hectares). Its sample survey showed the following breakdown (INSAN 1993):

Small farmers-	15.0 %
Medium farmers-	20.0 %
Large farmers-	65.0 %

The following were the major cropping patterns found in the area.

Rice-wheat	Rice-fallow	Rice-Mung
Rice-wheat-mung	Rice-maize	

As part of the interviews, I asked individually 35 farmers, present during a group session if they had been using chemical fertilizers and pesticides. The distribution of respondents according to farm size was as follows:

Small farmers (1 ha or less landholding size)-	10
Medium farmers (1-2 ha landholding size)-	10
Large farmers (Above 2 ha)-	15

For the informal interviews, farmers were first asked about their landholding size and then categorized into small, medium and large. Since the farmers were asked to state their landholding size in front of their neighbours, I assume that they reported it accurately as possible. If a farmer found it hard or could not say definitely, the others helped him. Although farmers reported land in bigha (the local land measurement unit), I converted these into hectares (1.5 bigha is equivalent to 1 hectare).

Use of fertilizers, pesticides and modern varieties

The field study indicated that all respondent farmers had used both chemical fertilizers and farmyard manure irrespective of landholding size categories. However, they differed in terms of using pesticides and improved varieties. The responses are tabulated below.

Table 9.1 Percentage of households using pesticides by farm size and crops.

Crops	Households Using Chemicals				Households Using Natural Pest Control			
	Small	Medium	Large	Total	Small	Medium	Large	Total
Rice	70	80	12	74	30	0	6.6	11.4
Wheat	0	30	6	26	-	-	-	0
Vegetable	50	70	12	69	30	10	20	20.0

Source: Field study

The findings presented in Table 9.1 cannot be generalized because farmers were not selected randomly from a large population and it was not possible to verify farmers' responses using other techniques. Nevertheless, the table indicates that, in Amaduwa, small and medium farmers use chemicals for rice crops as much as do large farmers. And, the chemical pesticides are used mostly for rice and vegetables. In addition, the above figures does not mean that those respondents always use chemicals, because farmers said that the use of chemicals depends upon the infestation of insects and diseases. The responses in the table indicate only if they reported ever using chemicals. These finding correspond with the findings of a recent baseline survey carried out by INSAN in Amaduwa area, which showed high use of chemical fertilizers and pesticides by the farmers of all categories regardless of landholding size (INSAN 1993). Likewise, farmers said, in some years they use improved varieties, and in some years they do not use them for a number reasons, which include non-availability of seeds. In 1992, respondent farmers used modern varieties as given below in Table 9.2.

Table 9.2 Percentage of households who adopted improved varieties of cereal crops in 1992/93

S.N	Crops	Households			
		Small	Medium	Large	Total
1	Rice	90	80	100	91.4
2	Wheat	100	100	100	100
3	Maize	100	100	100	100

Source: Field study

The above Table 9.2 indicates that farmers were increasingly using improved varieties and there is no difference in adoption between small, medium and large farmers. However, it must be noted here that the majority of farmers grow more than two varieties to spread risks, and local varieties have not been discarded by the farmers. This means

that the majority of farmers planted both the improved and local varieties. Due to taste and price factors, in general, large farmers usually give priority to local varieties. Resistance of diseases and insect pest infestation of local varieties was not considered important by the farmers.

Having briefly summarized the agricultural situation of the Amaduwa village, the chapter next highlights the problems being faced by the farmers. The local development agents were not asked to prioritize farmers' problems in this village, as the last case study suggested to me that development agents attempt to view the problems of the village in terms of their own program focus.

9.1.1 Assessing problem situations in Amaduwa

In Amaduwa, the farmers were not asked to state how they view the present state of agriculture or what their problems were, instead they were to suggest the most important area of intervention in agriculture, in particular in natural resource management. My assumption was that farmers would seek assistance in those areas where they had real problems- an adage says, the wearer knows where the shoes pinches. The responses of the farmers are summarized in the following table.

Table 9.3 Areas of intervention suggested by the farmers

S.N	Suggested Areas of Intervention	Frequency
1	Improving irrigation facilities	27 (77.1 %)
2	Supplying fertilizer timely	26 (74.2 %)
3	Enhancing availability of improved seeds	24 (68.2 %)
4	Reducing the price of fertilizers	24 (68.2 %)
5	Suggesting measures to improve the soil through regular soil-testing	20 (57.1 %)
6	Supplying green manure seeds (Dhaincha)	19 (54.2 %)
7	Providing veterinary services	13 (37.1 %)
8	Supplying quality vegetable seeds timely	13 (37.1 %)
9	Supplying organic pesticides timely and with subsidized prices	4 (11.4 %)
10	Training in soil and water management	3 (8.6 %)

Source: Field study

The above table indicates that soil fertility improvement and improving irrigation are the most important areas for intervention in Amaduwa. The majority of the farmers have realized these problems well.

The next section highlights the nature of past and present on-going agricultural projects (development interventions) in and around Amaduwa. An understanding of the nature of these projects is necessary, more particularly after recognizing the nature of practices and innovations in which INSAN is engaged. This hopefully will illustrate not only my own purpose in selecting the Amaduwa site for the present case study analysis, but also (a) the context for understanding farmers' and other developmental actors viewpoints, and (b) the nature of challenges posed to INSAN.

9.1.2 Agricultural intensification program at Amaduwa village

As I stated earlier, the Terai is Nepal's "bread basket". Modernizing agriculture there has always been a prime concern for the governments. During the 1960s' Green Revolution period, Sunsari was one of the districts to operate an Intensive Agriculture Area Development Program. The objective of this program obviously was to promote chemical fertilizers, modern fast growing varieties and pesticides. If one were to research it, the impact of this program would, indeed, be found not less impressive in Amaduwa than in other areas, as a result of a number of factors, such as easy accessibility for extension and research workers. The VDC is connected to Biratnagar- Nepal's number one industrial city- by a 12-km all-weather road. Also, this VDC is situated near the Agricultural Research Station, Tarahara, one of the Regional Research Stations of the Nepal Agricultural Research Council. It would take not more than 30 minutes to reach the VDC from the research station by car. The influence of the research station is thus obvious.

After the termination of the Intensive Agriculture Area Development Program, in 1975/76, the government launched one of the country's largest irrigation projects, Sunsari-Morang Irrigation Project, with the financial assistance of the World Bank. The Irrigation Project had an agricultural extension component with the following objectives of intensifying agriculture and assisting farmers to make the best use of the newly available irrigation facility. Obviously, the agricultural component was to follow the Training and Visit system (T&V) of extension on a pilot basis, as the project was funded by the World Bank. Under the Sunsari-Morang Project an Agricultural Training Centre and a Seed Multiplication Farm were established at Jhumka (Sunsari district). Like Tarahara, Jhumka is also near Amaduwa. Having seen the success of the T&V extension, the Bank further supported the Ministry of Agriculture in launching an Agricultural Extension Project in 1985 to improve its extension service and to cast it in the T&V system. Sunsari district was one of the eleven districts under the new World Bank-funded project. With the initiation of the Agricultural Extension Project, the agricultural extension component of the aforesaid irrigation project was integrated to the District Agricultural Development Office of the Ministry of Agriculture.

At the local level, the initiation of an Agricultural Extension Project led to the establishment of an agricultural service centre at Chitahi VDC, located about 1 km from Amaduwa VDC. The Training and Visit System of agricultural extension made arrangements to hire local farmers to serve as front-line extension agents on contract. Initially, they were given a one month long intensive training and then follow-up in-

service training and fortnightly training. These agents were referred to as Panchayat Level Agricultural Assistants (PLAAs). Under the approach each VDC had one PLAA. In 1991, the Ministry of Agriculture removed the PLAAs.

In sum, at Amaduwa VDC, at present the following agricultural agencies/individuals directly or indirectly influence farmers.

- Agricultural Service Centre, Chitahi
- Sunsari-Morang Irrigation Project
- Regional Agricultural Research Station, Tarahara
- Regional Agricultural Training Centre, Jhumka
- Seed Multiplication Farm, Jhumka
- Permaculture Development Farm
- Ex-panchayat level Agricultural Assistant

Previous discussions illustrated two different types of influences on agricultural development operating simultaneously at Amaduwa VDC: one concerned with high external input agriculture, and the other discouraging it. While high external input agriculture has become common practice among farmers, permaculture as a design system is only newly introduced.

However, it is interesting to note that "Permaculture" is not a new invention or concept for farmers in Nepal or for many other developing countries such as India. The two great Hindu epics- the Ramayana and Mahabharat, written 4,000 to 5,000 years ago, have time and again preached modern people to work with nature, honour it and care for the earth and its people. These epics have nicely described how hermits of those days, namely **Vasistha and Vishwamitra,** ran self-sustainable farms. Although for some people these epics might be fictitious, they are deeply rooted in the faith, traditions and behavior of millions of Hindus all over the world. If the use of chemical fertilizers, modern varieties and pesticides have become common practice of farmers in the Terai and the Kathmandu valley, these inputs are nevertheless still luxury, not affordable and inaccessible to the majority of farmers in the mountains and hills of Nepal.

9.2 Permaculture design, the innovation

Permaculture, a short term for permanent agriculture, was coined by the two Australian ecologists, Bill Mollison and David Holmgreen, in 1975. It describes an approach to development which involves a self-sustaining, consciously designed system of agriculture, having the properties of natural ecosystems such as diversity[1], stability[2] and resilience[3] (Mollison 1988).

The meaning of permaculture has now extended far beyond "permanent agriculture". As Dahal (1992) puts it, it is a "design system" aimed at achieving sustainable human cultures through integration of human needs with plants, animals, buildings and soil, within a cultivated ecosystem which emulates the diversity of the natural ecosystem, focusing on, among other things, plant-animal interactions and vertical stacking.

The following are the basic philosophies of permaculture, which is based on the assumption that if properly managed, the earth's more fertile lands and its forests could meet everyone's food and wood needs abundantly and indefinitely.

Philosophies of permaculture

Earth care

- Working with, rather than against, nature.
- Addressing first the problems associated with resource exploitation and system overload.
- Protracted and thoughtful observation rather than reactive, incremental and thoughtless action.

People care

- Of all the animals living on the earth man is the most conscious animal.

Self control

- Setting limits on consumption and population.

Thus permaculture promotes behaviours such as working with nature, studying relationships of its different elements, wise judgment and decisions and self-reliance. The following paragraphs briefly describe the permaculture, initiated by INSAN.

As has been said earlier, permaculture is a design system. It is based on the principle of "zoning" and the amount of labour available within a family. Starting with the house as the focal zone, all other elements in the human/biological/productive/functional system are adjusted and located in relation to each other in such a way to enhance system diversity over space and time. For example, elements requiring frequent visits, e.g., vegetables and stall-fed animals, are located near the house, while those requiring only intermittent attention, such as forest plots, are located further away. Tree plantations and species are selected according to wind direction. Hardy species such as **Sissoo** would be planted at the outskirts and fruit trees such as mango in inner areas. Another important aim of permaculture design is to cease using fossil fuels, that is, to stop using chemical fertilizers and switch to organic materials such as oil-seed cake and composting farm yard manure, and recycling of energy and nutrients within the farm system; and to stop using chemical pesticides and switch to biological substances or materials found within the farm system.

In summary, permaculture design is both an approach to sustainable land use and a set of integrated practices. Not only it is highly knowledge-and management-intensive but it is

also an effort to reverse or halt many practices that agricultural intensification programs or the Green Revolution have promoted and/or advocated. Besides, it requires farmers to identify those local and/or indigenous practices which they had been practising in the past and which became history with agricultural modernization. This also means that INSAN requires a complete commitment on behalf of the farmers to the technology (permaculture), prior to being selected for participation in the project.

With these short descriptions of the nature of the innovation, the chapter next describes farmers' and other development actors' viewpoints on permaculture and then examines the intervention process.

9.3 Understanding farmers' viewpoints

To understand farmers' viewpoints with respect to permaculture I conducted a focused group discussion session at Amaduwa where neither staff from the PCD farm nor government extension staff were present. The discussion session was begun by asking farmers if they had ever visited the PCD farm. After this, the following questions were spontaneously posed in the field with a view to encouraging farmers to present their viewpoints on permaculture practices as completely as possible.

My field study indicated that, in the first place, very few farmers had visited the farm. Many said that, in the beginning, they were cautious to enter the farm as they thought that it was a foreign farm. They subsequently learnt that it was an agricultural farm such as that in Tarahara. Indeed, the farmers, who had been to the farm (although the number was very small) were impressed by it. However, "impressed" by the farm did not mean that it appealed to them. The following statements seem sufficient to suggest that they were yet to be convinced of and to appreciate permaculture practices.

The farm has plenty of money and resources;

The farm should have used chemical fertilizers, although it says it did not use them.

The staff of the farm will not starve if production decreases as a result of not using chemical fertilizers. But we will.

Mustard cakes and ground nut cakes are more costly and not readily available as chemical fertilizers;

Cakes and composts cannot be as effective as fertilizer;

Compost making is not easy and requires a lot of labor and material apart from cow dungs. We have neither sufficient animals, nor labor.

How would it be possible for us not to spray this year, with the assumption that there would be less insects next year?

> *Planting of trees in the farm is a luxury for us. How can we feed our children? Can we wait for so many years.*
>
> *They tell us to experiment with permaculture design bit by bit in the field. That is not practical. It would further increase our problems.*
>
> *I have been observing the farm. It needs a heavy investment in the beginning. The Agricultural Development Bank does not finance us, if we are to experiment with permaculture design. Our JT will not approve permaculture practice.*

Secondly, it seemed that for farmers the sole message of the farm was to abandon chemical fertilizers and pesticides. Many farmers could not understand INSAN's concerns, such as this one:

> *"If we spray for pest infestations, we end up destroying both pests and the predators that feed on them, so the following year we get an explosion of pests because there are no predators to control them. Consequently, we spray more heavily, putting things further out of balance."*

For farmers, it was important that they get good yield in the current year. They did not want to deal with what would happen on the following years. In addition, they indicated that finding biological materials for pest control was both difficult and costly, whereas chemicals were available if and when they needed them. Likewise, many farmers pointed out the other side- the situation of fields where chemicals are not sprayed while neighbours spray their fields. They asked what would happen when insects and pests from sprayed fields moved to the farms which did not spray.

The above concerns suggest two things. First, abandoning chemical fertilizers and pesticides would not be an easily acceptable option for them in the present circumstances, as said by a respondent:

> *" We have passed the matriculation examination (completed schooling), and the farm wants us to enrol again in Standard One. We have gone too far and returning to Basic is not possible, it is just like asking a river to flow upstream."*

The other important implication of the above concern is what farmers realize concerning the social organization of innovation: that it requires an understanding of the ways and consequences of strategizing beyond farm level, or beyond the level of an individual's actions (Engel 1995).

Thirdly, farmers, who have been to the farm, explicitly said that they had gone there to buy seeds and seedlings, and treat animals, but not specifically to ask or learn about permaculture design. None of the farmers participating in my focused group discussion had participated in any of the training courses organized by the farm.

From the above statements it can be construed that designing farms along permaculture principles has not taken hold in the Amaduwa area. Central to these concerns is the

implication that crucial aspects of permaculture such as enhancing bio-diversity, promoting integrated farming, and recycling of energy and nutrients have gone into eclipse, despite the facts that farmers have clearly experienced problems of declining soil fertility and increased pest infestations, and that operating a self-reliant farm with no external inputs used to be a part of the culture and life of Nepalese peasants. On the one hand, this poses a challenge to INSAN, on the other it raises the question: is INSAN aware of this situation?

Informal discussions with technicians working for INSAN and also reviewing of literature it has published reveal that INSAN is aware of the situation. According to the field staff of INSAN, although the PCD farm provided free services to the farmers residing in the vicinity of farm areas as a part of their outreach programs, farmers do not frequently visit the farm. Introducing permaculture practices is difficult. In a report, INSAN wrote that a considerable number of households in the villages from around the PCD farm have not yet come into contact with INSAN training, demonstration or extension activities (INSAN 1993 a). For this, INSAN is critical of the functioning style of the District Agriculture Development Office. It noted:

> *"Farmers are cynical about past misappropriation or misallocation of District Agricultural Office funds intended for demonstration crops on farmers' fields; they feel that they have been misled or cheated in the past and are wary that INSAN may do the same (INSAN 1993)."*

Studying how farmers care for, perceive and respond to the suspicion that they had been misled or cheated in the past by the District Agriculture Development Office is not the purpose of my research.

However, the primary issue at hand is that the majority of the farmers in the Amaduwa area have yet come to value and adopt permaculture design. As said by Smith (1993), the PCD farm at present appears as an "island of abundance and fecundity", and the villages surrounding it a "mainland with subsistence and energy-intensive high input farmers". This raises questions: how does INSAN approach farmers to enable them to operate farms along a permaculture design system? How are farmers participating in research and extension processes related to permaculture? How are the efforts of the different actors in the vicinity coordinated and/or integrated with each other? While looking for answers to these questions, the following sections attempt to (a) take a close look at INSAN's intervention approach, and (b) pass it through the lenses of the knowledge systems perspective.

9.4 Intervention approaches: identifying missing links

This section looks into research, extension and training processes used by INSAN. For the purpose of this section, the terms "INSAN" and "the PCD" farm are used interchangeably.

9.4.1 Conducting research

As pointed out earlier, operating farms along a permaculture design has not yet taken hold in the Amaduwa area, although it was once a part of farmers' lives and culture, more particularly prior to the launching of the 1960s' agricultural intensification program. Many indigenous technologies have been lost or have become things of yesteryear. Recognizing this, INSAN has made a priority of searching, documenting and verifying farmers' traditional wisdom, knowledge and skills. To identify local wisdom, knowledge and skills, INSAN is currently engaged in the following:

- Using local farmers, appointed as local consultants/farm advisors; and

- Advertising in newsletters (INSAN) to write about sustainable agricultural solutions practised by some individuals in specific local areas, and about seeds of local resistant varieties, trees, and herbs. For the information passed along, the informers are rewarded with books and materials on permaculture. The following provides an interesting example about Nepalese rice farmers' experience of controlling gundhi bugs.

  "Nepalese farmers usually experience infestation of gundhi bugs during the grain's milky stage of development (before the kernels harden). If the type of rice being grown is a traditional variety, farmers believe the bugs can be controlled by carrying a smouldering bundle of jute sticks (what remains after the useful bark is removed) in hand while walking naked around the border of the rice plot at midnight" (From INSAN 1993 b).

In addition, the PCD farm carries out site-specific research such as growing of multi-purpose trees and grass species, experiments using organic pesticides on seasonal vegetables, comparing the results of commercially available neem pesticide with that made on the farm, testing low-tillage and Fukuoka's no-tillage techniques. However, the research conducted at the PCD farm appeared similar to conventional research, the on-station trial of the government experiment farms with all of its shortcomings and weaknesses. Of the many weaknesses the following are relevant to our context:

- Lack of farmers' participation in the technology design phase;

- Farmers give little importance to or do not take into account earlier conditions of the farm while assessing the value of technologies presently generated by the farm.

- Farmers are little influenced by the technologies developed at the demonstration farm since the physical and technical environment within the farm is very different from farmers' environment and constraints.

In short, the above discussions suggest: it is likely that the majority of farmers would not benefit from INSAN's research process unless it develops a mechanism allowing participation of farmers in large numbers. Indeed, it has constructed a built-in mechanism to benefit from farmers' knowledge and skills. However, its present research process

leaves farmers little chance to carry out their own experimentation. Neither can the farmers influence the farm, nor do they have a say in determining the nature of research being conducted at the farm, a typical condition often observed in many public research stations of developing countries. Unless farmers are involved in developing and refining technology, they will always be reluctant to use it, irrespective of how practical and less costly is the technology.

Having described the research process, the study next deals with the training offered by INSAN to popularize "Permaculture". As training is its entry point, training is described prior to extension process.

9.4.2 Organizing training

Training is perhaps the most important area of action in promoting permaculture design. Not only has training created an identity for INSAN as an institute for permaculture development in Nepal at the national level, but also provided it with an opportunity to draw on resources through many sources (see Annex 9.1) and enhance the prospects of its institutional sustainability. From the viewpoint of transfer of technology, training is its starting point. According to INSAN, the purpose of farmers' training is capacity building and preparing them to follow permaculture techniques. INSAN's visit to a farm begins after the farmer receives training. The training carries a fee which, in most cases, is likely to be paid by the NGOs and projects on behalf of the farmers. As I was told , farmers living the Amaduwa PCD farm area are deferred payment as a part of the farm's outreach program. The following describes the major types of training courses offered to farmers.

Introductory training

Introductory training takes into account the impact of "modern" agriculture on the lives and livelihoods of farm families and the negative effects of agro-chemicals on soil, water, food and human health in general. It is a 4-day course proposing alternative and sustainable approaches to modern chemical-agriculture, such as Permaculture, LEISA and Fukuoka's Natural Farming, and their relevance to the Nepalese conditions.

Refresher training

As a follow-up to introductory training, farmers are given a six day training split into two parts of three days each: the first half of the training is held before the onset of the monsoon, and the second half at the beginning of winter, so that crops from both growing seasons can be dealt with. The objective of this training is to provide participants with an opportunity to apply their permaculture knowledge to the specific problems they encounter on their farms, and to share their experiences with others to arrive at solutions.

Come-back conference

The purpose of this two-day conference is to facilitate sharing of experiences and ideas among farmers who have taken part in one of INSAN's training programs. INSAN aims to present the suggestions, ideas, and recommendations of the conference directly to His Majesty's Government, to influence the agriculture policy makers. As well, INSAN expects that this program would help it to relate its future programs and strategies to the actual needs of farmers.

In short, the above farmers' training courses seem interesting; however, a basic question remains: how do these training courses address local problem situations and realities? It was not clear how the training needs are assessed and how problem situations and farmers' perspectives are understood prior to training. The following criteria were mentioned in regard to farmers' selection for training.

- Requesting the VDC's chairman to nominate a farmer;
- Receiving the suggestions from the local consultant (farmer advisor);
- Understanding farmers' interests during the field visit; and
- Assessing farmers' interests when they visit the PCD farm.

These criteria suggest that INSAN retains control over farmers' selection for training. Since a farmer is not nominated or selected by a group of farmers for training, the farmer has no moral responsibility to train other farmers in permaculture after completing the permaculture course. Besides, permaculture, as an innovation, has already set not only the objectives of the training, but also imposed certain boundaries on the training. Central to this conclusion is the suggestion that technologies for training are already set.

Given this research and training processes, the next section describes the extension process.

9.4.3 Carrying out extension activities

As has been pointed out, permaculture design as an innovation has yet to "get off the ground" for its characteristically complex nature of innovation. The nature of the innovation, indeed, partly explains its concomitant difficulties in applying a simple linear model of TOT. Besides this, there is another factor which can partly explain the difficulties in getting permaculture off the ground. Many people, in isolated, traditional rural areas, had been reluctant to use inorganic fertilizers as they perceived fertilizer as "unnatural" compared to manure and believed that its use would poison the soil as well as the animals and people who consume the products grown in that soil, although soil fertility problems were evident. This was clearly the case where the innovation was incompatible with already existing ideas and practices. The same concept seems to be operating in the Amaduwa area, but in the opposite direction, as evident from the

presence of many agencies and individuals who have been promoting high input agriculture for more than thirty years (see Section 9.1.3). Given this context for transfer of technology, this section describes the extension processes used by the project. These include: establishment of a demonstration farm, provision of farmer advisors and initiation of model farms at the farmer's level.

Establishment of demonstration farm

The purpose of the demonstration (PCD) farm is to convince farmers of the principles and philosophies of rolling permaculture. The basic principle of establishing demonstration farms is to provide relevant practical experience to farmers in running a sustainable farm. As stated earlier, the PCD farm consists of three model farms simulated around Nepal's small, medium and large farms for demonstrating the value of permaculture design (See Annex 9.2). Although the value of the PCD farm with regard to research, training and extension cannot be debated, I have already illustrated how farmers presently interpret the PCD farm as a whole. This raises a question of its usefulness as a demonstration site for the farmers in the area.

Provision of farmer advisors

To extend the adoption of "permaculture" design, INSAN has provided farm advisors, in addition to establishing the PCD farm. INSAN coined the term "farmer advisors" to refer to those farmers who it hires with full respect for their wisdom and experience. According to INSAN, farmer advisors are its front wheel drive. The following are the roles expected from them:

- Collecting all kinds of sustainable agricultural solutions among the villagers;
- Assisting INSAN extension staff to set up a register of indigenous knowledge, make photos, slides and videos;
- Identifying the felt needs of the farmer families in the development of sustainable farming and bring these to the notice of INSAN;
- Collecting seeds of local resistant varieties, trees, herbs, etc.
- Assisting in farmers' training courses to make them suitable to farmers;
- Assisting in setting sustainable demonstration farms (model farms) in the villages;
- Grafting permaculture ideas, methods, designs onto local agriculture systems.

Besides the above roles, farmer advisors are expected to discuss the value of alternatives demonstrated on the PCD farms and suggest how to make them a real solution for the local farmers.

However, as has been discussed in Section 9.1.2, utilizing local people for agricultural extension purposes is not new to the public Agricultural Extension System in Nepal. If the latter gave them the name of "Agricultural Assistants" (PLAAs), INSAN prefers to identify them as "farmer advisors". In terms of role, the former utilized them to transfer modern production inputs, and the latter intends to utilize them to set up "sustainable demonstration farms" at farm level. In terms of remuneration, agricultural assistants were paid less by the government, and often reported that they were also exploited. Regardless, their effectiveness in Nepal's agricultural extension system has always been reported better than the professional field extension agents. In many instances, they made local people forget the need for professional extension agents.

Interestingly, it is worth noting that, at present, both of the farmer advisors (also called local consultants) working at the PCD farm Amaduwa, are none other than ex-PLAAs. At present, they feel themselves honored to be known as farmer advisors and/or consultants and showed more responsiveness to their tasks than before. It remains to be seen how will they handle the new, contrasting roles, establish themselves with the farmers in the area, and make good of themselves in the future.

Initiating model farms at farmer level

As INSAN is convinced of the value of demonstration, it intends to establish "sustainable demonstration farms" at farmer level to convince other farmers of the value of permaculture design.

Since applying permaculture technology requires using it completely, and farmers would not be in a position to reap its benefits if they were to adopt it partially, INSAN/PCD farm is of the opinion that conducting method demonstrations, group discussions, etc. won't serve its purpose unless the innovation is demonstrated fully from A to Z. And INSAN is, therefore, opposed to contacting farmers unless they receive training. INSAN encourages and assists ex-trainees to establish model permaculture farms on their own farm so as to enable them to provide examples to other villagers on sustainable agricultural technologies. INSAN views initiating model farms on farmers' fields crucial to gaining the confidence of other farmers in their vicinity. These model farms are expected to facilitate the dissemination of permaculture principles and practices beyond the direct "zone of influence" of INSAN PCD farm.

However, despite INSAN training, technical advice and free seeds and saplings, farmers seemed reluctant to establish model farms. Presently, two farmers have started planting hedge-rows. Of the two farmers, one farmer wished to work voluntarily on INSAN farm to learn from the farm staff.

In short, it is evident from the above that INSAN's intervention approach is different from a linear model of technology transfer; takes research, training and extension simultaneously in promoting permaculture technologies, and has made serious attempts to benefit from farmers' knowledge and wisdom. Given this, the question then remains: why could permaculture technologies not take hold in the Amaduwa area? There could be several explanations for it as shown earlier, ranging from the nature of innovation to the diffusion

process itself, such as the use of the agricultural extension approach. Many studies have already shown that approaching farmers through an individual approach is slow, costly, and not effective. Aside from this, in the next section, I attempt to examine it through the concerns of the knowledge systems perspective.

9.5 Searching for synergy among actors: the knowledge system perspective

As I discussed in Section 9.2, many actors including the PCD farm are presently working toward the development of agriculture in Amaduwa village. Of the many actors, the PCD farm is the only institutional actor, whose purpose is to promote development of sustainable permaculture farms in the area. But sustainable farming would mean different things to different people as sustainability is itself a debatable concept and understood differently by different people. And the farmers' first priority is increased production, although the need for sustainability is always with them (see Chapter 4). This means that it is crucial for the PCD farm to move towards securing cooperation and understanding of other relevant actors (GOs and NGOs) including local people from all sectors if sustainable farms are to be established on a large scale, not limited to one or two farms of a few innovative farmers. This cooperation, in turn, would prevent farmers from being confused, as they had been in this case. It would help them to make decisions timely and appropriately at the household and community levels, a goal of the innovation. Integration of roles among the different actors is a must if they are to play complementary roles through appropriate linkage mechanisms, and would allow interchange of information between them. This process has been clearly missed in this case. The following will elaborate this issue further.

Switching from conventional agriculture to permaculture requires farmers residing within a certain area to come together, and make collective decisions and actions. Bringing farmers from different localities together, and preparing a joint proclamation might be useful in convincing policy-makers so as to ensure greater support for INSAN and enhance confidence of the individual farmer participating in the conference. This is usually done in come-back conference, see Section 9.4.2. The need is to bring the majority of farmers (men and women) from a given area together, and facilitate them to shift from conventional agriculture to a non-conventional agriculture such as permaculture. As put by Russell (1986), for sustained development one has to foster the creation of active participation, and self-reliant organizations. In the absence of a self-reliant capacity of permanent indigenous institutions, the benefits of aid-funded donor projects have often become short-lived.

The other crucial factor is clearly the lack of links between the PCD farm and the other development actors, more particularly the GOs' agricultural extension agents working in the area. Many technological solutions proposed under permaculture design such as the planting of live fences on and around the farm and sowing leguminous crops to improve soil fertility are neither understood by, nor accessible, to GOs, extension agents. Farmers' groups formed by extension could be a forum for promoting the principles and philosophies of permaculture design. At present, neither the GOs nor the PCD farm have made efforts to learn and benefit from each other for the benefit of the farmers at the

local level. For example, the GOs' extension agent has not been to the farm for two years although the physical distance between his office and the farm is hardly 1 km. When I asked the JT if he had ever been to the farm, he replied that he had been to the farm once nearly two years ago where he saw some eggplants and tomatoes. He had neither incentives or pressure to visit the farm. The contact between the agricultural technicians of the irrigation project with the farm was no different from that of DADO's field extension staff.

Likewise, the PCD farm deemed it unnecessary to work and cooperate with the GOs' field extension staff, as it viewed their values and attitudes as very different (concerned with high external input agriculture) from the concerns of permaculture. Organizing training and other activities related to permaculture were the sole concerns and responsibilities of the PCD farm. The GOs' field extension staff were rarely invited in any programs run at the farm as the PCD farm was unaware of how the former could make any difference to them. For example, the PCD farm brought 60 farmers together from around nine VDCs surrounding Amaduwa area and organized a farmers' conference (1-2 Pousha 2050), but failed to invite GOs' and other relevant actors (INSAN 1993 c). Interestingly, one of the objectives of the Amaduwa conference was to communicate agricultural development to related GOs and NGOs on perceptions, attitudes, experiences, problems and constraints for the development of the permaculture process.

Of the several examples here, this example demonstrates the lack of coordination and integration of activities at the field level. Lack of coordination and integration of activities at the field level means conflicting interests among different actors, which further implies the lack of social synergy- a typical knowledge systems disorder, now causing a bottleneck in the promotion and development of the permaculture design system.

9.6 Summary and conclusions

Permaculture design is an innovation that intends to address many issues ignored by conventional agriculture and to correct many post Green Revolution problems. Despite its many strengths and is not being a new concept to Nepalese farmers, this research shows how farmers in the Amaduwa area have found permaculture practices difficult to apply. Designing farms along permaculture principles has not gotten off the ground. The reason is not so much because the movement was in infancy and faced the issues of information, training, community organizing and policy advocacy, but because the people had become used to high input agriculture. This is promoted by a host of projects and institutions. In addition, it is supported by timely credit which is distributed through the agricultural development bank operating in the area. Likewise, the cooperative society and private traders provide fertilizers and pesticides as timely as possible. Biratnagar city being near to the village is another advantage.

On the other hand, permaculture demands a totally different system of farming. Permaculture demands a true believer. Farmers have to take all or nothing. But farmers (a) do not know how to go about it, (b) think it requires more resources (e.g. labour) than they have got, and (c) have not been provided with a *path* to get from their present situation to

permaculture. Offerings such as free training, technical advice, free seeds and saplings have encouraged them only little. The farmer's remark that after completing the matriculation examination (completion of schooling) they are now asked to enrol back to Standard One needs to be seriously considered. Not only is this a message to intervention, but also indicates shortcomings and weaknesses in intervention processes, strategies and approaches. The findings indicate that the institutional configuration has not been able to support the innovation.

Notes

1. Diversity is the quantity of different types of organisms, species, cultivars and/or physical elements per area. And, it is the result of an immense variation found among and within ecozones as a function of the interaction of elevation, altitude, soil condition, steepness and orientation of slope, wind precipitation and relief of terrain.

2. Stability concerns fluctuations in productivity that result from numerous fluctuations in an agroecosystem's physical and social environment.

3. Resilience is a property of a land system which refers to its ability to recover its original qualities after a certain degree of degradation has taken place.

CHAPTER 10

ON COMMUNITY FORESTRY
(Case study 3)

The present case on community forestry is about a form of social forestry in which the government, represented by the Ministry of Forests, seeks to promote tree planting at local levels in a part of state owned forest. Hence the Ministry of Forests is the intervening agency in this case. This case first describes how the community forestry program as a planned intervention of the government was initiated in Nepal, how it changed its course of action, and its intervention process. The chapter then moves on to examine intervention processes and the issues affecting community forestry activities. The findings presented in this chapter are based on a review of the literature, results of discussions held with forest officials in the Ministry of Forests and field offices under it, and field research. While discussing GOs' perspectives, the Ministry of Forests, Department of Forests and the District Forest Office are used interchangeably, unless stated otherwise.

10.1 Nepal's community forestry: a history

In recent years, the community forestry program has received highest priority in the forestry sector in Nepal (HMG/N 1988). The program is now in implementation throughout the country. Almost all donors operating in Nepal are presently involved in community forestry (Annex 10.1). In addition to this, the majority of international NGOs and local NGOs participate extensively in community forest development activities. The following describes how the program was initiated in Nepal.

In 1978, the community forestry program was formally initiated when the government enacted two regulations, the Panchayat Forest By-laws and Panchayat Protected Forest By-laws. It may be said that the need for community forestry was realized with the Forest Act of 1961 which contained a provision for transferring government forest land to village communities[1] for establishing community forests in their areas. Ironically, this legislation remained of a standstill for more than 15 years. No steps were taken to implement it and the legal status of the forests was not addressed (Gilmour and Fisher 1991).

Why did the government become interested in developing community forests after a decade and a half of promulgating the 1961 Act? In this regard, different people have different opinions. Some of the causes are briefly described below:

- World attention drawn by observers such as Eckholm (1975) who presented the famous crisis view[2] on the state of deforestation in Nepal;

- Realization by the foresters in the Department of Forests of deteriorating watersheds in the hills (NAFP 1979). What the impact of Eckholm's crisis view was to them is difficult to assess.

- Strengthening of the crisis view by the World Bank (1978) which estimated that, at the then presumed rate of deforestation, the hill areas of Nepal would be totally deforested within 15 years i.e. by 1993 and that the Terai would be in the same state by 2003;

- Growing use of fuelwood- particularly after dramatic increases in the price of kerosene in 1974 and 1979- that attracted most attention from those concerned with the rate of deforestation. Forests provide the primary source of energy in the form of fuelwood (Seddon 1990);

- Support of the UNDP/FAO in initiating the Community Forestry Development Project in 29 of Nepal's 75 districts located in the hills of Nepal;

- "Fences and guards" approach adopted by the Private Forest Nationalization Act proved unmanageable as the pressure on the forest resources was too great (Gurung 1989).

It appears from the above that both donors' pressure and people's pressure were two major driving forces for the government to undertake community forestry activities in Nepal. If plantation projects attracted huge sums of money from external donors, people's pressure urged it on. In the hills, the rural people have played an important role in the use and management of the forests because of their dependence on a variety of forest products to maintain an agricultural lifestyle. People are totally dependent on their local forests for fuel, fodder, compost and farmyard manure (Helles 1988, Carter 1992). Not only is it possible to identify century old indigenous forest management systems in Nepal, but also in many areas, local people recognised the problem of forest degradation themselves many years before Eckholm and the World Bank (1978) attracted world attention to the state of deforestation in the hills of Nepal. For example, many maintained that several indigenous forest management systems originated in Nepal around the 1960s to protect degrading forests (Gilmour and Fisher 1991, Fisher 1989), independent of the Private Forests Nationalization Act of 1957, which adopted not only a protection approach of "fences and guards", but also made all forest lands public.

10.2 From forest centered approach to people centered approach, a turning point

As stated earlier, community forestry in Nepal has its formal origins in two regulations, the Panchayat Forest By-law of 1978 and the Panchayat Protected Forest By-laws of 1978. These regulations made provisions for involvement of local communities in afforestation and management of forests by turning over lands accessible to village people. While examining the implementation processes of the community forestry program, two turning points can be distinguished. These are the handing over of the forest's ownership to local government units (village panchayats, now VDCs) and the handing over of forests directly to users' groups.

10.2.1 Handing over forests to the local government units, a forest centered approach

In the beginning, the government's intervention in community forestry came through the establishment of panchayat forest (PF) and panchayat protected forest (PPF) as provided by regulations mentioned above. Below is the brief description of panchayat forest and panchayat protected forest.

Panchayat forest refers to any government forest area or any part thereof, which has been rendered wasteland or contains only stumps, entrusted by His Majesty's Government to any Village Panchayat on prescribed terms and conditions for reforestation in the interest of the village community.

Under panchayat forest, each village Panchayat is given 125 ha of forest land, all produce and income from which belongs to the Panchayat.

Panchayat protected forest refers to governmental forests in any area or part thereof, entrusted by HMG/N to any local Village Panchayat on prescribed terms and conditions for the purpose of protection and proper management.

Under panchayat protected forest, each Panchayat manages 500 ha of forest, receiving 75 percent of the income.

The process of transferring ownership certificates is very cumbersome and because the district office does not have the power to decide on its own, the case must pass through several bureaucratic levels within the Ministry of Forests. Sometimes, it takes up to three years. Writing management plan is still difficult. After getting approval from the office, on behalf of the local community, the Panchayat contracts with the District Forest Office for the following.

- undertaking plantations in PF and PPF as required by the District Forest Offices;
- protecting and maintaining the forest;
- implementing a management plan written by the District Forest Office;
- protecting the forest products from theft and smuggling;
- protecting forest against fire hazards;
- protecting the trees from girdling, lopping, resin tapping, debarking etc.; and
- preventing the removal of stones, gravel, soil or sand from the forest area.

In addition to the above, the Panchayat is prohibited from:

- transferring ownership, destroying, selling or mortgaging the forest;

- practising shifting cultivation;
- converting a PF into a garden or an agricultural farm; and
- constructing buildings in the forest except as needed for watchmen.

It is apparent from the above that the Department of Forests delegated only a limited amount of authority to the village Panchayat. To some people, it was a sort of panchayatization of forests, as the Panchayat is the lowest-level political and administrative unit, and not considered fit for forest management (Umans 1993). In many instances, the organisation managing a forest is much smaller than the panchayat, and sometimes cuts across panchayat boundaries. The panchayats are relatively new structures formed after the initiation of the Panchayat System of democracy in 1960.

In short, Panchayats were the target groups or clients of the Ministry of Forests represented by its district offices and foresters. The relationship between local people and the office was an indirect one, mediated by panchayats. Although reforestation and afforestation were major goals, the laws were silent concerning who actually bore the costs of creating new forests through such activities. As a result, community forestry was confined to the handing over only of accessible forests, and the provision of all inputs free of cost by the government through the Department of Forests and district forest offices.

Although such an arrangement facilitated the communication between the village government, the Panchayat and the state technical agency, experience indicated that this was often not the most appropriate social unit for carrying out routine management tasks. What made it a forest centered approach is described at the end of this section in Table 10.1. First it is necessary to look at the performance of community forestry in Nepal.

10.2.2 Performance of Nepal's community forestry program, too wanting, too shallow

Many hail Nepal's community forestry for its pioneering step in turning over existing forests to the people. Many also argue that it is too little and too late to reverse the decline in the overall forest resource (Wallace 1987). Its performance over the last 14 years suggests that neither was it effective in handing over forests to user groups, nor efficient in input utilization (Kanel 1993).

Over a period of 14 years, the Ministry of Forests has turned over about 90,000 hectares of forest to about 550 user groups, or an average of a mere 6,000 ha per year to 40 groups per year. This is in spite of the fact that the program covered 67 districts of the total 75 districts in the country by 1987 (Carter 1992). According to Kanel (1993), in 1991/92 alone, the Ministry of Forests spent Rs 225.5 million to turn over just 7,000 ha of forest lands to user groups. Of this total cost (Rs. 225.5 million), Rs 26 million was spent solely for production and distribution of 17.2 million tree seedlings. This reveals a per hectare cost of turning over forest of nearly Rs 30,000 (US $ 600.00).

The poor performance of community forestry is, indeed, not due to the lack of potential forests to develop into community forests. Nelson and Karmacharya (1989) have roughly estimated about 1,189,338 ha of land in forested areas and 1,102,214 ha of shrub and grasslands suitable for community forestry in 37 hill districts based on information of the Land Resource Mapping Project of 1987. Up to 1991/92 the Ministry of Forests had turned over less than 10% of total potential community forests to the people.

If the unimpressive conversion to community forestry is part of the problem, the other part is the people's lack of interest in the maintenance or protection of community forests. The below provides such a case of a community forest in Gorkha district (Oerlemans and Steins 1994).

The community forest in Nareshor (Gorkha district)

In the 1980s, inspired by USAID's Resource Conservation and Utilization Project (RCUP), the people in Nareshor established a community forest on a nearly naked forest slope. Focusing on the transfer of knowledge concerning conservation of the trees, the project helped the farmers to plant saplings. The Project paid the salary of four watchers (Heralu in Nepali) to guard the forest. After the termination of the Project, the District Forest Office took the responsibility but provided for only two watchers. In 1987, the District Forest Authorities handed over the forest (47 ha) to the Panchayat as a community forest. From among the users a forest committee was formed consisting of nine members from nine wards selected by the residents. After four years the forest became productive. The people drew up the rules concerning when to collect firewood and fodder and when not to collect it. The forest was the pride of the village. As a part of its regular extension program, the District Forest Office would often provide travel costs (including food and lodging) for the committee secretary to visit other parts of Nepal to relate to the people the success story of their community forest. Subsequently, though, the office discontinued paying watchmen's salaries, shifting responsibility to the committee, and visiting researchers found no one guarding the forest. Further the committee has no funds for the salaries. The following were the responses of the key informants on this aspect:

- 'People get bundles of wood in the forest and pay afterwards. If the member of the forest committee from the Ward does not go to the houses of the buyers to collect the money, we do not have income from the forest.'

- 'Some of the people in the Forest Committee are not honest. They keep the money collected themselves.'

- 'Some farmers cannot pay for the bundles they have bought'.

- 'The forest committee is doing a good job and they have earned money, but it's not the season now for collecting wood, so there is no money to pay the watchmen'.

In the beginning, the researchers (Oerlemans and Steins) were impressed and formed the idea that the functioning of this forest committee might give an example of how intervention should work in practice, but after remaining for a few weeks in the village they

found a sense of cooperation lacking among the users. Due to lack of funds, the watchmen could not be paid, and the forest was unguarded. The watchmen were needed in order to overcome the problem of 'free riding', and timber trees were being cut. Although the forest committee was trying to find a solution for the lack of funds, it was difficult for them to organize a meeting, since many of them had other obligations.

The above Nareshor story is not an exceptional one but indeed appears typical, which is apparent only when one looks deeply into the matter and lives in the village with the villagers. In many places, the forest committees formed earlier, where not reorganized, have now started to become defunct. Conducting a detailed case study of community forests in Gorkha and Dolakha district, Baral (1993) aptly questioned, "Where is our community forestry?". Not only did he find most of the objectives in the management plan of community forests superficial, but also participation of the real users in general assemblies of forest users usually poor, although the office held several small group meetings, discussions, and house-to-house surveys. Very few women participate in discussions. Proposals mainly emerge from dominant speakers.

My findings in three community forests[3] were not different from the findings of Baral (1993), and Oerlemans and Steins (1994). Although people had formed plantations, they rarely practised weeding or other forest management activities. People planted new saplings in the forests as they received support from the Department of Forests in the form of tree saplings and labour costs for digging pits. Yet, in Bhaluban community forests, people neither formed plantations, nor harvested forest products as specified in the plan. Likewise, people did not pay for the watchmen to protect the forest. Free riders are readily found here. In Bahunbhanjyang, people approach Redd-Barna (an international NGO which has a field office in Bahunbhanjyang) or the District Forest Office to resolve conflicts with respect to their community forest, rather than deciding for themselves.

Likewise, on my way from Dhuwankot in Dandaswanra, I found the Forest Committee defunct following the demise of the Panchayat System in 1990. Ex-Panchas could either not face the people, or the people wanted to exclude them. People were waiting for the instructions of the District Forest Office on forming a new Users' Committee. This reflects how shallow the program went. This suggests that not only was the performance of community forestry not impressive, but also the program was trapped as an end in itself.

In short, it took another 10 years for policy makers and others at the Ministry of Forests to realize that the Panchayat was not an improvement, if the goal of community forestry was to realize and ensure better management of forests. This may be the reason behind the statement of Gilmour and Fisher (1991) that in Nepal's community forestry, legislation has been less important in shaping Forest Department activities than the rules and regulations under which it is applied.

The section next describes the handing over of forests to users' groups, and its implications.

10.2.3 Handing over forests to users' groups, towards a people centered approach

In 1988, the Master Plan for the Forestry Sector recommended directly transferring to users' groups responsibility for decision making, management, protection and control of forests. Before it could be approved by the government and enacted as a law, the 1990s' political upheaval and restoration of multi-party democracy facilitated the process and brought radical changes to the concept of community forestry in several respects. New forest legislation was enacted, the Forest Act of 1993. Not only does it define community forests, but it also aims to transfer management responsibility to community interest groups. On top of this, it has specified several processes to be observed while turning over a part of a forest to a user group and the activities to be performed in turn by the user groups. It establishes rights and responsibilities for the groups.

The law requires that the users of a forest form a group and register with the District Forest Office, and then request the office to turn a part of the national forest over to it. While making a request the user groups are required to prepare and submit an operational plan along with the application. People may ask for the technical assistance of the district forest office in preparing the operational plan as needed. The user groups are required to provide expenses for the development of a community forest from their funds.

Not only is the new Act progressive, but also it would seem to promote a new approach to community forestry in which the foresters will deal directly with the local people to whom the forests matter. The Act is likely to produce at least two types of impact in community forestry: the rate of and processes involved in making accessible national forests into community forests, and the management and utilization of community forests.

Table 10.1 presents the implications of the new approach to community forestry by comparing it with the earlier approach of transferring forest ownership to village Panchayats or VDCs. This table reveals that the earlier approach was clearly a forest centered approach, the objective of which was to form plantations in degraded forest lands.

The table indicates that the new legislation has provided both authority and responsibility to the users. Indeed, this places heavy demands on users. The questions arise: How are people likely to respond to the challenges imposed on them by forest authorities? Are local people prepared to shoulder such roles? What support do they require? These issues will be explored in subsequent sections. Prior to finding answers to these questions, it is necessary to look at how this shift corresponds to current sustainability concerns.

Table 10.1 Implications of handing over forests directly to users' groups

Issues	Handing over to VDCs	Handing over to users
Forest ownership	VDC (politico-administrative unit)	User groups (Village-based non-political institutions)
Management of forest	Forest committee formed by the VDC	User groups (homogenous common interest group)
Preparation of operation plan	Department of forests	User groups
Plantations	Compulsory	Optional
Relationship with forest users	Indirect, mediated by forest committee and the VDC	Directly with the users
Selecting tree species for plantations	Department of Forests	Partnership between the user groups and the Department of Forests
Sale of products on the market	Under the table, not allowed	Allowed
Cost of creating new forests	Department of Forests	Users; technical assistance may be provided if requested
Role of foresters	Teacher, instructor	Facilitator
Protection of Forests	VDC, Salary for the watchmen provided by the Department of Forests	User groups
Community forestry approach	**Forest centered**	**People centered**

Table 10.2 compares the concerns of community forestry in the 1990s and 1980s. The present people-centered approach of community forestry seems to be incorporating crucial aspects of sustainability (Umans 1993). Understanding the distinction between the two is necessary, as the change in the emphasis of Nepal's community forestry corresponds to this changed context. This provides an indication of the roles of intervening agencies, intermediary agencies and intervened parties as forests fulfil several crucial functions, and are a key element in sustainable development. Many different individuals, groups and institutions are interested in using them, and are involved directly or indirectly in that utilization.

Table 10.2 Community forestry in the 1980s and 1990s

Concerns	Community forestry	
	In 1980s	In 1990s
Objective	Sustained yield of single products, particularly fuelwood	Sustainable land use
Viewpoint	Seen as end result of development process	Means by which development is carried out
Target group	Politico-administrative unit	Non-political, user-based village organization
Involvement of local people	In reforestation through the contribution of voluntary labour	In the whole process of decision making, implementation and evaluation
Focus	Reducing labour time necessary to gather forest products and increase accessible supply of forest products	Empower people by giving them access to common property resources or state property such as forest land
Approach	Forest centered	People centered

Source: Adapted from Umans (1993), Gilmour and Fisher (1991), Hamilton (1985), Arnold and Stewart (1991)

In sum, Table 10.2 poses challenges for the intervening agencies. Understanding the intervention process is therefore crucial to assess the likely responses of intervening agencies.

It was not possible to enquire into how the foresters have responded to the concerns of people centered community forestry, due to limited time, and people centered community forestry seemed of recent origin in Nepal. Thus the following section describes how they intervened in the past.

10.3 Intervention for community forestry, an indoctrination approach

When asked how a community forest was initiated, people's responses differed from place to place. However, the following describes a classical indoctrination approach often used by the District Forest Office while initiating a community forest programs in the district (Gronow 1990). The process is described here without reference to any particular location.

People remembered that around four or five years ago, some officials from the district forest office had come to the village. On entering the village panchayat, these officials first contacted the Pradhan Pancha (elected chief of the panchayat). With the support of the Pradhan Pancha and other local elites, they selected an area in the forest which could be handed over to the Panchayat as panchayat forest or panchayat protected forest. There was no incentive for these officials to consult with the local people who were to be benefitted. Rather, they had consulted earlier with the district level local leaders and authorities such as the Chief District Officer or Local Development Officer.

Secondly, a mass meeting was organized in the village, chaired by the District Forest Officer or the Pradhan Pancha. The District Forest Officer, Chief District Officer and local teachers gave speeches to the 'masses' on the importance of protecting forests. Emphasis was put on "Nepal ko Dhan Hariyo Ban" (The green forest is Nepal's wealth). Not only that, but people would also be reminded that if they did not protect this forest, their land would wash into the Bay of Bengal (Gronow 1990). This might exemplify how great the impact of Eckholm's crisis view was following the initiation of community forestry in Nepal! It demonstrates how effectively the foresters could frighten the people.

Thirdly, a "Panchayat Forest Committee" was formed, as the officials were convinced that local people had understood the need to protect the forests and plantations. Without further discussion a list of committee members from among panchayat officials, school teachers and other members of the local elite were drawn up. The few women included were wives of the local elites or members of the local Women's Organization.

Fourthly, after a few months the Panchayat received a certificate confirming its ownership of the forest and a technical plan prepared by the District Forest Office detailing how the forest should be managed by the committee. The Panchayat was informed that the PF and PPF regulations restricted its use of forest products until the Management Plan was written and executed.

I found in the study areas that many people did not in fact know whether a management plan had been written; if it had been written, it could be lying neglected on the shelves of the Panchayat office (now VDC office).

At this point, after all above preparation, nothing would happen, according to Gronow (1990). The forest would continue to be used as if none of these events had ever taken place. According to Baral (1991), it is also likely that the Forest Officer would form forest committees in consultation with a limited number of elites in the panchayat. This would mean that these members would not be likely to represent users, and the people might not even be aware that a management plan had been written for their forest. The Committee would rarely meet, and the plan would usually be left in the Panchayat office cupboard to become a showpiece or left to rot.

The above is the indoctrination approach, grounded in the "Government Knows Best" policy. It is evident from the above that the users are largely excluded from the community forestry process in this approach. The need is defined more by outsiders than by the people to whom the forest matters. The basic assumption of this approach is that

the villagers are ignorant and wilfully causing the destruction of the forest. So they need to be taught and instructed. Figure 10.1 illustrates what is this classical indoctrination approach and attempts to distinguish from the people centered approach.

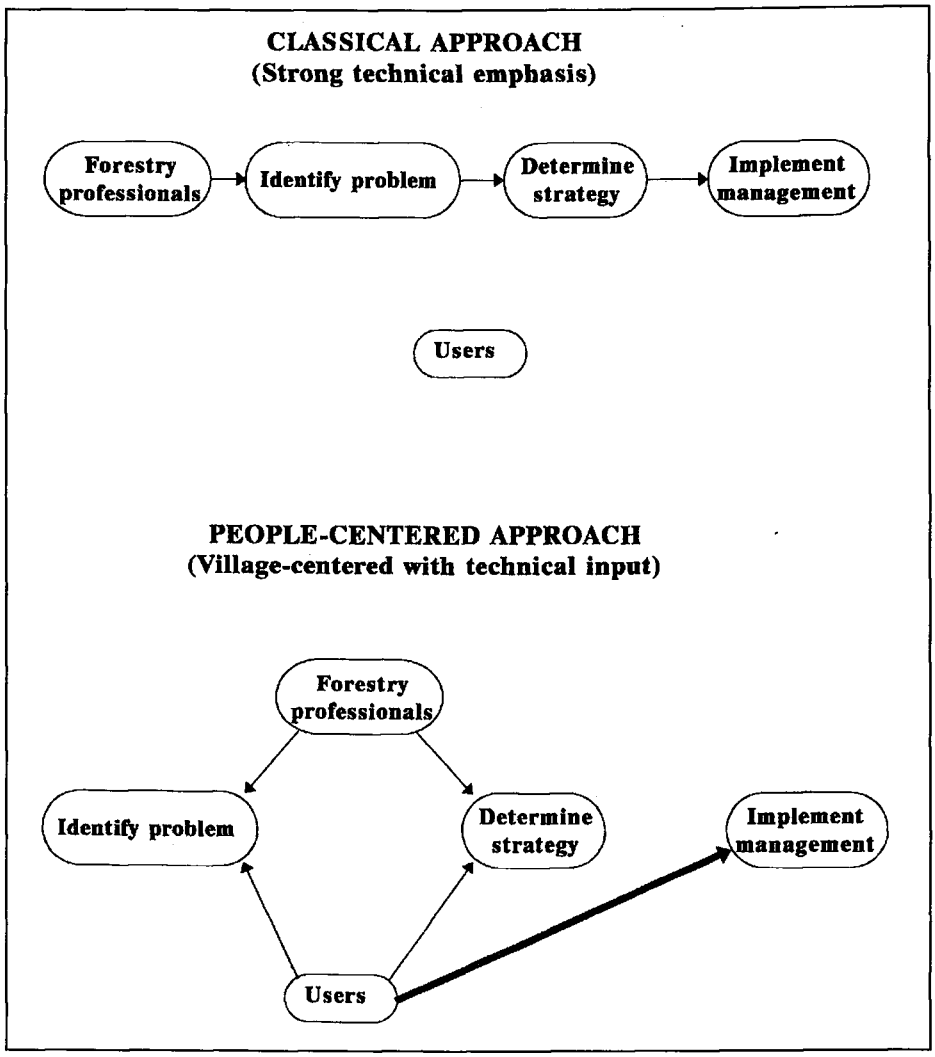


Figure 10.1 Indoctrination approach versus people centered approach

Source: Gilmour and Fisher (1991)

As the process was simple and straightforward, so was its effect on the rural people. Not only did the problem lie in the amount of land turned over to the users, but it also failed to make any differences for the people to whom it was directed.

10.4 Key issues for people centered community forestry

It is obvious from above discussions that community forestry is neither a question of production and distribution of primary products, nor merely about making distinctions between what trees are grown or who grows them, or turning over forests to local people. In view of this, this section looks into some key issues which require careful attention if people centered community forestry is to make a difference.

10.4.1 Handing over forests to users' groups: different people, different perspectives

Not only is community forestry subject to a community's response, but it is also a political issue as it involves control of resources. As put by Gilmour and Fisher (1991), any move to transfer control of resources is likely to lead to attempts by some individuals to manipulate a situation to their own advantage. In turn, these attempts are likely to favor the Ministry of Forests which consider forest resources to be directly under their control. The reluctance of the Ministry of Forests to handover forests to rural people is characteristic. In view of this, an attempt is made here to understand perspectives of different actors with respect to handing over forests. This include the Ministry of Forests, local leaders, and rural people.

When asked about the poor handing over of forests to user groups, senior officials in the Ministry of Forests indicated that the weaknesses and shortcomings lay in old legislation. According to them:

- The old legislation failed to precisely define "community", making no distinction between a community or user group and the village panchayat (presently village development committee),
- The act imposed several requirements or conditions for handing over a forest to the village panchayat, and
- The regulations were silent regarding the possible sale of forest products by the community on the market, a source of conflict in the future.

However, the district forest officers in the study districts viewed the handing over problem differently. In this regard, their responses were as follows:

- Lack of local people's willingness to take responsibility and to actively cooperate with the ongoing work program; in particular farmers' participation in plantations was not encouraging.
- Only few forests have well-defined groups of users. In most cases, the forest is located in one place and the users are dispersed over a large surrounding area.

- People living near the forest are often not ready to involve outsiders (from other villages who need to use the forest) in forest management.

- Problems become more severe when the forest is in a different VDC, or on the border between two VDCs.

- Forming a forest committee in the village is sometimes very difficult, because the people are different not only in terms of ethnic composition, but also they hold different political ideologies. This makes taking initiatives to turn over forests to local people risky as it might mean questioning by seniors and involving village politics.

- The lack of resources (financial and manpower) limits frequent visits to rural areas. However, these are necessary if community forestry is to become real both on paper and in the field.

It is neither possible, nor necessary to quantify each of the above factors in the insignificant turn-over of forests to local people. But they collectively suggest why the record of the Forest Department has remained unimpressive in devolving control to rural people.

If the above were the responses of the foresters, the village leaders during the panchayat system viewed problems differently. During one discussion, a leader neither blamed the legislation nor the foresters. According to him, the panchayats' leadership at the local level was very weak. He said that the village panchayats did not behave any differently from any other bureaucratic organization. Local leaders were too weak to exercise authority or to perform the duties vested in them by the legislation, although they were elected by people. As the local leadership depend on the support of the government officials in the district such as the Chief District Officer, the Local Development Officer and the Forest Officer to win elections, they became district-oriented. The following statement from an ex-panchayat leader illustrates this:

> *"Now I often think we became too dependent on governmental officials (bureaucrats) in the past. Whenever I requested the DFO to hand over this forest [he indicates a near-by forest] several times, he had always some reason to postpone it. And I never had arguments against that."*

From the rural people's point of view, there are four possible factors that made it easy for the Department of Forests to operate at a minimum scale and be highly selective when handing over forests to people. The first is people's passiveness or disinterestedness in accepting responsibility for management or protection of the forests. Also, this concerns the way people are encouraged, supported and motivated to participate in the process. The second reason is their powerlessness in making foresters or local Panchayat leaders work on their behalf. Thirdly, conflicts among themselves for the use of forests may have kept them from approaching the Department of Forests. Finally, people may not feel it necessary to ask the District Forest Office to hand over the Forests to them because they had always used the forests regardless. To understand people's perspectives, the following

section attempts to uncover the history of three community forests covered by this research.

In Bahunbhanjyang, farmers had not asked the District Forest Office to hand over forests to them. They had been using forests and also practising *khoria* (see Chapter 4). When Redd Barna (an international NGO, Save the Children/Norway) established its field office in Bahunbhanjyang in 1990, it stimulated local people to develop a community forest in the village. After this, local people approached the District Forest Office many times. From the slow action of the Forest Office, some farmers even suspected that the chief of the VDC was not in their favour. According to local people, Redd Barna's pressure prompted the Forest Office to issue an ownership certificate to them. The forest was officially handed over to user groups on June 1992. It has 69 users living in five villages of ward 7. In addition, users remarked that the writing of an operational plan is a difficult task and would not have been possible had Redd Barna not helped them. In Bahunbhanjyang, farmers even included *khoria* sites of some farmers within the community forest, although it was a hard job for farmers to get *khoria* practitioners to accept it.

Identifying users of the forest area (Lohiban) was not a problem in Bahunbhanjyang. Through the efforts of the VDC office and the Redd Barna field office a notice was issued in several parts of Bahunbhanjyang for all users of the Lohi forest to gather in a definite place and time to discuss the use of Lohi Ban and transform it into a community forest for its management, protection and utilization by the community. The information was also passed by neighbours and local leaders from mouth to mouth. And indeed, they knew who the users of the forest were. According to the local people and the Redd-Barna field officials nearly 90 percent of the people turned out for the meeting. While forming an executive committee to manage the community forest, farmers were careful to represent all villages and wards using the forest. Likewise, ethnic composition and sex of the members were taken into account. In choosing the committee, farmers acknowledged the support of Redd Barna.

Khoria practice in forest was a serious problem in initiating a community forest. Some farmers had been doing *khoria* for several years. Farmers had two alternatives, either to forget the idea of establishing a community forest and allow people to continue khoria, or to halt khoria and work for the benefit of majority of local people. The khoria farmers were not initially ready to accept, but later on they did accept due to community pressure. Plate 10.1 shows how *Khoria* is incorporated in Lohi community forest.

Plate 10.1 Khoria included under Lohi Community Forest

In Dhuwankot, the Save the Children/US (an international NGO) helped locals to prepare the operational plan and facilitated the formation of a users' group. The group has 31 users. But the committee does not meet, and the people do not help protect the forest. The forest was turned over to them in March 1991.

In Manekapur, farmers remembered that about three years ago before, many officers from Surkhet came to the village in a group to inform them that their village was selected to develop into a model village. They were informed that the Government of Canada - funded Karnali-Bheri Integrated Rural Development Project, already in operation in their district for 10 years, was launching a new program called Akikrit Shrot Parichalan Program (ASP) (An Integrated Resources Use Program). As a component of this program[4], they were told, a community forest would be established in the area and the District Forest Office would bear all costs. The community forest currently has 242 households with users from 1, 2 and 3. Although organizing users' meetings from three wards with more than 200 households is very difficult and the users' executive committee rarely meets, people were contributing fixed amounts for maintenance and protection of forests through their respective ward members. For them, the forest was an integral part of their lives.

The majority of the respondent farmers in Manekapur felt that the forest that they were given was degraded one and would require several years before it would be fully usable.

Some thought they might not be allowed to use forest products free of charge in the future.

Each of the above three cases suggests that local people know that community forests are important and likely to serve their interests. They have approached the forest authorities, but encountered difficulties unless encouraged, mediated or supported by an external agency. People's frustration was mainly with the slow process and lack of necessary incentive and support structure.

10.4.2 On stakeholders

Many different individuals, groups and institutions are interested in using forests, and are involved directly or indirectly in their utilization for different purposes. As community forestry is an intervention, it causes perturbations in local social systems. One common type of perturbation is suspicion of the motives of intervening agencies. Although this is a minor problem, it can turn into a major one if intervening agencies overlook it, as community forestry concerns one of the most crucial resources, particularly in poor households. These are dependent on the use of forests for different purposes, ranging from shifting cultivation to the sale of fuelwood. In view of this, this section attempts to examine actors and stakeholder in community forestry, and local people's responses to this.

The Village Development Committee appeared to be a most important and powerful stakeholder. The VDCs considered forest lying within their boundaries to be their property, whether or not it is a community forest. They argued that the forest is the source of revenue for the VDCs. Apart from forests they have no other resources. Hence, their concern was that they have the right to levy taxes on local people for using products from the forest lying within their boundaries. Some reported that VDCs are presently pressing the Ministry of Forests to allow them to tax the people who use these products.

Furthermore, VDC leaders mentioned that they are the ones who resolve conflicts in the use of forests and other natural resources and who support the local people in initiating, developing and sustaining community forests. They argue that they should thus be entitled to receive taxes from the people. As well, it was learnt that many VDC position holders (Chairpersons, ward members etc.) are presently demanding that the government hand over the forests to the VDCs, as during the Panchayat period. It seemed that losing ownership of the forests meant losing the power, prestige and financial benefits. This situation seemed aggravated if the chairman of the user committee and the chairman of the VDC are different people.

On the other hand, many users seemed clearly opposed to allowing VDCs to levy taxes for the use of products from the community forest. They said that it would amount to a double taxation on them. They had already been providing free labour in the management of community forests and also paying a fixed amount to the user committee for each bundle of fuelwood they brought from the forest, in order to hire watchmen. Thus, not only is a VDC likely to facilitate the process, but it can also frustrate the users.

The other stakeholders are Non-governmental organizations and local voluntary organizations. The NGOs and voluntary organizations were found to be using the community forestry program as an entry point to implement other community development activities, and vice versa. The community forestry program seemed to provide an easy access to local rural development organizations to undertake development activities. The following provides some concrete examples from the field.

In Jhargaon, the Redd Barna field office (Save the Children/ Norway) organized a functional adult literacy class for farm women. However, the learning materials were selected so as to encourage them to initiate a community forest in the area, and exert pressure on their husbands to do the same. The people acknowledged the effectiveness of this class. This indicates a catalytic role for intermediary organizations in initiating and sustaining community forests. The intervening agency, the Ministry of Forests, needs to recognize this, and encourage NGOs if community forestry is to take hold among rural communities.

In addition to the VDCs and NGOs, other stakeholders might be village based extension workers from the Ministry of Agriculture. They could facilitate the process or create some sort of perturbation as indicated earlier in this section. Unless coordinated effectively, the livestock production program of the District Agriculture Development office is likely to make protection and maintenance of community forestry further difficult.

Likewise, there are many other actors and stakeholders. Attempts to set up local arrangements for forest management may fail if the interests of various groups are not considered. As put by Grimble (in press), stakeholder analysis is crucial for initiation and sustainable management of community forests. "Stakeholder" refers to all those who affect, and/or who are affected by, the policies, decisions, and actions of the system. Stakeholder analysis is particularly useful where resources are managed as common property (e.g. forests, irrigation systems) and where resources are officially owned by the state but function in practice as *de facto* open access resources.

In sum, the actors in community forestry are not only user groups and foresters but other institutions and individuals. They can facilitate or complicate the community forestry development process. The following are some of the stakeholders in community forestry.

- User group'
- Forest Committee
- Forester
- VDC-based NGOs and local clubs
- Watchmen (Heralu)
- Local leaders
- VDC based development workers such as Junior Technicians and Junior Technical Assistants of the Department of Agriculture Development.
- The community nursery
- VDC Office (Chairman and other officials)
- Non-Government Organizations

10.4.3 The sustainable utilization of natural resources: towards linkages and coordination

It is apparent from above discussions that community forestry involves various actors and their interests. As community forestry is about the management of natural resources, there will be actors with diverse and conflicting, but interdependent, claims on the use of natural resources. This requires a platform for decision-making which would take into account the various interests and provide opportunities for conflict resolution, negotiation, accommodation and consensus-building for concerted action (Röling 1994 c). Thus, the importance of coordination and linkages among different actors and stakeholders is a necessary condition for the success of the community forestry program. However, the findings suggested that coordination and linkages are missing.

Coordination and linkages problems were viewed differently by different actors. For example, senior officials and policy makers in the Ministry of Forests reported difficulties in coordinating the activities of the donors. According to them, in the community forestry sector, the number of bilateral and multilateral donors are many. As the level of support differs, so districts are also treated differently. As a result, they need to confront the problem of unfair treatment and complaints from many districts (Shrestha 1993). Some projects have training components and some do not. If they do have training components, the nature of the training varies. According to them, farmers, local leaders and others often question why are they treated differently in community forestry project as compared to the next neighbouring district.

On the other hand, district officers mentioned their problems in coordinating the activities of leasehold forestry, community forestry, private forestry, national forest demarcation and protection and agroforestry. According to them, the activities of one sector are sometimes likely to affect the other sector. For example, initiating community forestry might adversely affect the national forest because farmers are likely to stop taking their animals to the community forest and use the national forest. They were in role conflict. Should they assume the policing role to control the national forest, the community forestry program was likely to suffer. Not only did they face intra-office coordination problems, but they also had coordination problems with other development-related offices in the district. As stated earlier, the livestock production program of the District Agriculture Office often made protection of new plantations further problematic. The Production Credit Program for Rural Women (PCRW) was likely to make maintenance of a community forest difficult when initiating a goat keeping program for poor rural women.

Likewise, farmers' problems are different. They require both community forestry and livestock for their livelihood and farming. The following is an example of a coordination problem faced by farmers in Manekapur.

In Manekapur, the District Forest Office initiated the community forest for two reasons. First, the village appeared promising. The people were interested and past records showed that local people had approached them several times. Secondly, it had a goal of initiating a community forest in the second semester of the fiscal year and the time was passing.

The program was planned in such a way that full cooperation was achieved between the community and the office. As planned, the people planted seedlings and developed rules to protect plantations in the community forest. Meanwhile, the Department of Agriculture Development initiated a livestock program, and the Production Credit Program for Rural Women initiated a goat keeping program, as a part of K-BIRD's ASP program. As a result, protection of the community forest became a problem. But farmers needed all the three programs. Had these three offices coordinated their programs earlier and worked jointly with farmers, perhaps they would have found a mechanism for the proper management and sustainable utilization of the forest.

If such was the situation in the field, the forester and the agriculturist often attended meetings at the district headquarters with the local development officer and project coordinator. The activities of each office were discussed individually, but they never considered how a program of one office was likely to affect the programs of other offices or what their collective impact in the field was. Likewise, how a JTA could support farmers in preparing and executing the operational plan was neither the concern of forest authorities nor of the District Agricultural Development Office.

10.4.4 Extension and training support

Supporting community forestry requires strong training and extension support from senior Ministry officials to farmers in the village. In the past years, community forestry suffered as a result of both weak extension and training activities and mismatches with the needs of the people. Short-term training was given to forest committee chairman, secretary, watchmen and nurserymen. Not only was such training insufficient but it did not match the needs of the people receiving it. One of the reasons for this situation was that forest officers are technical people, and they are generally not trained in the theory and practice of extension and training. Therefore, they are likely to be uninformed of the latest developments in extension and training practice. More than for forest officers, training is needed for rangers (community forestry facilitators) in social skills and extension. They need to change their behavior. When they were initially trained, it was on subjects deemed necessary by their seniors. They need training to enable them to change their role of policing the forest to that of facilitation and, understand the value of learning from farmers.

Likewise, farmers require training not so much in plantations even though there is hardly any evidence that people ever planted forests in the past. There had been some tree planting on private land. The most important areas for training are in social skills. In all study areas, farmers and local leaders looked for strong training and extension support. However, district forest offices seemed not equipped for such activities technically or financially. Lack of physical facilities for training at district offices was one factor. The other crucial factor was that they needed to learn how to learn and work together with farmers in the field.

10.5 Summary and conclusions

This chapter traced how the community forestry program in Nepal was initiated and what led it to shift from a forest centered approach to a people centered approach. It was shown that although it received the highest priority and heavy investments, the community forestry program's performance over the last 14 years has been bleak in terms of both turning over forests to user groups and inculcating an ownership feeling for the forests among the rural people.

It is often argued that people have a keen interest in forests and forest lands and hence are easily won over provided the right policies and practices are employed. This is, by and large, too simple a perspective.

This chapter demonstrated that in terms of legislation Nepal's community forestry program has been a progressive one in the past, and is becoming increasingly progressive. Community forestry appeared even to have incorporated major tenets of current sustainability concerns. However, it was contended that, in past years, neither was it effective in handing over forests to user groups, nor was it efficient in input utilization. Likewise, it is currently likely to fall short of its mission and lose sight of its purpose again, if it again fails to facilitate learning processes throughout the system.

Community forestry is neither a question of production and distribution of primary forest products, nor merely about making distinctions between what trees are grown or who grows them, or turning over forests to local people. Rather, it is about the management of natural resources, which requires a focus on higher levels of system aggregation than the farm, and longer time horizons than the growing season; and it requires a focus on groups of stakeholders in natural resources than individuals.

Besides, attaining sustainable utilization of forest resources requires coordination and integration of activities of multiple actors. The interdependencies of the various actors and their potential role are not realized or explored adequately. This chapter concluded that the innovation, people centered community forestry, cannot realize its full potential unless calibrated adequately and appropriately with other elements of the knowledge systems.

Notes

1. The government had nationalized forests in 1957 by enacting the *Private Forest Nationalization Act of 1957* in order to remove the remnant of feudal land tenure; about one-third of the total forest and cultivated lands were owned by feudal (75 percent of which belonged to members of the Rana family) under birta tenure right. Birta land was granted by the state and was usually both tax free and heritable. Although one of the major intentions of this Act was to prevent the destruction of forest and to ensure the adequate protection, maintenance, and utilization of privately owned forests, it is often claimed that the tragedy of the Nepalese forests began after this Act. The locals lost a sense of ownership (Joshi 1991, Bonita and Kanel 1987). However, many do not subscribe to this view. They argue that evidence is increasing from many parts of Nepal that local people were unaware of the Act (Gronow and Shrestha 1991, Gilmour and Fisher 1991). Contrary to the view that rural people reacted to the 1957 legislation by destroying forests is the claim that a great number of indigenous forest management systems (which were set up by villagers to protect degrading forests) had their origins about 1960.

2. In 1975, Eckholm drew world attention by presenting a "crisis view" on the state of deforestation In Nepal. He claimed (1975: 764-5):

   "There is no better place to begin an examination of deteriorating mountain environments than Nepal. In probably no other mountain country are the forces of ecological degradation building so rapidly and visibly...

   "Population growth... is forcing farmers onto ever steeper slopes, slopes unfit for sustained farming...villagers must roam farther and farther from their homes to gather fodder and fuelwood, thus surrounding villages with a widening circle of denuded hillsides...Ground-holding trees are disappearing fast...Landslides...occur more and more frequently...The incidence of flooding by swollen rivers coming down from the mountains is increasing...Topsoil washing down into India and Bangladesh is now Nepal's most precious export...It is apparent that the continuation of the present trends may lead to the development of a semi-desert type of ecology in the hilly regions".

   However, as noted in chapter 1, this theory of environmental degradation, the crisis view, is challenged by many. Among others, Ives and Messerli (1989) provide the most comprehensive analysis of the current state of the theory and present a more balanced view. Nevertheless, the impact of crisis view has remained significant.

3. The following were the three community forests that provided the setting for this research at the local level:

- Bhaluban Forest Committee- Dhuwankot VDC, Gorkha District. The forest was handed over to a users' group (forest committee) in March 1991 (Chaitra 21, 2048 B.S). The total number of households using the forests were 31 during the research period.

- Lohi Forest Committee- Ward 7, Bandipur VDC, Tanahu District. The forest was handed to the users' group in June 1992 (4 Shrawn 2049). The users of the forest are 69 families living in five villages of Ward 7, namely Bahunbhanjyang, Moharia, Gurung Gaon, Bahunbhanjyang and Chandrakot.

- Manekapur Forest Committee- Ward 1,2,3 , Latikoili VDC, Surkhet District. The users of the forest are 242 households from three wards. The forest was handed over to the users' group in 1990.

4. Akikrit Shrot Parichalan Project (ASP) of the Karnali-Bheri Integrated Rural Development Project (K- BIRD)

The K-BIRD is an integrated rural development project initiated in 1981/82 through the grant assistance of the government of Canada. After 10 years, in 1990/91 the project realized that it failed to have any tangible impact on the lives of rural people except a few buildings and infrastructure which have begun to collapse in the course of the project due lack of rural people's support and interest in them (K-BIRD 1992). This led project advisors to conceive and implement several mini-programs to correct past weaknesses and shortcomings before the termination of the project by the end of 1993. Integrated Resources Use Program (ASP) is one of such programs. In ASP, the project required all the district level development offices receiving the support of the government of Canada to select and work jointly for the development of a common village in the district, and the number of villages to be increased in phases.

According to project documents and interviews with key project officials, the project decided that sectoral integration was not sufficient for integrated rural development to take place. The intention was to integrate the community with the sectoral programs. According to the project officials, the need to integrate the community was realized when they found that neither was the government accountable to the project activities, nor the project to the government program. In short, external assistance was not fully utilized and also in many instances, mis-utilized. To implement the program the project formed several committees at different levels. The central coordination committee formed under the chairmanship of the project coordinator is to make policy decisions and seek viable solutions if problems arise in the field. The purpose of district coordination committee formed under the chairmanship of the Local Development Officer of the District Development Committee is to implement and facilitate the program at the district level. Last but not least, the village coordination committee formed under the chairmanship of one of the chairpersons of the sectoral groups (Forest Users' Committee, Livestock Group, Women Development Group, Soil and Water Conservation Group, Agriculture Group) is to facilitate the activities of farmers' groups in the village and integrate community and sectoral programs at the community level. However, during my field research, I came to see that the committee at the village level did not exist and many farmers reported that they did not know whether any such type of committee was formed or existed at the village level, apart from five farmer groups formed independently by five sectoral offices.

CHAPTER 11

ON EXTENSION
(Case study 4)

The last three chapters discussed two cases concerning systems or technologies of land use, agroforestry and permaculture, and a third one on management of natural resources, e.g. community forestry (the government's planned intervention to ensure sustainable utilization of forest products in rural communities). In this chapter, I turn to a different but related subject- extension- which denotes change, promotion, getting farmers to do something, planned intervention or communication intervention, depending on how one views it. Hence, unlike the last three chapters which examined three elements of knowledge system- innovation, intervention processes and institutions- this chapter gets right to the intervention process. Not only does this case complement the previous three cases, but it also reveals factors to be taken into account if extension is to face a dual challenge: to promote agricultural development that is sustainable, and to develop sustainable extension systems (Garforth 1993).

For this case, the World Bank-funded Ministry of Agriculture's project, the Agricultural Extension Project II (hereafter the AEP) provides the setting. In this chapter, I have first sought answers to the question: what led the AEP to shift from the Training and Visit system to a Problem Census/ Problem Solving (PC/S) approach of agricultural extension. Second, I set out to describe how an intervention process is perceived and acted upon differently by different actors at different levels. Thirdly and more importantly, I have attempted to describe how it actually worked in the field following the changes introduced in the system. Thus, this case analyses introducing PC/S process into agricultural extension as an intervention in extension staff.

In addition to field research that I conducted at Tanahu, Gorkha and Nawalparasi districts for this case study, I have used relevant data collected as a member of the Task Force formed by the Ministry of Agriculture, Government of Nepal to prepare a "National Agricultural Extension Strategy". Interestingly, during my field work, the MOA was engaged in defining the future orientation, structure and strategy of the extension system to improve its contribution to Nepal's agricultural sector development. The need for such a strategy was realized partly due to the lack of a coherent, effective, well-regarded strategy, and partly because preparation of the strategy was in itself one of the conditions set forth by the World Bank for its further support of agricultural extension work in Nepal. Because of these mounting pressures to reform the agricultural extension service in the country, the findings presented in this chapter are especially significant.

11.1 From Training and Visit to the Problem Census /Problem Solving approach

Many attempts have been made in the past to reform and strengthen the agricultural extension service in Nepal. These include frequent reorganizations of the extension service (see chapter 3) and use of multiple approaches such as the Integrated Rural Development approach, the Tuki approach (in Nepali, Tuki refers to a lamp- multiple progressive farmer approach), the Farming Systems Research and Extension approach, the Commodity Group approach, and the Training and Visit approach. Of these approaches, the Training and Visit (T&V) approach, as a pilot project, was introduced in 1975 by the World Bank-funded Narayani Irrigation Project in the three Terai districts, namely Bara, Parsa and Rautahat. After this, the T&V approach became an integral part of all irrigation projects funded by the Bank such as the Sunsari-Morang Irrigation Project. In 1981-82 this approach was further expanded when the World Bank/UNDP funded two MOA projects; Agricultural Extension and Research Project (AERP), and the Hill Food Production Project (HFPP) used this blue print. In addition to these projects, in 1985, the government initiated a third project- the Agricultural Extension Project (AEP)- to reorganize and strengthen the agricultural extension service in 11 Terai districts. This project encompassed all districts previously using the T&V approach as a component of World Bank-assisted irrigation projects. Initially, this project was to terminate in December 1991 but was extended several times, partly due to slow progress in the construction of physical infrastructures, and partly due to the need to provide uniformity and continuity of the activities initiated by the AERP and HFPP.

In Nepal, the T&V approach has not been used throughout all 75 districts of the country for two reasons. First, in some districts, some donors such as the Swiss Development Corporation and USAID were using other extension approaches, e.g, the Tuki approach and the IRDP approach. Second, people were not convinced of its applicability in the hills due to the difficult terrain, inaccessibility and other socio-economic conditions (Basnyat 1990).

In 1991, the T&V approach met an abrupt end when the government refused to take Agricultural Assistants into the civil service or to provide an appropriate salary. Agricultural Assistants were also called PLAAs in the Terai under the T&V approach. Obviously, this created a vacuum in the field for extension. The project was therefore to decide how to fill the gaps that resulted thereafter. In addition, the AEP sources argued that the AEP changed its course of action because the T&V approach:

- failed to provide clear evidence of production impact; and
- further intensified a technology transfer bias, which had already existed in the on-going public sector extension system.

During discussions, the following issues emerged:

- Contrary to its (T&V approach) objectives, the extension system was not responsive to its beneficiaries because it provided little opportunity for planning the extension programs or recommendations based on farmers' information or problems and needs.

- Little or poor diffusion of technologies under the contact farmer approach. Too few farmers were contacted. The "visit" component of the T&V was very weak, if not completely missing. Only the "training" remained.

- Little attempt was made to gain active and purposeful farmers' participation in identifying and prioritizing their problems and needs.

- Extension messages concentrated mostly on the major food grain crops. Many of the messages were too simplistic, not location-specific and hardly took financial considerations into account. Technical recommendations were too general and input-dependent. This viewed the farm management perspective in extension and research establishments as a purely technically-dominated perspective.

- Finally, and more importantly, extension failed to capitalize on farmers' knowledge, experiences and local resources in planning field level extension programs.

From 1991 onward, the AEP made several shifts in its policies and activities, primarily initiated after the termination of the PLAAs, and then to correct the situations which resulted. Major turning events in AEP II are described below.

In 1991

- Terminated the position of the PLAAs;

- Discontinued the T & V approach; and

- Formed **contact farmer groups** at three groups per VDC in such a way that one group comprised 30 farmers, 10 farmers from each ward of the VDC.

In 1992

- Introduced a **Problem Census/Problem Solving approach** in extension with reference groups as further modifications to the on-going T&V approach in Tanahu, Chitwan and Morang districts at 9 farmers' groups per VDC. This meant three times more than in the previous contact farmer group approach.

In 1994

- Expanded PC/S in additional six districts namely, Syanja, Gorkha, Nawalparasi, Parsa, Sunsari and Jhapa.

Whether the T&V approach was effective or not is another issue, and examining its impact is outside the scope of this research. Nevertheless, it came to an end in Nepal following the removal of PLAAs as discussed below.

11.1.1 Ending the provision of agricultural assistants

In Nepal, when the T&V approach was first introduced in 1975, there lacked sufficient numbers of field extension workers, JTAs. With a view to provide the service with at least one village-based extension staff for each 700 to 800 farm families, or one extension agent per panchayat (now VDC), a decision was then made to provide a one-month-long intensive training to local young people leaving school (who had completed eight years of schooling), and appoint them to work on contract as agricultural assistants (PLAAs) for the panchayat including the village of their residence. This meant that they could live at home and look after their farms and families also. The salary was set so low (approximately US$ 6.00 per month) that the government accepted the proposition and failed to take into account future potential problems. After all, the salary was to be paid in Nepalese currency through foreign currency on loan. The situation would then, indeed, appear favourable for a foreign currency hungry country like Nepal! The offer seemed nice to the local people as they got not only access to extension services- the outside world- but as there was also some monetary incentive and opportunity for the future. Initially, the plan was to select for the job young people under 35 years of age who had completed at least eight years of schooling so that they could be upgraded to JTAs later after necessary education and training. However, the plan remained in office files and was forgotten afterwards.

The PLAAs were full time extension workers. They were required to participate in a fortnightly training and visit to farms of contact farmers on scheduled days, and to walk with JT/JTAs and SMSs in the field, if these happened to come to the VDC. They were to conduct demonstrations, field trials and to fill farmers' requests for improved seeds, fruit saplings and other production inputs, as instructed by the office. If they failed to sell the inputs because of low quality or because they were not available in time, or if farmers did not pay them for whatever reason, they were to compensate from their salary. If the office failed to provide the inputs requested by them for the farmers, they were the ones to suffer. Thus, they were the bridge between farmers and extension. Farmers called them "Sahayak JTA" (assistant JTA). Since PLAAs remained in their villages, it made it easier for JTAs to go elsewhere from the work field.

Views on the performance of PLAAs has remained mixed. For some people, PLAAs' understanding of farmers' problems was much better than that of JTAs, and farmers accepted their advice readily. On the contrary, in a study, APROSC (1988) found most of

the PLAAs neither attending fortnightly training regularly, nor visiting contact farmers on scheduled dates. The main reason was the salary provided to them. It was very low, not even an equivalent to a week salary of an unskilled labour. Thus, it weakened both the training and visit aspects of the T&V approach.

Then came democracy in 1990. The PLAAs felt themselves empowered to demand their rights and they petitioned the government to recognize them as civil servants, increase their salary commensurate with an appropriate level of civil service, and provide other related fringe benefits. Finding an unfavourable response from the government on their part, they responded with a strike and locked field and district agricultural offices. With the help of police and other means, the government brought the strike to an end. As the PLAAs were divided among themselves, the strike could not continue. Finally, the government responded by discontinuing the PLAAs in agricultural extension. Thus, the 15 years' contribution of the PLAAs went unrecognized.

Since above was a spontaneous political decision, the AEP was not fully prepared. Termination of PLAAs meant not only the need to search for an alternative, but also it brought about discontinuation of fortnightly training. In turn, this led to the cessation of scheduled visits to the farms of contact farmers by grassroots extension, where it was there. Thus, it brought about the end of the T & V approach.

Obviously, this created a vacuum in field level extension work as there were no PLAAs to whom to provide fortnightly training, or who were to visit contact farmers on fixed dates and times in fixed locations.

The above situation disturbed the whole system. That extension approach, which was initiated to reorganize and strengthen the extension system in the country, met an end, as it had been based on a rather shallow and temporary foundation.

Following the termination of the PLAAs- grass roots extension workers- the AEP had no choice other than to reformulate its objectives and adjust to the new situation. To fill the gap, the AEP first introduced a Contact Farmer Group Approach, the objectives of which were then formulated as follows:

- to mobilize farm communities by using sociological principles in designing and managing the extension program;

- to introduce village-level situational analysis in gaining information on the farm, farm household, and infrastructure of the community, and to ensure that any future planning relating to research and/or extension be based on farmer information; and

- to base extension programming and service delivery on a farmer-centred problem census and problem-solving approach (PC/S).

Having traced the politico-technical reasons that led the AEP to shift from the T&V approach to a contact farmer group approach, I will, first, briefly describe the contact

farmer group approach and then go on to assess how it actually worked in the field, since it provides a context for better understanding of the PC/S method.

11.1.2 Using the contact farmer group approach

Using farmer groups for extension purposes is not new to Nepal. From 1988 onwards the group approach has been the basic strategy of Nepalese extension, except for the AEP districts which were under the T & V approach. Although the experience of working with a group approach is mixed, the government has endorsed it as an effective approach to reach large number of farmers (Baral et. al. 1989, NPC 1992, DOAD 1994). Perhaps, for this reason, was the group approach the choice for the AEP, when it was necessary to abandon the T&V approach.

Forming farmers' groups has always been a problem in Nepal. Evidence indicates that groups begin to crack or become dysfunctional as soon as they are formed. Continuity of groups is a concern. In view of this, the AEP decided to institutionalize the group approach as follows:

- Three groups in each VDC are formed so that each group consists of 30 farmers from three wards with 10 farmers from a ward;
- Farmer groups thus formed are themselves to select their respective leaders, who are to attend a monthly meeting-cum-training organized at a fixed date and time at the nearest service centre.
- The leader is to be paid an allowance of Rs. 50 (US $ 1.00) per meeting.
- The leader is then to organize farmers' meetings regularly, at least once a month, so as to transmit messages and summarize their problems, suggestions and demands.
- Respective JT/JTAs are required to attend such monthly meetings organized by farmer leaders in the wards for further follow up action.
- The SMSs are to supervise the work of JT/JTAs in the field, provide technical backstopping to them and assist them in conducting demonstrations and trials.

With the above arrangements, the questions arise: what happened in the field? Has the system worked? How did field extension staff and farmers respond to the above approach, situations or arrangements? The following paragraphs attempt to find answers for these issues.

The exploration began with office records and files. The office record revealed farmer groups were formed in the three study districts as shown in Table 11.1.

Table 11.1 Numbers of farmers groups formed in three study districts

S.N	District	Total VDCs	Groups	Remark
1.	Gorkha	69	207	
2.	Tanahu	47	141	
3.	Nawalparasi	77	231	
	Total	193	579	

Source: Office documents

However, findings during the field study put a question mark over the existence of all groups mentioned in Table 11.1. Because of likely official sanction against the staff, the names of the VDCs and districts are not used in the following story.

Farmers' groups under the contact farmer group approach, do they really exist?

In Bishnunagar VDC, the JTA's record showed that there were three farmer groups in this VDC. The names and addresses of farmers and leaders participating in such groups matched the office record that I had with me. With the records obtained from the office and the JTA, I went to Bishnunagar VDC. I met a leader of a group. When he was asked to state the names of farmers in his group, he was not able to. Although the office record showed that the group was formed a year previously, he had not yet met other members in his group. Likewise, the farmer members did not know that they were members of a group! Asking them to name the leader was ridiculous.

Similarly, in Haripur VDC neither the group leader nor members knew that they had formed a group. When the JTA in the area was asked how he submitted farmers' names to the office, he said that he got the names from the chairman of the VDC and ex - PLAAs. He went on to say that forming farmers' groups is a difficult job. He went on further to question why farmers would form a group just because there was a public notice circulated by the office. He mentioned going to the place posted, only to find no one there. An example of such a notice is given on Figure 11.1. The notice reads: As per the decision of His Majesty's Government, hereafter the agricultural extension programs will be implemented through farmers' groups. The office hereby requests all farmers, brothers and sisters of Ward No.., VDC... to assemble in large numbers at the following place and time so as to form farmer groups by themselves and use the opportunity to participate in agricultural extension programmes.

Figure 11.1 ADO's appeal for farmers to form farmers' groups (Photo)

Secondly, if groups are formed or if a person knows that he is designated a leader by the JTA, he is likely to attend monthly meetings, provided that he is free on the meeting date or if he happens to pass by the ASC on that day on his way somewhere else. This means that attendance of group leaders at monthly meetings is irregular, uncertain and certainly not encouraging, although they are paid Rs 50.0 (Approximately US$ 1.00) every time they attend.

When JT/JTAs working in the three study districts were asked about the participation of group leaders in the meeting, all respondents said that participation was very low and not encouraging. One JTA remarked critically, "*Bosses make decisions from Kathmandu without considering that someone (referring to JT/JTAs) has to walk up to three days to attend a half day meeting in a village.*"

Thirdly, even if groups are formed by the farmers from the three wards as required by the office, they generally never meet in the village (ward) unless the JTA goes to the village first and invites them. In this situation, it can be said that farmers come individually and not as members of a group. Besides, JTAs point out other factors, that they carry the responsibilities for three VDCs each, which means nine farmer groups each. Attending meetings of nine groups in three VDCs on fixed date and time every month is

extremely difficult. They stress that they are given the job of only walking from a village to other. After all, they say, " *We are human beings too*".

To summarize the above discussions, the contact farmer group approach would seem to be the old wine of the T&V approach in a new skin of the contact farmer group approach grounded in the same philosophy and principles. If one placed PLAAs in the role of farmer leaders, this approach would not look different from its predecessor, the T&V approach. The problems of working with the contact farmer group approach are obvious. Although part of the problems lies in supervision and monitoring, the following issues are equally noteworthy.

- Farmers groups are formed to fulfil the targets of the office.
- Why farmers would join a group and how they would support group activities are not considered.
- Farmer groups are viewed as a means of distributing agricultural inputs freely available from the office in the form of mini-kits of modern seeds or materials for demonstration and vegetable seeds for kitchen gardening.

11.2 PC/S process: an intervention in extension staff

After experiencing several technical problems with the contact farmer group approach and farmers' indifference to such groups, in 1992, the AEP decided to introduce the PC/S approach in few wards of two VDCs each of three districts Morang, Tanahu and Chitwan. For this an orientation course was first organized by the project for the staff of the three districts in September 1992. After about a year, the project extended the process to another six districts. The same three consultants hired earlier were made responsible to work for nine districts- three districts each.

In Nepal, the credit for initiating the PC/S process goes primarily to three senior extensionists, namely R.C. Mishra, former coordinator of the AERP and presently associated with the World Bank/Nepal; Mr. P.C.P. Chaurasia, former coordinator of the AEP who presently supporting the District Agriculture Development Office as a local consultant based in one of the three pilot districts; and Mr. B.R. Kafle, also former coordinator of the AEP and presently Chief of the Central Agricultural Training Centre. To them PC/S was a further modification of the ongoing T&V approach through farmer groups, the purpose of which was to identify how extension could support farmers significantly in solving their problems for enhancing the sustainability of agriculture. Since farmers have many problems which cannot be solved all at once, farmers are to be involved in identification and prioritization of problems, and the role of extension is to act as facilitator for organizing farmers and/or to act as a link between farmers and concerned agencies for the best utilization of local resources.

The project hired three local consultants in the three districts to initiate the PC/S approach and assist the respective district offices in further expansion. The following describes the PC/S process.

The problem census and problem solving technique (PC/S) is an extension method and a dynamic educational process aimed at changing the values and behaviour of farmers or village communities, so that they can successfully adapt to continually changing situations.

The problem census technique, as a method of agricultural extension, was developed in reaction to that dominant top-down approach which modified, distorted and made dysfunctional the existing farm system in order to accommodate the new technology. This was because it sought to introduce technology without knowledge of the existing traditional farming systems or caring to assess how the technology fit into the existing blueprint for farm development, which was developed many generations ago within the traditional farming community (Crouch 1984). Grounded in the premise that farmers are in the best position to identify the problems which are of central concern to them at any given time, PC/S has the following objectives:

- Bring together or encourage an existing group of farmers to meet with the goal of identifying major problems in the farming systems;
- Create a learning situation which is farmer or village-centred;
- Identify existing attitudes and the extent to which attitudes differ between group members. If differences exist, it is up to the group to isolate these variations and resolve them through group consensus; and
- Draw on and rely on the combined knowledge and experience of group members.

According to Crouch, this technique was used in many developing countries after Tully successfully applied it in field situations in Asia and the Pacific Basin. For example, Lamrock applied it in Papua New Guinea in 1966, Crouch and Hoare in Thailand in 1980 and 1983 respectively. These suggest that the method is not new, and that the AEP intended to test it in Nepal following the need to modify the current T&V approach, partly as a result of termination of PLAAs as stated above, and partly as result of widespread dissatisfaction with the T&V approach in Nepal.

The T&V approach and PC/S approach seem two extremes on a continuum. In the former, the extension worker makes decisions for the farmer with no prior discussion, or already has a preconceived idea of the current problems; in the PC/S approach farmers are to identify problems and find solutions, and extension workers are to facilitate farmers these endeavours.

Thus, the PC/S process prescribes certain behaviours or practices for the extension workers. These require unlearning and reversing many past roles and activities which they

acquired partly as a result of working with top-down approaches for many years, and partly as a result of their past education and training. Some of the major role changes expected in extension agents in the PC/S approach are as follows:

- from information giver to information seeker
- from trainer or expert to learner
- from problem solver to facilitator
- from research-oriented to farmer-oriented

Thus, unlike interventions such as community forestry and permaculture, which had more to say to the farmers, the PC/S approach is concerned with the extension staff and their institutions. This means that the introduction of the PC/S process in agricultural extension can be viewed as an intervention in extension staff. It demands changing the behaviour or practices of extension workers and the institutions employing them.

Having briefly described the PC/S approach, the chapter next discusses its implementation in the field. The information here is primarily based on the Rapid Appraisal of Agricultural Knowledge Systems carried out by the task force (Annex 11.1).

11.3 Responses to intervention from the field

To learn how the extension staff have responded to this PC/S intervention, the team first held a staff meeting at district headquarters, attended by the SMSs, JT/JTAs and the District Agricultural Development Officer (ADO). The floor was opened with the following questions:

- How did you experience with the PC/S?
- How useful has the process to your work?
- How likely is it that the process be expanded to other VDCs?
- How have farmers responded to the new process?

11.3.1 Tackling the symptoms, not the root causes

For the JTAs working in the PC/S site areas, the PC/S process meant additional burdens and responsibilities. They were afraid that they would have problems in the future as the process might create unnecessary expectations among the farmers. They commented that when farmers were asked to discuss problems, they started making lists of demands, not problems. To give an example, the JTAs showed a list of problems identified by farmers from a VDC in response to the question, "What problems do you experience in increasing

production and income from your vegetable and fruit cultivation?" Farmers' priority problems were as follows:

Lack or insufficiency of irrigation facilities.

Lack of good improved crop and vegetable seeds.

Lack of proper market facilities for fruits and vegetables.

Lack of facilities for soil tests of individual plots.

Insufficiency of technical services and training.

Difficulties in getting institutional credit easily and in time.

Unavailability of chemical fertilizers and insecticides in time and high increases in their prices.

Unavailability of sprayers and dusters.

The buying price of milk by the Dairy Development Corporation (DDC) is less than the production costs of milk.

Lack of drinking water facilities for farm animals.

Lack of free pasture lands to take animals out.

High price of feeds and fodders for farm animals.

Lack of technical know how on livestock farming.

Veterinarians charge high fees on private calls.

No one trained in the village in treatment of livestock diseases.

For the ADO, PC/S was a problem and a time consuming activity because farmers' problems were not easy to tackle. The following provides examples of how problems are solved in the district.

Problem : Soil tests of individual plots

Solution: As frequent soil testing of each individual plot is not essential, we will provide information to the group about the results of the soil test which the office had conducted previously. However, we need to compile those past records.

Problem : The DDC offers low prices for the milk it purchases

Solution: We talked about your problem with the DDC office in Tanahu district. They said that the DDC cannot increase the price. Hence, if you are able to get better prices elsewhere, organize yourselves and sell to them. The office has no objection.

Problem : Problems related to feeds and fodders for the animals

Solution: Our office would encourage establishment of local nurseries in the private sector and assist in the sale and distribution of the plants among farmers. Included were seasonal fodder such as Berseem, Oats, Teosente, Jowar and Bajra in the cropping system.

Problem : Lack of technical support for livestock development.

Solution: It is cost-effective for the office to provide jointly all necessary services to the groups on all aspects of farming (crops, horticulture and livestock), instead of extension agents from various disciplines serving different groups separately. Hence, we have integrated the various services in the best interest of the majority of farmers with our limited manpower resources in the office.

Problem : Increase irrigation facilities

Solution: Sorry, according to the District Irrigation Office, it has neither the budget nor the manpower for undertaking a feasibility survey. They are already occupied with other projects. Despite this, we will make every possible effort to help you in this regard.

In addition to the problems and corresponding solutions mentioned above, the ADO recalled a problem he faced with a farmers' group recently. Farmers made a demand for the Arun-2 variety of maize seeds. When the office requested the seeds from the Agricultural Inputs Corporation, the corporation replied that it could not meet the request due to a shortage of seeds. The seeds were also not available from the National Maize Improvement Program of the NARC. But farmers were not ready to accept any other varieties except Arun-2. As a result of increased farmers' pressures, the DADO approached the Minister of Agriculture who responded immediately to the situation and instructed the NARC to provided seeds from anywhere and report to him. The seeds reached the district. Fortunately, the Minister belonged to the district. When the ADO was asked how he would face the situation should he come under such pressure from all the VDCs in the district, with more than 500 farmers' groups, he could not reply. Many other unanswered questions remain:

Would a Minister always respond quickly like this?
Can the NARC or any other agencies fulfil a Minister's order like this?
Is it practical and possible for a Minister to respond like this?

The above discussions reveal that the problems are superficially tackled and that their interrelationships have not been dealt with. For example, farmers' concerns about soil tests do not mean that they want to analyze past reports. They were trying to communicate to extensionists that there are soil problems.

Although the PC/S process had been in use for more than a year, the SMSs had not yet visited the VDCs and apparently were unaware of the process and its consequences. They saw no reason to visit the VDC, as a full fledged external consultant was specifically employed by the project for this purpose.

During the meeting, the consultant frankly expressed his dissatisfaction over the implementation of the process in the district. He felt that the office used him as if he were a staff member to implement the PC/S program. For the office, PC/S was seen as an end, not as the process it is meant to be. In this connection, when asked to explain the issue, he recalled an event in the past when he and the JTA had to contribute to the cost of organizing a training course for the farm women from their own personal-funds.

Realizing how different actors responded differently to a new situation, the team proceeded to Bhanu VDC to make first hand observations of farmers' reactions on the PC/S process.

11.3.2 History repeated

The Agricultural Service Centre located at Bhanu VDC is responsible for implementing agricultural development programs at two VDCs, Bhanu and Barbhanjyang. The office record showed that the ASC has formed 15 farmers' groups as follows:

Barbhanjyang	3 groups (Contact farmer group approach)
Bhanu (Wards 2,3,4)	9 groups (PC/S process)
Bhanu (Remaining wards)	3 groups (Contact farmer group approach)

In the office, we were told that three farmers' groups were formed in each of Wards 2, 3 and 4 of Bhanu VDC following a PC/S exercise. Three groups each were to represent small, medium and large farmers. This meant that there would be nine groups in total.

It was a surprise to us that even in the PC/S area only eighth groups had been formed, in contradiction to the office report, just as had been found earlier in the contact farmer group approach. When asked for the reason, the consultant and the JTA both answered that they had asked Pashupati Dhakal to form a group. They nominated him as the leader of the group as he was active and expressed his willingness to work as the leader. He had time for extension work. So they visited him frequently. However, they eventually found

that the farmers did not accept him. This was, obviously, unknown to office or remained unnoticed in the file.

When we met Mr. Pashupati Dhakal, he had a different story. According to him, he had not wanted to be the leader. He asked the JTA several times to take his name off of the list, as he had been unsuccessful with both the farmers and the JTA. Farmers would not form a group except if they were certain beforehand of forthcoming support from the office. To farmers, PC/S was a new World Bank development project. As well, he thought that many farmers did not to be in his group or be led by him, because his political preference did not correspond with that of many other farmers in the area.

The other interesting finding of the team was that the farmers neither understood the meaning of small, medium and large, nor did they know which group they belonged to. They did not really know how they were characterized into such types. According to field staff, land holding size was the basis of classification. However, when farmers were asked the land holding size, this sort of classification appeared to be flawed.

The above discussions indicated that farmers' understanding of the PC/S process was not impressive. The farmers were not internally motivated to form groups and the groups were not self-initiated, free standing or autonomous. The result was the decreasing participation of group leaders in the monthly meetings organized at the agricultural service centre as shown below.

First month-	100% (14 out of 14)
Second month-	85.2%
Third month-	78.1%
Fourth month-	78.1%
Fifth month-	50%
Eighth month-	50%

During one of the regular monthly meetings of farmers' leaders, when we asked if they held farmers' meetings in the village or ward on a fixed date and time as envisaged by the project, they frankly said that they do so provided that the JTA or consultant comes to the village. This means that farmers do not meet when the JTA or the consultant does not come to the village. The farmers particularly wanted to know the nature of forthcoming World Bank support coming along with the PC/S project. Many asked what this 'PC/S' process was. This implies that farmers viewed PC/S as a development project or an end in itself.

It was also known that the JTA kept records of the meetings. Whatever was decided or discussed by the farmers remained in the files of the JTA, and was perhaps forgotten following his transfer to other places. This indicated that farmers were coming to the meetings not because they felt them necessary, but because they were looking to the future and wanted to be sure that they would have a share in the new project. This raised several questions: Have the field extension staff understood the new roles and behaviours expected from them by the PC/S process? Have they unlearnt previous roles and behaviours, which they had acquired earlier as a result of working with the top-down

approaches such as the T&V system for many years? Are they taught to use the approach? Did the extension organization facilitate the development of a platform necessary for using such a bottom-up approach? Finding answers to these questions is difficult. However, the following dialogue between a farmer and a JTA, which occurred in my presence in a group meeting, provides some answers to these questions.

During a meeting, an influential farmer asked a field extension worker to provide him with 25 kg of the Arun-2 variety of maize seed and the latter responded that he will relay this to his supervisor in the office. However, immediately, the farmer countered him asking why he was there to ask them to prioritize the problems, if he could not provide even just a 25 kg bag of seed. He would be better off not coming to the village next time. They debated hotly for a while until finally, the JTA showed his muscles by saying that he would not come to the village next time if he failed to deliver the seeds. Some seemed to be enjoying the debate. Some were sympathetic to the extension worker, some seemed against him, and some slipped away as they had no time to listen to such a fruitless debate. Interestingly, after the debate was over, the extension worker seemed very unruffled. He said, "Oh, never mind! This is what often happens. As Ram (fictious name) wanted to show his bossism, so did I".

As illustrated above, asking farmers to list their needs, problems and priorities in the village during a meeting organized by extension only provided an opportunity to a few farmers (indeed, rich, resourceful, male and vocal) to fulfil their interests and needs at the cost of the resource-poor and the farm women, who are not likely to take part in such meetings or speak confidently even if some do participate. This was what I, personally, felt and observed on two occasions.

- First, I realized this while I was asking farmers to present their views on the present state of agriculture and prioritize their problems and needs.

- The second time, my view was supported when I participated in the above mentioned meeting organized by extension field staff in a village to identify farmers' problems and needs.

In addition to the above, there are two other problems associated with this practice of asking farmers to list problems and prioritize them.

- First, it prevents local people and other relevant actors, development workers included, from viewing problem situations in management and utilization of natural resources through a system perspective, as it avoids the need for finding inter-relationships or interconnections among the problems. This implies that problems exist independently of each other and that they could be tackled one by one, on a priority basis. This process generally brings out problems which are visible from outside such as landslides and irrigation, but not the causes which might themselves be problems.

- Secondly and more importantly, the process places extension in a very difficult position. It makes extension commit people to providing those things to which it does not have direct access such as providing irrigation facility and increasing the farm gate price of milk.

When JTAs were asked whether it would be possible for them to attend farmers' meetings in the event that 10 groups were formed in a VDC at the rate of at least one group per ward as prescribed under the PC/S process, they said frankly that it would not be possible.

11.4 Coordination and linkages

Agricultural extension is one of the components of agricultural system. It is unlikely to be able to sustain a useful function unless it is supported by an effective technology generation/adaptation institutional capacity. Nor can we hope to achieve desirable changes from extension if other ingredients for change are more limiting, as for example access to resources, inputs, markets or credit (Röling 1988). Using the PC/S process requires better coordination and linkages not only among line agencies (e.g. Agricultural Development Bank, AIC, Cooperatives) but also with other governmental organizations such as District Development Committee.

In light of this, an attempt was made to assess the effectiveness of the existing coordination committees in achieving coordination at the district level. This was necessary because the respective agencies looked at the problems in isolation and not in totality.

Role of formal coordination committees

In all the study districts, the committees were formed duly as required by the MOA. However, they played either only a secondary role, or had no role at all. Most of the respondents (local development officers, agricultural development officers and other line agencies' officers which include the ADB/N, AIC, Cooperative Societies) were not content with the performance of the committees. According to them, either meetings were rarely organized, or participation in the meetings was very poor. The Chairman of the committee (Ex-officio chairman of the District Cooperative Organization) had either no time, or he did not fully cooperate. Some respondents claimed that the chairmen did not understand his role.

In this regard, the responses from the chairpersons were as follows:

- The Ministry of Agriculture has circulated only the policy paper with duties minus rights;

- Agricultural officers avoid coordination and consultation;

- If even an agricultural development officer who is the coordinator and the member-secretary of the committee cannot influence the concerned line agencies, how can the chairman, who has no legal authority, make any difference? and

- The Ministry of Agriculture and central level departments and corporations send contradictory orders to district offices, making coordination at the district level offices difficult. Besides, they have no way to verify the what were the information and orders they have received from their respective departments.

On the other hand, the following were the responses of the agricultural development officers:

- The chairman does not appreciate technical issues in general and is inclined to take programs always to his own area; and

- The chairman has no interest to coordinate.

When the issue of coordination was raised with the local development officer who is entrusted by the Decentralization Act to coordinate the total development process in the district, their responses were as follows:

- Attempts were made by sectoral officers (agriculture, livestock, agricultural bank, inputs corporation) to bypass him due to their political connections and relationships with the Minister or central level leaders in the district;

- Undermining of the role of local development officer by other ministries and central level departments;

- Disruption in continuity in work and meetings due to frequent transfers of various line agency personnel;

- Interference by line ministry officials (e.g. agriculture and forestry) and their reluctance to delegate their power to the local development officer; and

- Line agency officers are more senior to him in administrative rank and also more educated.

In short, the findings suggested that the line agencies seldom synchronize their programs and activities with each other. The above responses imply that part of the problems of inter-institutional coordination and linkages lie with the personal characteristics (traits) of the officials concerned, and part of the problem stems from the next level above them, evolved as a result of the prevailing socio-economic, political and bureaucratic system of the country. The following example will make this conclusion clear.

Although the National Agricultural Research Council (NARC) is autonomous, it is required to work through the Ministry of Agriculture. The Secretary of the Ministry of

Agriculture is also a member of its Board. However, he appeared powerless when the NARC decided to discontinue the bi-monthly and semi-annual research and extension workshops initiated in the 1980s for no valid reason, without consulting the Department of Agriculture Development (extension). The Department wanted to continue them because they had provided at least some mechanisms ensuring research-extension linkages, even though the performance of such workshops was not impressive.

11.5 Summary and conclusions

Although PC/S is an excellent means for establishing specific interest-based groups within each village for the purpose of helping them become better learners and problem solving groups, this case study illustrated how the process turned into an end in itself. Not only it was taken differently by different people at different levels to suit their own interests and concerns, but also the intervention process failed to identify and support essential innovations for sustainable agriculture or to correct existing shortcomings and weaknesses of the present system. Rather, the system began to malfunction with mis-reporting. There was deficiency in the process whereby intervening agencies (in this case AEP and consultants), intervened parties (JT/JTA, SMSs, ADOs) and other actors (farmers, the ADB/N, research organizations, the irrigation office, the DDC and the AIC) could bring in expertise and analytical capacity to facilitate mutual learning, joint action, negotiation, accommodation, consensus building and so on. The system has more or less come to a standstill. This indicates both mismatch among various components of the knowledge system, and the development effort slipping comfortably back to TOT.

The primary reason that could be given for the above situation is that extension- an element of the knowledge system was made to change its course of actions without making necessary changes in other relevant elements of the knowledge system, particularly in the institutional aspects. Obviously, this is likely to make the extension system further susceptible to other disorders and pathological conditions. As Röling (1982) remarked, in a system, if a subsystem is not changed, adjusted or adapted simultaneously along with changes within other subsystems, then it is very likely that some pathological conditions or disorders will develop in the system, and the whole well-intentioned effort can collapse as the unchanged elements begin to cause bottlenecks. This means that if extension is to move successfully from a production concern to a sustainability concern, it is important to consider changes in all relevant aspects such as extension methods and approaches, organizational structures, content and scope, approaches to targeting, training of extension staff and farmers, and so forth.

PART IV

DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

CHAPTER 12

INSIDE INTERVENTION: DISCUSSIONS AND CONCLUSIONS

While the last four chapters sequentially discussed four different concrete development efforts, namely agroforestry, permaculture, community forestry and agricultural extension, this analytical chapter focuses on the factors associated with the effects of those efforts. The presentation is divided into three sections as follows. The first section integrates the piecemeal evidence which emerged from the cases discussed earlier. The second attempts to tie together the findings in order to understand the factors associated with the effects of those efforts. The third presents my view with respect to intervention, based on the lessons from the cases, other concrete experiences and theoretical insights. My intention is to contribute to a better understanding and designing of intervention process (keeping in mind the concerns of sustainable agriculture).

12.1 Beyond innovation: conclusions from the four cases

Drawing together the threads of evidence from the cases (chapter 8 to 11), this section argues that unless calibrated adequately and appropriately with other elements of the knowledge systems, innovation cannot realize its full potential. The findings, thus, agree with Cernea (1994), who argues that if social variables remain unaddressed or mishandled, then a Project[1] will be unsustainable and fail, no matter which governmental or non-governmental agency promotes it. Competent social analysis and creative social engineering are therefore crucial. This section first integrates the findings from the cases and then draws some initial conclusions. The cases have provided profound understanding of concrete development efforts that seek to introduce sustainable agriculture and the factors associated with the effect of those efforts.

As stated earlier, I have used the knowledge system perspective as a diagnostic framework to analyze the cases. This required me to find the conditions which would facilitate emergence of synergy in the system. In this research, synergy is not taken as an inherent property of the knowledge system, but as a property which requires functional differentiation between roles, and integration of different roles through adequate linkages. The integration means that the different actors play complementary roles through appropriate linkage mechanisms that allow interchange of information between them. Synergy is what makes the whole more than the sum of parts (Bonnen 1987, Röling 1989).

12.1.1 Understanding development efforts

Conventional wisdom suggests that people are not likely to spend their resources and energy on those things, events, or subjects which they do not value much or if these are not likely to make a difference for them. Hence, understanding farmers' viewpoints with

respect to Project activities, especially innovations, which are intended to support the people in the area and improve the problem situation, is crucial. In view of this, my inquiry started by examining farmers' perspectives on the technologies currently promoted by the Projects.

On technologies

The findings indicated that farmers had reservations about the functioning of community forestry, and that they had yet to own community forests, as was envisaged by the Project. And, marked differences were observed in agroforestry, permaculture and agricultural extension. The following describes how the majority of farmers in my research sites had second thoughts or different opinions with respect to technologies.

Agroforestry

The farmers' present practice of growing trees only in terrace risers and making efforts to avoid shading crops implies that they are not prepared to replace food crops with fodder trees. The first priority for the farmers was food for themselves, not fodder for animals. Farmers' negative attitudes towards coppicing and polarding reveal that farmers want to maximize fodder production per tree, rather than maximize fodder production per unit area as the Project intended. While making management decisions on what to plant, where to plant and how to lop trees, farmers need to consider not only their own goats but also neighbors' goats, and prevailing social customs such as letting animals free for grazing during crop fallow periods. In addition, farmers differed in their preferences for fodder trees, in particular exotic species such as ipil-ipil.

Permaculture

Designing farms along permaculture principles has not taken hold in the study area. Crucial aspects of permaculture such as enhancing biodiversity, promoting integrated farming and recycling of energy and nutrients seemed lost somewhere, even though the farmers have experienced problems in declining crop yields, declined soil fertility, and increased pest infestations. As permaculture demands a totally different system of farming and requires farmers to take all or nothing, farmers (a) do not know how to go about it, (b) think it requires more resources (e.g. labor) than they have got, and (c) have not been provided with a *path* to get from their present situation to permaculture. Part of the problem lies in the lack of coordination and understanding among different village-based agriculture related organizations. However, the findings indicate that the reasons lie not as much in information, training, community organizing and policy advocacy, as with the present system of agriculture which has gotten people used to high input agriculture. The latter is served by a host of projects and institutions. The findings indicate inadequacy of the institutional configurations to support the innovation.

Community forestry

Despite receiving highest priority and heavy investments the performance of the community forestry program in Nepal over the last 14 years is bleak in terms of both handing

over forests to user groups and inculcating an ownership feeling for the forests among the rural people. Nepal's community forestry program is trapped as an end in itself and despite changes in policy, and efforts to switch to an empowerment approach, community forestry has not taken off as institutional configurations are not adequately adapted to suit the innovation.

Agricultural extension

The findings indicate that introducing the PC/S process in extension has not resulted in improved functioning of extension. Not only was the process introduced without adequate understanding, discussion and debate, but also other essential components were not adjusted, adapted or changed accordingly. As a result, the process appeared to be serving the needs of a few resource-rich farmers. The responses from village-based extension workers to this process was not encouraging.

In sum, each of the cases revealed a wide gap between intervening agencies and intervened parties in terms of perceptions of technologies through which the former aimed to support the latter, and improve the problem situation. This suggests that the usefulness of Project activities has not become apparent to those people at whom they were directed.

Either the state, the farmers or the Project, or the Project failed to realize the worth of Project activities to farmers.

On problem situations

The findings indicated that the Projects view the problem situations in the villages through their own lens of sectoral viewpoints. Joint assessment of problem situations in the area together with the farmers and other development projects operating in any localities or within the boundaries of the Village Development Committee was not standard practice. For example, NAF holds that new science and technologies in agroforestry must be applied to farmer oriented agroforestry. It perceives the problem in the area as a result of the increased number of humans and livestock over the carrying capacity of the land. However, it neither questions the meaning of natural resource degradation or what that means for different actors and stakeholders. The concern of community forestry arises only when the local people, or the NGOs on their behalf, approach the District Forest Office to request establishing the community forest over a part of government owned national forests and to use them accordingly. The Project's concerns are the condition of the forest, existing types or varieties of trees, identification of the users of the forests and potential conflicts over the use of the forests.

Interestingly, agricultural extension made an effort to replace the "T&V" approach through the problem census/problem solving process. For this, farmers are asked to list their problems and prioritize them, as if problems exist independent of each other and can be tackled individually. The involvement of research and other development agencies and actors operating in the area in such an exercise is not thought necessary, or the other agencies do not participate as they are busy with their own work. It also implies that extension is capable of solving all the problems farmers have.

The effects of the above efforts in practice will be discussed later on. However, the findings indicate that problems are not only location specific; improving natural resources also appeared problematic, not because the problems are not visible, but because all involved actors view problems differently through their own personal lenses. For example, we can take the case of Amaduwa where different farmers have different viewpoints with respect to the problem situation , according to the area suggested for intervention. In this village, ASC and the Irrigation Project intend to promote modern varieties and chemical agriculture. The PCD farm views the problem situation in Amaduwa differently and discourages farmers from using chemicals. On the other hand, farmers feel that shortage of water, increased costs of fertilizer and declining crop yields as major problems. The unavailability of necessary fertilizer, seeds and pesticides when needed were also other problems. Farmers were confused about whom to listen to and where to go.

On inter-institutional linkages and coordination

The findings of this research indicate poor institutional linkages and coordination among GOs and NGOs; GOs and GOs; and GOs, NGOs and village institutions such as the village development committees. It appears that the institutional linkages among GOs and NGOs are relatively better at policy level, than at field level. This finding appears contradictory to many other findings that usually report that GOs and NGOs have very little coordination at the policy making level, but sometimes impressive coordination at field level depending on the personal relationships between officials. Of course, we cannot deny the importance of personal relationships in maintaining coordination and linkages, but it is likely that these end following the departure of the officials. This mobility of officials in Nepal among GOs is sometimes so high that building personal relationships becomes very difficult. In my view, personal relationships mean negotiation between two parties for non-interference with each other. Hence, it does also not necessarily entail that it will facilitate coordination in activities, or cooperation for solving a common problem.

Although the need for institutional coordination and linkages are thoroughly realized by all actors, from the village to district and to the central levels, this was not found in practice[2].

If institutional linkages between GOs and NGOs appeared better at policy making level, these seemed almost non-existent at the field level. The findings indicate that some government staff see NGOs as competitors. To them, NGOs' activities are temporary, donor-driven and contradictory to the government's. According to some government field staff, coordination with NGOs is very difficult because they concentrate on a small geographical area, bringing huge resources in terms of staff, financial and physical facilities. In addition, they argued that sustainability of NGOs' activities is difficult. After their term is up, neither the government nor the local communities will be able to provide continuity. In a similar fashion, NGO staff appeared critical of government staff. They said that government staff are paid whether they really work or not. Efficiency, effectiveness and responsibility[3] are not their culture. Since they do not like to work, according to NGO staff, they always find reasons not to coordinate.

In spite of the various committees formed to bring about coordination among GOs, the findings indicate that the coordination seemed almost non-existent among GOs and GOs from the policy making to the field level.

At the field level, when asked the reasons for poor coordination, each agency blamed the other for poor coordination. The question is: Why was organizing coordination such a difficult task when, in most of the situations, the actors understood the mutual interdependencies and the need for the other agencies? The agricultural extension case indicated that, in Nepal, even the law (Decentralization Act, 1982 and 1992) failed to bring about coordination among relevant actors. Several committees were formed from the central to the field level to ensure inter-institutional coordination among agriculture related agencies, but it seemed that they existed only on paper.

The findings indicate that part of problem of inter-institutional coordination and linkages lies with the personal characteristics of the officials concerned, and part of the problem stems from the level beyond them, a result of the prevailing socio-economic, political and bureaucratic system of the country.

However, as coordination is not a disembodied function, it will not magically resolve conflicts and improve efficiency. Chambers (1973:27) stressed many years ago:

> *"Coordination is liable to mean meetings, staff sitting through discussions which do not concern them, and in its more pathological forms listening to speeches, failing to make decisions, hiding from responsibility for inactivity behind a group consensus, and agreeing on technically poor programs".*

Not only does coordination involve costs, but also genuine coordination might subject real world activities to delays, changed scheduling, reduced funding, modified design, and diverted equipment. And, the other danger lies in the fact that when agricultural units regularly assist other departments they begin to expect support in return. Furthermore, this pattern of reciprocity diverts these units from attention to their own longer term aims and objectives (Moris 1981).

Central to above discussions is the suggestion that inter-institutional coordination is necessary but not without problems, dangers and cost. As Mintburg (1983) noted, "Every organized human activity- from making pots to the placing of a man on the moon gives rise to two fundamental and opposing requirements: the division of labor into various tasks to be performed, and the coordination of these tasks to accomplish the activity". But any activity which involves human beings, who are intentional and sense-making beings, is a complex activity.

12.1.2 Some initial conclusions

At this moment, the above discussions and findings presented in the cases permit me to make a number of conclusions which will form the basis for examining the factors associated with the effects of those efforts. Although projects differed in terms of

approach, method, clientele and innovation, there were several common issues which could be identified in them. This section enumerates them briefly.

- Smooth cooperation among component organizations or actors, one of the crucial factors contributing to synergy, seemed lacking in all the cases.

- The role of intervening actors such as the VDC was not recognized in any of the cases. As a result, case studies point to lack of coordination and integration of activities at the field level among village based development institutions (GOs, NGOs and local political institutions.

- Neither the problem situations of natural resource management units nor their improvement, in general, were viewed through a systems perspective by any of the parties and actors, whether intervened, intervening or intermediary.

- The Projects seemed to be functioning on their own with a sharp sectoral focus, even though they recognized the value of mutual interdependencies.

- Although farmers and rural communities are considered to be the source of knowledge and innovation, the findings indicate that the Projects, in general, treat farmers as passive receivers and promote technologies deemed desirable by them.

- There is a mismatch between various components of the knowledge system, especially the elements of the intervention process in all three cases. For example, adopting permaculture practices requires not only collective action by farmers at the community level and above, but initial support from the government in terms of price subsidies and other incentives are also necessary. Not only were these things missing, but the Project had not realized the value of the support of other institutional actors operating in the area. The Project discouraged farmers from using chemicals but failed to reckon with the impact likely, when neighboring farmers sprayed chemicals. The same can be said of the community forestry and agroforestry cases. Neither the nature of the technology nor the problem situation in the community was properly assessed in any of the projects. Hence, adjusting and adapting all the relevant elements of the knowledge system consistent with the imperatives of the innovation seemed remote in the cases.

Thus, all the cases collectively suggest on the one hand that technology, regardless of its merits, is not a sufficient condition for achieving the purposes of sustainable agriculture. Some deliberate action from external sources is necessary. On the other hand, the findings indicate that intervention (a brutal word!, following Röling and de Zeeuw 1983) is problematic in practice, not merely problematic in concept.

The above were the effects of the development efforts that sought to introduce sustainable agriculture in Nepal. The next section looks at the factors associated with the effect of such efforts.

12.2 Associated factors

Isolating the reasons for an observed effect or outcome is not possible as there are always multiple causes for a single problem. Nevertheless, many factors could be traced to the effects of those development efforts. The following seemed particularly important.

12.2.1 Valuing farmers' needs and priorities

Interestingly, in all the cases, the findings showed that the Projects projected themselves as giving considerable attention to farmers' needs and priorities. At least, they put themselves second to their clientele. This, indeed, illustrates the changed thinking and attitudes on the part of the intervening agencies.

However, the field study revealed a different story. There were marked differences between the Projects and the farmers. The Projects had very little knowledge of farmers' complex, dynamic and multiple objectives, notwithstanding the findings of Oerlemans and Steins (1993) that farmers have different intentions and sense-making activities according to their socio-economic priorities and/or caste. Different farmers respond differently to the same circumstances.

As a result, the findings indicated that Projects under my investigation have failed to understand how farmers make decisions with respect to adoption of technologies. Not only did the permaculture and agroforestry Projects fall into this 'category', but this also applied to the agricultural extension Project which was manifestly attempting to use a problem census/problem solving approach to agricultural extension.

The foregoing discussions suggested that it is unfair to blame researchers when they become out of touch with farmers' problems, whereas it is indeed so for development Projects, which are supposed not only to be more close to farmers, but also expected to influence researchers to become more responsive to farmers' needs, problems, and potentials. Thus, the problem is further aggravated when, the development Projects are in fact unaware of farmers' multiple objectives, but they become convinced that they are giving due priority to farmers' problems and needs. Interestingly, in a recent study Thapa (1994) had similar findings. He argued that the fodder tree selection criteria used by the Pakhribas Agricultural Centre and other development-oriented research organizations involved in the promotion of tree planting on private farmland in Nepal have not been explicit and may not, therefore, have been relevant to farmers' concern.

The above suggests that unless deliberate actions or serious efforts are made to put farmers first both in theory and in practice, it is very likely that the idea might remain either abstract or on paper. This requires the need to link theory and practice. While enquiring into the nature of intervention- particularly intervention by the bilateral donor organization- Röling and de Zeeuw (1983) had similar experiences, which prompted them to state that *reaching the poor and powerless through the powerful is a difficult task.*

In my view, the most crucial reason for the above situation is provided by Gills (1992a)[4] who stated that, in Nepal, researchers and development practitioners have not yet paid adequate attention while incorporating knowledge, technologies and institutions into indigenous rural systems. And the processes that generate these systems have hardly even begun to be studied here. In this context, Chambers' characterization (1993) of the normal professionalism and the new professionalism seems illuminating. In short, the above findings suggest that the call for "putting people first" in policies and investment programs for inducing development is a serious call which requires deliberate effort to recognize the centrality of the social actors both in ideas and in the action, or practice.

12.2.2 Means-ends confusion

Of the several factors responsible for the present state of affairs, means-ends confusion seemed particularly important. Although the community forestry case is a classic case of means-ends confusion, my study showed that it applies to all Projects. The Ministry of Forests is usually blamed for seeing community forestry as an end in itself because it evaluated the Project in terms of indicators such as number of user groups formed, hectarage of forest lands handed over to local people, number of tree seedlings produced, number of community nurseries established and area covered by new plantations. But, it would not be fair to blame only the Ministry of Forest. Mens end confusion applied equally to the agroforestry, permaculture and agricultural extension Projects. Indeed, it was dismaying to find that a process such as the problem census/problem solving approach of agricultural extension was viewed as "the World Bank's new Project" not only by farmers but also staff working for it. The Ministry of Agriculture never questioned critically the meaning and objective of the PC/S approach or what it wanted to achieve or for what purposes. Taking the role of a forwarding agency the MOA forwarded the process to the district offices without making necessary adjustments and changes in other components of the system. There was no debate or discussion on how to implement the process, or what its likely effects would be in the field. The consultants were simply moved to the field. The ministry did not even assess the potential conflicts between the roles and relationships of the consultant and the field staff. As a result, the consultant found himself working as a JTA, and the JTA observed and followed him what without daring to ask the purpose of such a process. The SMSs working in the district had no time to review how it worked in the field.

Likewise, the agroforestry Project aimed to establish demonstration farms and home nurseries. The Project assesses its performance through indicators such as the number of farmers trained in agroforestry, number of nurseries established and number and types of fodder trees planted. Likewise, the concern of permaculture was limited to the number of farmers receiving training and number of model farms (small, medium and the large) established. This indicates that the emphasis was on the outcomes of innovation as product, rather than on process.

Had the Project first dared to critically question the meaning of "Project" prior to implementing any activities, perhaps, there would not have been so much means-ends confusion. Engel (1995: 25) captures the implications of this when he states: "In complex

innovation theatres something like the 'best means to an end' does not exist. Always, many possible and acceptable ends compete in the perception of those eventually involved in judging the means".

12.2.3 Inadequate communication structure

While it is now widely recognized that sustainable management of natural resources cuts across the boundaries of many disciplines and levels of aggregation, findings from the cases suggest all development related actors functioned as *aggregates*, collections of people who are in the same place at the same time but share no definite connections with each other.

Of the several flaws identified in this research, communication gaps among various organizations on the one hand, and between farmers and these organizations on the other hand were striking. The importance of communication is apparent if one considers that human ideas, experiences, and intentions are not objective things like molecules and atoms. They can be changed through language, which is the principal vehicle for social communication. Communication is an essential form of human behavior that links individual people to their environment and, consequently, a crucial component of development because it links all other elements of the development process. Through communication it is possible to create a situation within which a more equitable sharing of information is possible. Thus, it has a crucial role in the intervention process. Effective communication needs an adequate communication structure that allows people to participate with others at equal footing in the decision making process.

The findings indicated a lack of effective interaction and communication among the Ministries of Agriculture, Water Resources, and Forest and Soil Conservation in their respective extension, research and training activities, and within departments or agencies. The meaningful patterns or mechanisms for interaction or cooperation were missing or weak in all the cases. The findings also revealed that the Projects paid very little attention to the prerequisite of an adequate communication structure that would enable the local people to participate in the development process and facilitate them in idea generation, decision making, implementation and evaluation of the development process. An inadequate communication structure appeared to be one of the chief causes of coordination problems and discrepancies between expectations of the people on the one hand and other development actors and development processes on the other.

Hence, on the one hand the problem arises: how can we bring a heterogenous group of actors, such as academics, agricultural extension agents and farmers to consensus, agreement and accommodation when there exist little or no interaction between them? On the other hand, the questions arise: why do they communicate? What's in it for them to communicate?

As discussed earlier, not only does communication cost money, but also it is intrinsically related to power (Giddens 1979). The communication of meaning in interaction does not arise separate from power relations, or outside the context of normative sanctions. Giddens claims, "All social actors know a great deal about the conditions and

consequences of what they do in their day-to-day lives, and yet at the same time there is a great deal which they do not know about the conditions and consequences of their activities, but which nonetheless influence their course".

12.2.4 The Project's project

As the farmer, a social actor, is said to have agency, or projects, so do the Projects themselves. To explain what I mean by "agency", I introduce here an example given by Giddens (1984). This is about the "spilled coffee", which describes how an individual, A, made the Individual, B spill the coffee. The story goes as follows (Giddens 1984: 9-10).

> Supposing an individual, A, were a malicious spirit and played a practical joke by placing the cup on a saucer at such an angle that, when picked up, it would be very likely to spill. Individual B picks up the coffee, and it duly spills over. It would be right to say that A brought the incident about, or at least contributed to its coming about. But A did not spill the coffee; B did. Individual B, who did not intend to spill the coffee, spilled the coffee; individual A, who did intend that the coffee should be spilled, did not spill it.

In the above example, individual A's act is intentional in that he knew or believed that his activity (placing the cup on a saucer...) would have a particular outcome. Instead of behaving in that way, individual A could have behaved differently, and not to make individual B to spill the coffee. That is, whatever happened would not have happened if that individual had not intervened. In short, individual A made individual B to spill the coffee through his 'agency'. With this example, Giddens defined 'agency' not in terms of the intentions people have in doing things but of their capability of doing those things in the first place (which is why agency implies power: cf. the Oxford English Dictionary definition of an agent, as "one who exerts power or produces an effect"). Agency concerns the events of which an individual is the perpetrator, in the sense that the individual could, at any phase in a given sequence of conduct, have acted differently. The sense of "could have done otherwise" is obviously a difficult and complex one.

Furthermore, pointing to the logical connection between action and power, Giddens says that to be able to "act otherwise" means being able to intervene in the world, or to refrain from such intervention, with the effect of influencing a specific process or state of affairs. This presumes that to be an agent is to be able to deploy (in the flow of daily life) a range of causal powers, including that of those deployed by others. In short, human agency is characterized in terms of individual people initiating change in purposeful ways, causing outcomes, by manipulating the circumstances of those outcomes, by producing certain kinds of 'closure.'

My purpose in bringing up the issue of agency is that in many studies, particularly based in an actor-oriented perspective, farmers and other actors are shown using agencies in order to pursue their private or personal projects. However, the findings from the cases in my research show that the Projects also consist of agencies or projects within them. The point to consider here is that a Project is an organization which consists of people.

For example, NAF works with and through the SSS not only because it believes that working with and through local organizations is likely to sustain its efforts, and farmers are likely to benefit, but because the SSS chairman is an influential local leader in the area, and an associate of the BBP and World Neighbors. World Neighbors was the donor of NAF and the SSS. The SSS chairman was later elected as the chairman of the VDC in a last local election. Had NAF attempted to work without the support of the SSS, it was likely to encounter many problems and also face resistance in the field. And by bringing up the story of the drinking water system, I had earlier introduced the 'project' of the SSS.

Likewise, INSAN and community forestry had their own projects. Community forestry happened to be a past project of the Panchayat leaders. In Manekapur, people remembered that the District Forest Office did not approve of the community forestry Project in their village, as the then-Pradhan Pancha regularly got the least votes from this area. The Pradhan Pancha believed that they had a political orientation different from the "panchayat".

The case of the World Bank-funded Agricultural Extension Project is clear. It needs to use the Problem Census/ Problem Solving extension approach, if it wishes to continue receiving the Bank's support for the third term, to start in July 1995. While the approach was tested for the first time in a few wards each of two VDCs in three districts through highly paid local consultants, the Bank found it excellent, even without assessing how it had worked in the field. It wrote (World Bank 1994: 5):

> *"The problem census and problem solving (PC/PS) method that is now being tested in Morang, Chitwan, and Tanahu districts is proven to be an excellent means for promoting participatory program planning..."*

However, a draft proposal on the national agricultural extension strategy, prepared following a National Agricultural Extension Workshop held in Kathmandu on 23-25 February 1994, failed to recognize the gravity of the PC/S approach. As a result, the proposal was rejected without bringing it into adequate discussion and debate. And, a new task force was formed to draft the national agricultural extension strategy for the second time.

This finding suggests that it would be a gross mistake if Long and van der Ploeg's (1989) views are overlooked: that Projects are "battles over perceived goals, competencies, resource allocation and institutional boundaries" in which the "stakeholders" participate with the objective to get material and/or immaterial gains at the lowest costs.

12.2.5 Coming out from the grips of the TOT process

An important finding of my study was that all Projects had fully recognized the short-comings and problems of the top down TOT process. They had made serious efforts to reverse the process.

However, as discussed earlier, the Projects had again truly failed to come out of the TOT grip. For example, the agroforestry Project[5] introduced farmer-to-farmer extension and training, but used it strategically only to promote technologies that it deemed desirable. Farmers' choices and knowledge hardly mattered to it. Likewise, in the permaculture case, the purpose of the training was to promote permaculture technologies. The Project visited a farmer only when he attended one of its training courses. Thus, training was used as a tool to transfer technologies deemed desirable by the Project. This clearly exemplifies an example of the TOT process: Training is organized strategically to strengthen Projects' own grips on the farmers in the area. Farmers are regarded as recipients of technology, advice, and information.

On the one hand, the above suggests a general lack of understanding of local processes of experimentation and innovation. On the other hand the question arises: Why did Projects often fail to come out of the grips of TOT, even though they disapprove of it. To Giddens (1984), this points to an unintended consequence of intentional[6] acts of human agents, the social actors. All social actors know a great deal about the conditions and consequences of what they do in their day-to-day lives (Giddens 1984: 281). Quite differently, Chambers (1993) views the problem in terms of normal professional training and values. He argues that current training and education have been so deeply embedded in TOT that they blind scientists and development practitioners from looking beyond TOT. Thus Chambers indicates shortcomings of the educational system. In my view, the shortcomings of the educational system are only part of the answer. The other is the mismatch among various components of the knowledge system, which made the Projects slip comfortably back to TOT.

If the above is only one side of a coin, the other side is the fact that whatever the efforts an intervening agency makes, to some they will still appear to be within the grips of TOT simply because of the participation of intervening agencies in the process. For example, Long and van der Ploeg (1989) argue that increased interest in learning about farmer knowledge and practices has been often trapped by the limitations which farmer first places upon itself. Taking this issue further, Villarreal (1992) claimed, "Farmer first strategies have often meagre results, ending up either in populist activities which attempt to implement the words of the peasants to the letter, or in manipulative endeavour which present themselves as if they are picking up the words of the farmers, but instead put the words of 'outsiders' into farmers' mouths".

Technical change has then a political economy dimension. As suggested by Gibbon (1994) much broader criteria are needed in the assessment and understanding of change in production and processing systems.

12.3 On intervention: my thoughts

The foregoing discussion is likely to create an image that development interventions have no positive effect on the poor, and foster the pessimistic view of the impossibility of sustainable development. Rather, my conclusion is precisely the opposite. This is not because, as Cernea (1994) said, no effective alternative to development Projects has

emerged so far and it is that likely to remain a basic means for translating policies into action programs, but because we have millions of other successful Projects which have either gone unnoticed, or are not much discussed. It is also a fact that people learn more effectively through discontinuities or from failure than from successes. Hence, the tendency of many people, in general, is to bring out the cases of unsuccessful Projects and events. This reminds me of a question put to the BBC by a listener. The question was, "Why does the BBC give only the news about wars, strikes, fights, murders and so forth?" The answer was, "It is because people want to hear and know about them"

Given this, it is interesting to note a recent experience in Machkos, Kenya. Tiffin and Mortimore (1994) have provided a non-mathematical case study and model from Kenya describing the way in which investments in technological change, and especially in land improvement, have enabled per capita rural income to grow substantially with improved environmental conservation, through the interactions of increased population density, improved information and market opportunities. They claim: Malthus controverted.

That aside, I move forward to provide two small examples from Nepal itself, which worked successfully. In giving these examples, my purpose is to argue for the need to reconstruct a theory of intervention; I will come to this later on. The first example comes from the Soil and Water Conservation Program of the Government of Nepal (Tulachan and Shrestha 1994), and the second I have taken from my own experience.

Soil conservation program at Pareni Sub-watershed area

The Pareni sub-watershed area includes parts of four VDCs, Hapur, Narayanpur, Manpur and Bijauri in the Dang District of midwestern Nepal. The program was started in 1987/88 with the establishment of a conservation nursery with active participation of the local people. Over a period of seven years, from 1987/88 to 1994/95, farmers in this sub-watershed area converted a completely abandoned, barren and degraded land of 2,551 hectares into productive agricultural and forestry land working together with the District Soil and Conservation Office. By this 636 households with a population of 4,517 have been directly benefitted. The program worked as follows:

- by first concentrating on about 16 hectares;
- then gradually expanding it to 650 hectares.
- Presently, this sub-watershed area includes cultivable land (947 hectares), forest land (755 hectares), grazing land (456 hectares) and other land (393 hectares), respectively.

The most important feature of this program is that the District Office does not make decisions by itself about the program. The soil conservation user's group is to decide for itself concerning problems. The role of the district office is to make the problems visible and provide technical supervision, as sought by the local people.

For example, deforestation and overgrazing had created a number of gullies in the sub-watershed area. Following discussion between the office staff and farmers it was found that grasses could be used for controlling erosion in small gullies. Hence, vegetative measures (including napier and bamboo brush-wood check-dam construction) were used for gully erosion control; whereas the obvious choice of the office would have been using gabion wire or constructing other physical structures.

Bringing together more than 600 households from four VDCs to a platform was indeed a difficult task, but it happened. This happened because at stake was the management of a natural resource. This confirms Röling (1994 c) who argues that at the level at which the natural resource is actually managed, stakeholders realize their mutual interdependence through informal interaction which allows them to take integrative positions. Not only had people looked beyond the VDC level, but also created a platform to work with the District Office and among themselves. And indeed, the District Soil Conservation Office acknowledged the coordination and support of all other actors in the district such as the national and district political leaders, agricultural development officer and irrigation engineer.

Thus, this program provides a good illustration of how people cooperate voluntarily with each other when the problem becomes visible to them, and value forthcoming external support.

As postscript, in the Rapti Development Progress Review Workshop held from September 30 to October 3, 1993 at Tulsipur, Dang, the Director General of the Department of Soil and Water Conservation stated that the Pareni Sub-watershed program will be replicated as a model in other parts of Nepal (Tulachan and Shrestha 1994).

The second example is about the Junar (sweet orange) plantation program in Ramechhap district where I was one of the actors in the development process.

The Junar plantation program at Ramechhap

Sukhajor is a village which lies at a distance of 2 km north of Ramechhap Bazar, the then-district headquarters. Of the many tribes, living in this village the Tamang people are exceptionally poor. Their lands do not usually support them for more than three months out of the year. They earn their livelihood through carrying loads (rice, fertilizers general goods) from Sindhulimadi to Ramechhap Bazar. The distance is 27 km, up and down. It takes them nearly three days to make a single trip. Tamangs do not differentiate between sons and daughters and they teach both how to carry loads on their backs as early as he or she is eight or nine years old. Whatever he or she carries becomes the income of the family.

With this brief background of the village and the people, I present the case which occurred in June 1980. I (then Agricultural Development Officer) was inside my office, perhaps reading a newspaper. I heard a voice in the other room, asking where he could buy two seedlings of Junar plants. The voice seemed to me very familiar, but I did not recognize it and out of curiosity came out of my office. Two men, with whom I often

used to chat on my trips to Sindhuli and Kathmandu, were standing in front of my colleague. They were Ram Bahadur Tamang and Laxman Tamang. During my trips to Sindhuli, I used to ask them how they could carry such big loads (sometimes about 100 kg) and why they took these little kids with them. In response, they used to laugh and say, "Oh, didn't you notice they are in school now? They learn how to read and write like this".

On finding them in my office, I called them into my room and we began to discuss their work and farming systems in general. During the discussion, I asked them what they would do after the road was constructed between Sindhulimadi and Ramechhap Bazar. I asked them: won't you lose your job? It appeared that they had either not thought about it, or that they'd had no time to think about it. I asked them if they knew that negotiation was in progress between the government of Japan and the government of Nepal to build a road between Kathmandu and Sindhuli, linking Ramechhap. They said that they had heard about it but that no one knew when it would be materialize. We went on discussing the proposed road and its possible impact upon them like this. During the discussion, two options emerged. The first was to move high or into other districts or places where there was no road, and continue the same sort of work. However, they said that this was not a practical solution as they would not be welcomed by other people. They would be a threat to others' livelihoods. Besides, finding such places was difficult. Roads were being constructed everywhere. The second option was to head towards Kathmandu and the Terai in search of jobs. This would mean further problems. We discussed the psychological, economic, social and physical problems of migration. They thus realized the prospective threat to their survival and livelihood. Eventually, I offered to come to their village and think the issue over with them to see what could be done for the future. They agreed and we fixed a date so that they would be available in the village.

As agreed, I went to the village and stayed two nights there. Although I could have left and come back to my office on the same day, I did not. I wanted to talk and know more about them. My purpose was to establish a partnership with them, meet as many people as possible. The outcome of the visit to Sukhajor was as follows:

- A small scale irrigation system (*kulo* in Nepali) in the village. There was water source although it was small. They knew that it was technically feasible. What they lacked was only financial support.

- A private "Junar Nursery" so that at least a few people could work, and also as a source of livelihood for the nursery owner.

- Every household was to plant at least 15 Junar seedling in the first season. However, they wanted my commitment first that the irrigation project would start in that year. They seemed worried that I would be transferred and their Junar seedlings would dry in the field.

After returning from the field, I went straight to the irrigation engineer and told him all about it. He was very much impressed. He promised me that he would do his very best to cooperate with me. It thus became our joint Project. We went to the village the next day.

Farmers had been right, that there were no technical complexities. We decided to work on the *kulo* first, and get approval afterward from the District Agricultural and Irrigation Committee[7]. After a budget estimation, the engineer transferred 75% of the budget directly into a joint account in the Agricultural Development Bank, held by a farmer's representative and himself. The rest of the 25% budget was to be shouldered by the farmers, either through cash or a loan from the Agricultural Development Bank. The Bank sanctioned the loan without any problem. The construction of the *kulo* then started with the farmers' participation. Because the farmers themselves worked, they eventually saved money through which they paid back the Bank's loan. However, in the meantime, we told Chairman of the District Agricultural and Irrigation Committee about the above program. On hearing the full story, not only was he pleased, but presented the program to the committee himself, and got it through.

While the *kulo* was under the construction, farmers started to plant Junar seedlings as agreed earlier. A private nursery established in Bhaluwajor VDC (approximately 12 km from Sukhajor) provided them with plants under the subsidy program of the District Agricultural Development Office. The Sindhuli Agricultural Farm provided all necessary technical support and follow-up services as necessary. The work of the Japanese Overseas Volunteers and the Japanese fruit experts is also to be acknowledged. A year or so later, I was transferred to the next district, Sindhuli.

In March 1994, 14 years later, I happened to visit Ramechhap. My purpose this time was to observe and learn about the activities of the Tamakoshi Sewa Samiti (TSS), one of the lead NGOs working with the Nepal Agroforestry Foundation. I wanted to triangulate with it earlier findings during the fieldwork in Judigaon. When I stepped out of aeroplane at Akashe airport, I saw a few people selling Junar there. I wanted to buy some Junar and I headed towards them, and found Ram Bahadur and his friends from Sukhajor. They recognized me at once. Meeting old friends was a very happy occasion for both of us. Things have changed in Ramechhap. The proposed road which prompted them to plant Junar seedlings in the first place was not yet constructed, and still being negotiated between Nepal and Japan. However, the district headquarters had been moved from Ramechhap Bazar to Akashe, near the airport, in 1990.

While I was in Ramechhap, the airport was still under construction. Ram Bahadur seemed satisfied with his income and happy. He asked me, " Did you realize that it would have been this airport and the movement of district headquarters from Ramechhap Bazar to Akashe that would have snatched our livelihood, not your Sindhuli-Ramechhap road? ".

Although many lessons could be drawn from above two examples, at least three major conclusions seem particularly noteworthy:

- People are likely to come to a platform when problems become visible to them or are made visible to them. In the above example, the proposed road was the cause, and survival was the problem.

- As people are knowledgeable, capable and sense makers, problems can be made visible to them through language, sense making and other mental exercises. It is not

necessary that things be made physically visible, as extension generally does this through demonstrations and field visits. However, this does not mean to imply that demonstrations and field visits are not necessary.

- Neither farmers nor intervening agencies should be viewed as part of a problem. Both of them can be a solution to a problem.

- When issues of natural resources and livelihoods arise, people are likely to come to a platform for action at a higher level of aggregation.

Finally, unless we begin to think of Projects not as packages of plans, activities and resources but as INTERVENTIONS in the lives of rural people, we are not likely to improve project-based development (Fowler 1988).

12.4 The theory on intervention, we need: beyond a mechanistic model

This section returns to the questions that opened this research (chapter 1), concepts of intervention developed in chapter 6 and findings presented in this chapter.

In order to find answers to the questions of how to intervene (approaches, methods, processes and content), where to intervene (levels), and with whom to intervene, this research examined four different concrete development efforts that seek to introduce sustainable agriculture. It also examined the factors associated with the effects of those efforts. In doing so, viewing intervention within a soft system perspective, a definition of intervention was proposed in chapter 6 as follows: Intervention is an interaction or a negotiation process where intervening agencies, intervened parties and other actors bring in different (rather than a different level of) expertise and analytical capacity to facilitate learning, joint action, negotiation, accommodation, consensus building and so forth. Clearly, the findings of this research supported this definition. The double hermeneutic characterization of social scientific knowledge proposed by Giddens (1979) thus seemed particularly useful in understanding development efforts and the factors associated with the effects of those efforts. It took into account not only the concerns of actors and systems, but also the political economy dimension. As argued by Giddens, social practices such as intervention involve communication, power and sanction. For this, a mechanistic model of intervention seems too rigid and too specialized to address real-world messy problems, and reductionism too small and too thin to understand intentional sense-making human beings.

Each of the four cases suggested the need to reformulate a theory of intervention. Although I am fully aware that this small study of mine is much too insufficient for this, I am of the opinion that it is possible. We must pull together the experiences gained so far from carrying out several successful and failed projects, and reconstruct a theory of intervention. I would in fact prefer finding an alternative word for intervention, as it is not a very lovely word. Röling and de Zeeuw (1983) have rightly remarked that the word seems brutal, and even the pedagogy of oppressed is a sort of intervention.

Earlier, Röling (1988) argued for the need to develop a science of intervention, interventology, but that suggestion seems to have been forgotten.

Not only have our current experiences, but also the perspectives such as the knowledge systems perspective and actor oriented perspective, generated many valuable insights on intervention. Although the latter approach makes a plea for deconstructing planned intervention, it also refuses to reconstruct it. Long (1992: 271) argues:

> *"Actor-oriented approach is not action research, but rather a theoretical and methodological approach to the understanding of social processes. It is concerned primarily with social analysis not with the design or management of new intervention programs".*

The above was, perhaps, in response to critics who argued that the actor oriented approach is of little practical significance because it provides a better language for dealing with struggles and conflicts than it does for dealing with the cooperation, accommodation, and collective agency which are also implicit in interface situations. It generates a number of seemingly important "guiding analytical concepts" such as agency, social actor, multiple realities, arenas of struggle, life-worlds, discourses, interfaces, discontinuities of interest, values, knowledge, power, structural heterogeneity, strategies and so forth. But it is not always clear as to exactly how these are theoretically connected to each other (Leeuwis 1993: 90).

Regardless, we need to acknowledge the actor-oriented perspective for uncovering many serious problems being faced by the planned development model of intervention.

All of the above aside, the actor oriented approach appears to me limiting as it perceives actors, both intervened and intervening as part of problem. This is implicit in the definition of intervention as "multiple realities" made up of differing cultural perceptions and social interests and constituted by the on-going social and political struggles that take place between social actors involved. Indeed, this is only one side of a coin. The other side is that people also cooperate, accommodate and work at the collective agency level so as to achieve their purposes. Viewing people as part of the problem is pessimistic thinking. Rather, the need is to view them as part of the solution. In my view, in bringing this issue out, the knowledge systems perspective has further crystallised the thinking on intervention.

As Cernea (1994) argues, sociologist's contribution consists not just of uncovering social variables overlooked in the planner's approach; it often requires reformulation of the problem that requires solving. Unless we have such a theory of intervention that informs and links theory and practice, development practitioners again and again are likely to slip in effect back to the dominant TOT process, even though they understand its problems or disapprove of it. The need is to link theory and practice. My findings have very clearly indicated the need to retrain development professionals along these lines. However, we require a theory which will inform practice while designing and managing new interventions, and reforming the existing ones.

Therefore, my suggestion is to combine the insights so far generated by different perspectives, not only the knowledge system perspective and actor-oriented approach, but all others available, and reformulate a theory on intervention. We have many other thought-provoking concepts and ideas that have come from the practical experiences of development professionals and philosophers such as Robert Chambers and David Korten. Scientific journals and literature are full of development related experiences. And, the experiences of international agencies can also be added to this. Yet, all these experiences have up to now remained scattered.

Taking those things into account, I would like to propose a view on intervention as alternative to mechanistic view, based on lessons learned from my research and other theoretical insights (Table 12.1). This alternative view is grounded in the soft systems perspective so as to initiate discussion and debate. Hence, this is not exhaustive. Rather, it is only a first step towards designing intervention theory. As this is a skeleton, it is in search of flesh, blood and soul.

12.5 Summary

This chapter looked into the findings of the four cases and integrated them. Having identified the factors associated with the effects of concrete development efforts that seek to introduce sustainable agriculture, this research argued against viewing Projects as packages of plans, activities and resources, but as INTERVENTIONS in the lives of rural people. The need is to shift our emphasis from things (plants, water, animal, fodder) to people and their relationships. Finally, this chapter suggested reformulating theory of intervention within a soft systems perspective, as the mechanistic model of intervention is too rigid and too specialized to address messy problems, and reductionism is too small and too thin to understand intentional sense-making human beings.

In addition, this chapter has provided a skeleton for an alternative view of intervention, which is to initiate debate and discussions for Projects while planning, implementing, monitoring and evaluating their efforts. It can serve as an acid-test to examine the effects of development efforts. The development agents, working for GOs and NGOs, can evaluate themselves, checking their progress.

Finally, I must state that studying four cases in a few sites neither allows the generalization of findings at a larger scale, nor a basis for thinking about their general performance. Since the purpose of my research was to understand the intervention processes and hence only partially focused, it would be unfair to the Projects to judge their performance on the basis of this research.

Table 12.1 Two perspectives on intervention contrasted

	Mechanistic model of intervention	An alternative view (Soft systems perspective)
Assumptions about human beings	Object	Subject, intentional and sense making beings, part of solution
Target group viewed as	Beneficiaries, clients	Partner, knowledgeable and capable of agency development
Purpose of technology	Prediction and control	Looking for reasons, Making things visible, accommodation, sense making, prediction
Definition of Intervention	Discrete set of activities	Multiple realities, learning, accommodation, cooperation and negotiation
Intervention approach	Transfer of technology, top down	Joint learning process, neither top down, nor bottom up approach, decision making through facilitation, making things visible
Focused on	Clients	All range of actors and stake-holders
Dimension	Technical	Technical, socio-economic, political dimension.
Role of inter-ventionists	Educator, trainers, providers	Learners, facilitators, catalysts
Views about system	Exists in reality	Ways of knowing about things, people's construction

Table 12.1 provides many answers to questions raised in chapter 1.

Notes

1. Following Umans (1993), I have used the capital P to differentiate in concrete terms "a specific development project" with "project" in its abstract meaning as commonly used in the social sciences (e.g. the actor pursuing his project).

2. Below, the case of the Raji Cooperative Society, in Tanglingchok in Gorkha district (located 0.5 km from Maskichhap) is presented. It has not been functional for a few years, and is in a state of collapse. Although the functioning of this society would directly affect the functioning of organizations such as the Agricultural Development Bank, the District Agricultural Development Office, the District Livestock Office, the Food and Marketing Corporation, the Village Development Committee and the Agricultural Inputs Corporation, no agency has taken the initiative or responsibility to understand its problems or facilitate its functioning. Although the office buildings of almost all these agencies are located within one complex, there is neither coordination nor integration of their activities. They communicate little with each other with regard to the programs and support that they could provide each other for the benefit of farmers. And there is no mechanism that would allow them to work together for a common purpose.

   The case of the Raji Cooperative Society in Tanglingchok, Gorkha

   In 1962, the Raji Cooperative Society was established in Tanglingchok in accordance with the then-new cooperative movement as heralded by the government of Nepal. The cooperative movement has the following mandates:

   - providing production credit loans to member farmers.
   - making available agricultural inputs such as fertilizers, seeds and pesticides.
   - making available marketing facilities for the farmers to buy and sell produce.

   This society is required to provide services to about 2,500 households of six VDCs, cultivating nearly 3,000 ha of land. It has 1,085 shareholders. This includes Maskichhap. The society is expected to be self-sustaining through the commission provided by the Agricultural Development Bank for advancing credits to farmers and selling agricultural inputs. Sales between fiscal years 1990/91 and 1991/92, the last records available, suggest a disappointing state of affairs:

	1990/91	1991/92
Urea	19.98 Ton	1.88 Ton
Complexal	3.47 "	3.01 "
TSP	0.31 "	0.05 "
Total	23.76 Ton	4.94 Ton

   The sale of agricultural inputs justifies neither its survival nor the operation of the office in the area. In addition to this, the society has not distributed production loans to farmers for the last three years. Clearly, the society is dysfunctional and is in a state of bankruptcy. According to the manager of the Society, the Agricultural Development Bank refused to provide it loans because it could not repay an overdue loan to the Bank, as a result of which it could not advance production credit to farmers. The Bank record shows that the Society owed the Bank Rs 319,992.00 as of July 1993, but the record of the Society shows Rs 109,558.62 in outstanding loans to farmers in the area. Should farmers need production credit they are now required to approach the Bank in Gorkha district directly and to submit their land ownership certificates as collateral. Unfortunately, most of the farmers' land ownership certificates are deposited with the Cooperative Society. Whatever be the reasons for the

poor performance of the Society, the only sufferers are the farmers. And no one has taken responsibility for it. The manager of the Society has no official salary but takes a "salary" out of farmers' loan repayments. As far as the Bank is concerned, it is one of the usual cases of default and the government has already provided a guarantee. The District Agricultural Development Office has nothing to do with it even though the performance of the Society has a direct relationship to its own performance. In addition, there are no records proving which farmers have already repaid their loans, and farmers may thus be required to repay a loan more than once. Uneducated and poor farmers do not understand that they should keep papers and receipts throughout their lives.

3. The Tamakoshi Sewa Samiti (TSS) provides an interesting example. Since the District Agriculture Development Office has a program providing mango saplings to farmers, the TSS asked the district office to provide plants for the farmers in its focus area. Through this, the office could both save the amount in transportation and other costs. The district office would have information about where and how many plants were distributed so as to provide necessary technical follow-up services. The other reason for the NGO to approach the district office was that the latter had the budget for providing a transport subsidy for fruit plants to the farmers. As the office required an advance for the costs of the plants, the TSS collected money from interested farmers and deposited it in the account of the district office. But the district office informed the TSS after the season was over that the plants were not available. Not only was it embarrassing for the TSS to approach the farmers tell them of the unavailability of the plants, but it meant an additional work as they then had to contact each farming household and return the money back.

   The above story was confirmed by the district office. According to the office, the Horticulture Farm, Janakpur, did not supply the plants. It was farm's responsibility to supply the plants.

4. The Winrock International Policy Analysis in Agriculture and Related Resource Management had organized a workshop on "Indigenous Management of Agriculture and Natural Resources" on June 8 and 9, 1992. For the workshop, one of the areas in which papers were requested concerned the processes that generate knowledge, technologies and institutions, incorporating them into indigenous rural systems. Gill (1992a) stated that not a single paper was available in this regard.

5. Because the Project did not want the farmers to be influenced by its presence during cross visits, it deliberately did not participate in such visits. The question arises: did it miss the chance to learn from conversations and dialogue among farmers? Would it have been more fruitful had it felt the opposite that it needs to learn from the farmers also? In the cross visits, farmers generally attempted to learn about the following subject areas from their counterparts:

   "Facilities which they could receive from the NAF when they plant fodder trees"

   "Numbers, kinds and sources of plants"

   "Shading effects of these plants"

   "Observing demonstration plots"

   However, the farmers did not limit their discussions to the fodder trees and grass crops. Some farmers negotiated among themselves for the supply of rice and maize seeds. Some reported on his experience in controlling aphids in peach trees. When one farmer saw an orange tree bearing well on the farm, he asked the owner: how old was the tree? Where did he get the plant? How did he sell the fruit? And there were many other important questions. The point to make here is that the Project did not realize that it needs to learn from farmers' experiences.

6. Giddens (1984) characterizes "intentional" as an act which its perpetrator knows, or believes, will have a particular quality or outcome and where such knowledge is utilized by the author of the act to achieve this quality or outcome.

7. This committee is chaired by the chairman of the District Panchayat, and the District Agricultural Officer is the member-secretary. The irrigation engineer is also a member of the committee.

CHAPTER 13

RECOMMENDATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

The last chapter discussed findings from the cases and drew conclusions from them. This chapter proposes recommendations and suggestions for further research. The findings and recommendations of this research are likely to have far-reaching implications for both governmental and non-governmental organizations in Nepal, which presently are making serious efforts to provide new directions to Nepal's agriculture, in particular to the sustainable management of its natural resources.

Regardless, I want to emphasize that my recommendations and suggestions are only a proposal or a framework for discussion, debate and future action. They are not meant to dictate what should be. Rather, my intention is to report what I have learned about intervention while looking into the work of a few concrete development efforts, and reviewing the literature.

This chapter consists of two sections. The first section provides recommendations and the second suggestions for further research.

13.1 Recommendations

Two important elements, were missing in all the Projects. The first was the art of learning from the people, their successes and past mistakes. The second was viewing the problem situation through a systems perspective, that is, how one problem is related to others, and how the activity of one organization is going to affect other organizations, and their activities.

In view of this, my recommendations first go to the people working at the policy making level.

13.1.1 Policy recommendations

My suggestion for policy makers is to consider the fact that adopting sustainable economic growth as a national policy is not sufficient. Hence, I ask the policy makers to reconsider the objectives of the current Eighth Plan (1992-97). The objective of attaining sustainable economic growth will not likely bring together multiple actors and stakeholders in a common platform or enable them to view the problem situation through a systems perspective. If such things are to happen, the first imperative is that one of the objectives of the Eighth Plan, attaining "sustainable economic growth" be replaced by "sustainable natural resource management". As long as the national policy is sectoral, it cannot be expected that people from different disciplines will think holistically, through a

systems perspective. Besides, managing natural resources sustainably does not conflict with poverty alleviation programs of the government. Rather it would facilitate the latter. Experience has clearly shown that farmers come to a common platform, take collective decisions and can forget all differences among themselves, if the subject concerns natural resources.

Likewise, organizing seminars and conferences at the national level in a capital city is likely to lead to a waste of resources, which are already very limited in the country. Evidence has shown that such seminars and conferences neither foster synergy among participants nor facilitate platform emergence, formation and agency development among stakeholders at different levels of aggregation. The present need is to facilitate discussions and debates at field level, attended by the partners of development efforts. If the goal of sustainable agriculture is to be translated into action, the first important task is to find the meaning of sustainable agriculture through discussion and debate with farmers and other relevant actors at work or field level.

The present relationships between government organizations and farmers need to change in order to establish an effective platform and partnership. For this farmers and government officials should not only listen to each other, but learn from each other. Presently, it appears that the role of farmers is to listen, and the role of government officials is to prescribe solutions to a problem that they themselves have not fully understood. Hence, my suggestion for policy makers is to initiate debates and discussions to reconsider the role of the region, district, ilaka (sub-district), VDC, ward and village. The present practice of attempting to implement programs and activities through districts is not likely to bring government officials and farmers to a common platform. In saying so, my purpose is not to argue for dismantling the present administrative and political divisions of the country, but it is to argue for redefining their roles and responsibilities. The district is too large. Monitoring and supervision of programs and staff from district level has not been cost-effective and has not worked. The policy makers should first themselves learn from past mistakes, look back what has gone wrong, and look down at what is happening at the implementation level.

The other important element in Nepal's bureaucracy is lack of continuity in tasks. Most things are done through circular papers and letters. As a result, good ideas are also killed when there is a change in the leadership. Hence, it is crucial that the policy makers begin to think of how to stop such problems. The need is to initiate a debate on this issue If agriculture is to become sustainable, there must emerge a platform for collective decision making and joint action at the field level.

Lack of effective communication is another important issue. For example, GOs and NGOs can work together and realize interdependencies at policy-making level, but not at task level. This is an incredible situation. It is the result of the lack of communication between different levels of government hierarchies.

13.1.2 Implementation level

The suggestions proposed in this section are for GOs, NGOs, Projects and staff working at field or implementation level.

As evident from the findings, the most important element missing is effective communication among different agencies operating at the field level. But communication is central to any negotiation process in which participants attempt to articulate, clarify, and revise their positions. Hence farmers, traders, GOs, banks, NGOs and others who think about agriculture must have access to one another's views, programs and activities. Hence, my suggestion is that any agency working at field level (GOs, NGOs, cooperatives and others) take the lead and form a platform for thinking holistically about each other's activities and problems. Communication and cooperation should be strengthened at any cost. They should not wait till someone from the central level asks them to do so. They have to learn from each other and support each other's activities. The problem of coordination will not remain a problem, if there is effective communication. Regular meetings among the agencies working in a geographical area might be helpful. But district meetings are not likely to create a platform at the field level. The need is to look below districts, at ilaka (sub-district), VDC and villages.

However, a platform directed towards action will never be successful if necessary, tangible opportunities are not sufficiently provided. As Röling (1994 d) argues: it does not help much if one mobilizes and organizes farmers in small and active groups, if there are no tangible opportunities to be grasped. People soon get fed up with meetings if they serve no purpose. So providing only one of the five elements (mobilization, organization, training, tangible opportunities and system management) is not enough, since these elements are complementary (Oerlemans and Steins 1993).

The other urgent task for development agencies in the field is to find and document indigenous knowledge and indigenous production systems, learn from this knowledge, and develop a mechanism to communicate among relevant actors.

The implementation level should review agricultural and natural resource management policies and programs, which are often decided and prepared at the central level without adequately discussion with farmers and other stakeholders at the implementation level, and provide feedback to the concerned agencies. They need to inform farmers (practice) and policy makers (ideas). They should not wait till someone from the policy-making level asks them to do so. They have to create their own space themselves.

13.2 Suggestions for further research

With limited resources and within a limited time period, I tried to look into the intervention process used by four different Projects at different locations, extending from east to west and from north to south. My purpose was to understand more about development efforts and their effects on the lives of those to whom they were directed. While I was conducting my field work, I further realized the need for conducting the following two

studies to complement the findings of this research and to contribute towards reformulating theory on intervention.

The need for a micro level study

Taking a VDC or two, studying how farmers of different sexes (e.g. male and female), categories (e,g. small, medium and large), ethnic groups (e.g. Brahmin, Chhetris and Danuwars), and types (educated, illiterate, civil servant and so on) respond to different intervening agencies (GOs, NGOs, agriculture, forest management and the banks), and how intervening agencies interact among each other and with different actors, and under what conditions their interactions become more meaningful, effective and foster synergy.

Participating in a larger study

In view of the strategic position of Nepal on the global map and the findings of my research, conducting the following research along the agenda suggested by Röling et.al. (1994) seems timely, relevant and crucial. The findings will not only be useful to Nepal, but also to India and Bangladesh, in addition to their potential contribution to advancing science.

- To gain more insight into the human use of natural resources and the possibilities for negotiated sustainable resource management by bringing to bear a constructivist perspective and a social actor approach on a number of concrete natural resource management situations;

- To develop procedures and participatory methodologies in specific collaborative action research projects with respect to:

    - facilitating the social construction of natural resource systems among stakeholders in those natural resources;

    - facilitating platform emergence, formation, and agency development among stakeholders at different levels of aggregation;

    - fostering synergy between external institutions;

    - developing supportive policy frameworks for sustainable natural resource management by platforms of stakeholders.

The establishment of the headquarters of the international Centre for Integrated Mountain Development in Kathmandu, Nepal seems clearly an opportunity to initiate the above kind of research.

ANNEXES

Annex 3.1

Summary of Agricultural Development Objectives and Policies in Nepal's Development Plans

Plan	Period		Major objectives/policies
I	1956-61	-	Increasing agricultural production through improved extension and inputs supply.
II	1962-65	-	Increasing agricultural production by giving attention to geographical specialization and opening of research centres and farms, and dissemination of improved technology.
III	1965-70	-	Increasing food grain production by 15% and cash crops by 73% over the plan period.
IV	1970-75	-	Providing priority to agricultural sector for the first time.
		-	Emphasizing increasing agriculture production on the basis of comparative advantage.
		-	Promoting cereal and cash crops production in the Terai, horticulture in the hills and livestock in the mountains.
		-	Formulation of a 10 year-agricultural development program.
V	1975-80	-	Priority continued to agricultural sector.
		-	Initiation of the integrated approach of planning and implementation of projects through IRDP
		-	Provided short term priority to food grain production and long term priority to horticulture and livestock development.
VI	1980-85	-	Priority continued to agricultural sector.
		-	Emphasized for self-sufficiency of food in the hills and generation of food surpluses in the Terai.

VII	1985-90	-	Priority continued to agricultural sector.
		-	Improving agriculture production while focusing on the issues of environmental deterioration in the hills and mountains.
		-	Attempting to stabilize agriculture and the natural resource base and promoting local and regional self-sufficiency in food production and other essential commodities in the hills.
		-	Developing high production potential areas in the Terai to balance deficit in the hills and mountains, and to generate export surpluses.
VIII	1992-97	-	priority continued to agricultural sector .
		-	Increasing agriculture production based on geographical features.
		-	Increasing production and productivity to meet the growing domestic food demands.
		-	Increasing production and productivity of raw materials for the expansion of agro-based industries.
		-	Enhancing gainful employment opportunities to the majority of small and marginal farmers.
		-	Maintaining a balance between agricultural development and environment.

Annex 3.2

History of Nepal's Agricultural Research Organization (within the MOA)

1922	Establishment of Agriculture Office together with two small experimental farms at Singh Durbar (Kathmandu) and Godavari (Lalitpur).
1924	Status of Agriculture Office elevated to the departmental level constructing the Department of Agriculture (DOA).
1947	Establishment of Agriculture Research Stations at Parwanipur and Kakani.
1952	Initiation of Agronomy Section in Kathmandu.
1957	Initiation of Soil Science, Livestock Development and Dairy Development Division under the DoA and continue to establish Agriculture Stations, Horticulture Farms, Livestock Farms, etc.
1962-1969	Establishment of technical disciplinary divisions such as Botany, Entomology, Pathology.
1972	Initiation of National Coordinated Research Programs on commodities such as Rice, Wheat, Maize, Sugarcane, Citrus, Potato, to fit in with the policy thrusts of the 10-Years Agriculture Development Program.
1975-84	Expansion of coordinated research programs on Oilseeds, Legumes, Pulses, Hill crops, Pasture and forage crops.
1978	Cropping Systems Research Initiated.
1985	- Cropping Systems Program changed into farming systems program and establishment of Socio-economic Research and Extension Division. - Establishment of National Agricultural Research Services Centre (NARSC) under the DOA.
1987	NARSC given the status of an agency (equivalent to department level) with the MOA and made responsible for conducting research activities of the DOA and Department of Livestock Services(DOLS).
1991	Provided autonomy to NARSC, making it a research council named as Nepal Agricultural Research Council (NARC), by newly enacted Nepal Agricultural Research Council Act 1991.

Annex 3.3

History of Nepal's Agricultural Extension Organization (Within the MOA)

1922 Establishment of Agriculture Office.

1924 Status of the Agriculture Office elevated to the department level and named as the Department of Agriculture (DOA).

1937 Created Agriculture Council to respond to the damages which occurred as a result of a great earthquake of 1934.

1951 Agriculture Council and the Department of Agriculture united to form the Agriculture Development Board.

1952 Establishment of the Department of Agriculture (DOA) by dissolving the then Agriculture Development Board.

1959 Establishment of Zonal Agriculture Extension Offices in 10 Zones under the Department of Agriculture.

1964 Initiated opening Agriculture Development Offices at the district level to support land reform program following the enactment of Land Reform Program in 1964.

1966 Department of Agriculture reorganized into five departments, namely;
- Department of Agricultural Extension
- Department of Agricultural Education and Research
- Department of Horticulture Development
- Department of Fisheries Development
- Department of Livestock Development and Veterinary Services.

1969 Zonal Agricultural Extension Offices dissolved to establish Regional Agricultural Development Offices.

1972 Following the policy thrusts of aforementioned 10-Years Agriculture Plan, aforementioned five departments united to construct:
- Department of Agriculture (Extension unified)
- Department of Food, Agriculture and Marketing Services
- Central Food Research Laboratory

1979 Department of Agriculture bifurcated again into two departments namely;
- Department of Agriculture (DOA) (For crops, fisheries and horticulture development)
- Department of Livestock Services (DOLS).

1990 Department of Horticulture reestablished.

1992 The Ministry of Agriculture reorganized and an unified Department of Agriculture Development established through merging of all sectoral departments, namely Department of Agriculture, Department of Livestock Services, Department of Horticulture, Department of Food, Agriculture and Marketing Services, and Central Food Research Laboratory.

Annex 4.1

Basic Information on the Study Districts Reported in Chapter 4

S.N	Features	Districts			Remark
		Gorkha	Tanahu	Nawalparasi	
1.	Physiographic location	Mountain	Hills	Terai	
2.	Altitude range (m above sea level)	488 to 8,156	415 to 2,134	91 to 1,936	
3.	Area, thousands ha	361.4	156.8	201.6	LRMP
4.	Agri. households	48,124	49,833	74,482	CBS
5.	Av. Household	5.23	5.35	5.84	CBS
6.	Number of Ilakas	13	13	15	
7.	Number of VDCs	69	46	77	
8.	Agri. land, thousands ha	64.5	40.3	69.6	LRMP
9.	Agri. land per household	1.34	1.69	1.54	
10.	Forests, 000 ha	88.3	84.3	114.9	LRMP
11.	Forests per household	1.84	1.69	1.54	LRMP
12.	Major farming system	Subsistence/ semi-subsistence mixed system livestock and horticulture based		Market oriented cereal crops based	

Note: LRMP- Land Resource Mapping Project 1986

CBS- Central Bureau of Statistics, 1991/92

Annex 8.1

Nepal Agroforestry Foundation

The project's background

Registered under the Association Act 2034 (1977 AD), Nepal Agroforestry Foundation was established in October 1991 with its headquarters at Kathmandu as a non-governmental and non-profit making organization committed for the promotion of agroforestry action research, extension and training (NAF 1994). It works in selected VDCs of four districts of central Nepal namely, Kavrepalanchok, Sindhupalchok, Ramechhap and Dhading. The following are its missions, objectives and services.

Missions:

a. To provide agroforestry support to grassroots NGOs committed to strengthen the capacity of poor and marginal communities and groups to meet their basic needs.

b. To relieve pressure on common property resources (CPR) by increasing availability of fodder given that the strategy of small farmers is to maintain large numbers of livestock.

Objectives

a. To promote " on farm" agroforestry through beneficiary operated trials, training, demonstrations and extension of multi-purpose trees, legumes, green manure and farm crops in association with livestock, soil and water conservation practices.

b. To enhance technical training and extension skills of development workers associated with program planning and support in agroforestry projects.

c. To develop and support 'lead NGOs', projects and institutions who network with small and marginal farmers in agroforestry.

d. To coordinate "on-farm" agroforestry research, training and extension.

e. To encourage farmers to produce seeds and plant materials of promising species for program sustainability and extension.

f. To become self-supporting by charging fee (actual expense) for its services.

Services

The NAF provides two type of services- **general support services** and **training support services** to NGOs and GOs on request, for example, CARE/Nepal, Redd Barna, Action Aid/Nepal, Integrated Development Systems (Kathmandu), Lumle Agricultural Centre. .

a. General support service comprises of:

- Technical support for agroforestry to partner NGOs through lead NGOs;
- Availing seeds and plant materials; and
- Availing agroforestry resource kit- booklets, posters, flip charts, sample seeds packets and sample record books.

b. Training support service comprises of:

- Providing training of trainers to farmer trainers,
- facilitating cross visits for farmers and program staff; and
- Exposure trips for administration and policy level people.

Annex 8.2

NAF's Board Members

a. in 1991

Mr. Jagdish Ghimire-	Chairperson (Chairman of TSS as well)
Mr. Laxmi P. Sharma-	Vice chairman (member of TSS)
Mr. Gopal Nakarmi-	Treasurer (associated with BBP)
Mr. Bishnu Hari Pandit-	Member-Secretary
Mr. Hut Ram Vaidya-	Member (associated with BBP)
Mr. Dinesh Dhungel-	Member
Mr. Bharat Adhikary-	Member

b. At present

Mr. Jagdish Ghimire-	Chairperson (Chairperson of TSS as well)
Mr. Hut Ram Vaidya-	Vice Chairman (associated with BBP)
Mr. Gopal Nakarmi-	Treasurer (associated with BBP)
Mr. Bishnu Hari Pandit-	Member-Secretary
Mr. Laxmi. P Sharma-	Member (Executive Director)
Mrs. Saraswati Gautam -	Member (associated with BBP and SSS)
Mrs. Anita Danuwar-	Member (associated with SSS)

Annex 9.1

Institute for Sustainable Agriculture Nepal

Established as a private consulting firm in 1986, the **Institute for Sustainable Agriculture Nepall** attained NGO status in 1990. Based on the philosophies, principles and practices of Permaculture, and drawing upon appropriate aspects of "Low-External-Input Sustainable Agriculture (LEISA) and "No-tillage" Farming (the Fukuoka method of Natural Farming), INSAN intends to promote ecologically sound and culturally appropriate sustainable agricultural practices in Nepal. It has the following objectives:

- To develop and promote ecologically sound agricultural and related practices through, training, demonstrations and on-farm research in Permaculture;
- To provide extension services at the grass-roots level to local farmers;
- To promote farm-related income-generating activities through the development of alternative cash crops and the identification of marketing possibilities;
- To promote community development at the village level, in particular in relation to the status of women;
- To facilitate staff development and support training in appropriate technologies and practices for INSAN staff and selected others, both in-house and elsewhere;
- To research and promote appropriate technologies for conservation and alternative sources of energy;
- To investigate and disseminate information on alternative materials and techniques for the construction of affordable energy-efficient housing;
- To promote retention of ecologically sound traditional technologies;
- To conserve national resources; and
- To promote ecological balance.

Funding and Finances

Although INSAN receives funding and assistance through a number of donors and organizations, in 1992 it has received further large package of a grant assistance from the Netherlands Government for a period of six years. The other important external donors are:

* AIDAB (Australia)
* Green Desert (UK)
* DANIDA /DVS
* SDC (Switzerland)
* JA Clark Foundation (UK)
* GAIA Foundation (Denmark)
* Ashoka Foundation (USA)
* Helvetas (Switzerland)
* Permaculture Group(Denmark)
* Permaculture Institute of Australia
* APACE (Australia)
* GTZ (Germany)
* IIED (UK)
* World Bank

Functioning

In the field, it is presently represented by the following three demonstration farms established at the three different agroecological settings:

* PCD Farm, Sunsari
* PCD Farm, Dolakha
* PCD farm, Bhaktapur

Annex 9.2

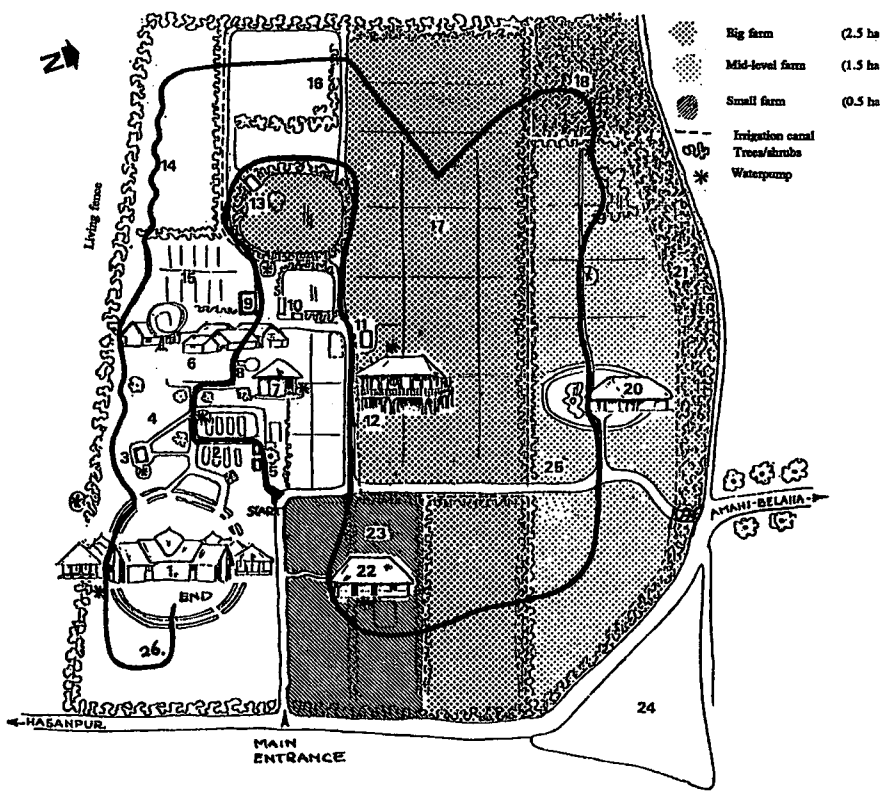
Amaduwa PCD Farm

Established in 1989, INSAN's Amaduwa Permaculture Demonstration farm has an area of 7 ha. The farm, located at 3 km from the Indian border, lies at an altitude of 50-60 m. It has the following objectives:

- To build up environmentally sound Permaculture farms;
- To make local people aware of the process of building up sustainable Permaculture farms in the context of their own regions;
- To demonstrate the possibilities of "Rolling Permaculture";
- To develop the properties as training and demonstration farms; and
- To set up resource-multiplication programs to provide plant materials, seeds and information to local farm families.

The farm demonstrates a permaculture design. To simulate typical Nepalese small (0.5 ha), medium (1.5 ha) and large (2.5 ha) subsistence farm-holding categories, the PCD comprises of three independent model/ demonstration farms (see Fig below). In addition to these three units, a **fourth central farm** of 2.5 ha is put aside for research, demonstration, resource-multiplication, training and extension purposes. According to the farm manager while there were only two species of birds found in the farm during its establishing period, the farm has now become habitat for more than 25 species of birds

PERMACULTURE DEMONSTRATION FARM



1. Office, hostel, training hall, ng hall
2. Tree nursery
3. Bathroom/shower
4. Vegetable/flower garden
5. First INSAN house (1989). Last forestree
6. Residential complex
7. Toilets
8. Gobar gas generator
9. Cattle shed
10. Nursery fishpond/pigsty/duckshed
11. Goat shed
12. Big farmer's house
13. Fishpond/pigshed
14. Multi-layer fruitgarden
15. Vegetable/flower nursery
16. Neem trees
17. Big farm
18. Fuel wood production plot
19. Mid-level farm
20. Mid level farmer's house
21. Fire protection forest
22. Small farmer's house
23. Orchard nursery
24. Police
25. Fukuoka no-tillage plot
26. Beetle vine

Annex 10.1

Involvement of Bilateral and Multilateral Donors in Nepal's Community Forestry Program

In 1992/93 the following bilateral and multilateral donors were directly or indirectly involved in community forestry in Nepal through the projects described below:

S.No.	Project	Donor	District
1.	Nepal Australia Forest Project	AIDAB	Kavre, Sindhupalchok
2.	K-BIRD	CIDA	Surkhet, Dailekh and Jumla
3.	Koshi Hill Area Development Project	ODA	Bhojpur, Sankhuwasabha Terathum, Dhankuta
4.	Palpa District Integrated Project	SDC	Palpa
5.	Community Forestry Development Project		UNDP/SDC
6.	Rapti IRDP	USAID	Palpa, Salyan, Rukum, Pyuthan and Dang.
7.	Hill Community Forestry Project	World Bank	38 Hill Districts
8.	Terai Community Forestry Project	World Bank	
9.	Rasuwa Nuwakot IRDP	World Bank	Rasuwa & Nuwakot
10.	Community Forestry Training Project	DANIDA	
11.	Community Forestry Extension Project	JICA	
12.	Dolakha-Ramechhap Comm. Forestry Project	SDC	Dolakha & Ramechhap

Source: Shrestha 1993: 6-8

Annex 11.1

Task Force as Mentioned in Page 197 (Extension Case)

The Ministry of Agriculture formed a task force on 27 April 1994 to draft a National Agricultural Extension Strategy which is consistent with Nepal's overall agricultural development strategy. The following agricultural extensionists of the Ministry of Agriculture worked in the team:

Mr. Asheshwar Jha
Mr. Padma B. Shakya
Mr. Dhruba N. Manandhar
Mr. Birendra B. Basnyat

Abbreviations, acronyms and local terms

ADB	Asian Development Bank
ADB/N	Agricultural Development Bank/Nepal
ADO	Agricultural Development Officer, Agricultural Development Office
AEA	Agroecosystem analysis
AEP	Agricultural Extension Project
AERP	Agricultural Extension and Research Project
AIC	Agricultural Inputs Corporation
AKIS	Agricultural Knowledge and Information Systems
APROSC	Agricultural Projects Services Centre
ASC	Agricultural Service Centre (JT/JTA headquarters)
ASP	Akikrit Shrot Parichalan, an integrated resource management program of the K-BIRD Project
Bari/Pakho	Dry land, lands other than wet lands that for various reasons can't be flooded for rice cultivation
BBP	Baudha-Bahinipati Family Welfare Project
CBS	Central Bureau of Statistics
CF	Community forestry
DDC	District Development Committee, an executive body consisting of elected members from the VDCs
DFAMS	Department of Food, Agriculture and Marketing Services
DFO	District Forest Office, District Forest Officer
DOA	Department of Agriculture
DOAD	Department of Agriculture Development
DOF	Department of Forests
FAO	Food and Agriculture Organizations of the United Nations
FC	Forest Committee
FF	Farmer First
FPR	Farmer Participatory Research
GDP	Gross Domestic Project
GNP	Gross National Product
GO	Governmental Organization
ha	Hectare
HFPP	Hill Food Production Project
HMG/N	His Majesty's Government/Nepal
ICIMOD	International Centre for Integrated Mountain Development
Ilaka	Sub-district, a district is divided into 9-17 sub-districts in Nepal.
INSAN	Institute for Sustainable Agriculture Nepal
IRDP	Integrated Rural Development Project
JT	Junior Technician, Village-based extension agents of the Department of Agricultural Development, HMG/N)
JTA	Junior Technical Assistant, Village-based extension agents of the Department of Agriculture Development, HMG/N

K-BIRD	Karnali-Bheri Integrated Rural Development Project
Khet	Wetland where water can remain on the surface or the upper soil layer, making the land suitable for rice cultivation
Khoria	A type of shifting cultivation, slash and burn agriculture
LDO	Local Development Officer, a civil servant, who, as a secretary to the DDC assists it in the exercise of its functions and coordinates the activities of district level offices of all the line departments.
LEISA	Low external input sustainable agriculture
LRARC	Lumle Regional Agricultural Centre, formerly LARC (Lumle Agricultural Research Centre)
LRMP	Land Resources Mapping Project
MOA	Ministry of Agriculture
MOF	Ministry of Forests
NAF	Nepal Agroforestry Foundation
NARC	Nepal Agricultural Research Council
NARS	National Agricultural Research System
NGO	Non-governmental organization
NPC	National Planning Commission
PCD	Permaculture Development Farm
PAR	Participatory Agricultural Research
PC/S	Problem Census Problem Solving Process/Approach
PF	Panchayat Forests
PLAA	Panchayat-Level Agricultural Assistant, a farmer who was employed by the Ministry of Agriculture on contract service to work as a full-time extension worker under the T&V approach
PM&E	Program monitoring and Evaluation
PPF	Panchayat Protected Forests
PRA	Participatory Rural Appraisal
PTD	Participatory Technology Development
RPK	Rural people knowledge
Ropani	Unit for measuring land in the mountains and hills, 20 ropanis make a hectare
RRA	Rapid Rural Appraisal
SA/NRM	Sustainable Agriculture/Natural Resource Management
SC/US	Save the Children/United States
Siwalik	First ridges of the Himalayan mountain system
SMS	Subject Matter Specialists
SSS	Samaj Sewa Samuha, a local NGO in Kavre district, Nepal
T&V	Training and Visit
TOT	Transfer of Technology
TSS	Tamakoshi Sewa Samiti, a local NGO, Ramechhap district, Nepal
Tuki	Word used for progressive farmers (means traditional wick lamp), coined by Swiss Development Corporation in its Integrated Hills Development Project
UNDP	United Nations Development Program
USAID	United States Aid for International Development
VDC	Village development committee, territorially based politico-administrative unit, formerly village panchayat.

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Summary

This study focuses on intervention processes that support sustainable agriculture. It argues that we know very little about how to intervene for sustainable agriculture, particularly for those areas where the Green Revolution has passed almost unnoticed and where degradation of natural resources is the normal practices, rather than the exception. As sustainability is a constructed, contextual and complicated concept, it is far from clear what sustainability is, how it comes about, and what it is actually for, although it has been at the top of the agenda for nearly a decade. No substantial biological or social-institutional breakthroughs or innovations have yet emerged, despite the considerable efforts that have been devoted so far to sustainable agriculture. Impressively, the word "sustainability" is such a powerful symbol that the very thought of an unsustainable agriculture immediately conjures up images of massive human deprivation and suffering and, ultimately, mass starvation.

This study is an attempt to seek answers to the following questions: How to intervene, where to intervene, and with whom to intervene to support sustainable agriculture? What effects are likely to be produced by development efforts that seek to introduce sustainable agriculture? What are the factors associated with the effects of those efforts?

The setting for this research is Nepal. The research had two phases. The first comprised a reconnaissance, the objective of which was to assess problem situations in sustainable agriculture and understand farmers'perceptions of and responses to sustainability/unsustainability of agriculture. It was conducted in two villages each of the Gorkha, Tanahu and Nawalparasi districts of Western Nepal, located in the mountains, hills and Terai regions respectively. Not only did this phase provide useful insight to the researcher to select cases of development efforts for the second and main phase of the research, but it also unveiled several sustainability problems of Nepalese agriculture. If resource degradation appeared a major problem for agriculture in the mountains and hills, the Terai presented the problems of post-Green Revolution agriculture. In addition to this, the findings indicated that the notion of sustainability will not attract or motivate farmers to participate voluntarily in any program of change or innovations, unless improving net farm income along with increased productivity is a part of the definition of sustainability. An interrelatedness of agriculture and culture was also observed. Based on the findings of the first phase, four cases each of agroforestry, permaculture, community forestry and agricultural extension were selected for the second phase.

This study reviewed the meanings of and approaches to sustainability. In this regard, the author took the side of the school of thought which viewed sustainability as an emergent property of a soft system, because goals such as productivity and sustainability are objectives of people, they emerge from soft systems, human activity systems, not from natural (e.g. plants) or designed systems (e.g. computers). Likewise, the author was of the view which opted for a fundamental "paradigm" shift in the way we think about and practise sustainable agriculture, and for adjusting, adapting and expanding knowledge systems as

consistent and coherent with the logic of sustainable agriculture. Crucial in this approach is the need to loosen the grip of the dominant view that sustainability is a goal which can be attained through making some adjustments to the standard development models. Keeping this in mind, concepts and theories on intervention were reviewed.

On reviewing intervention concepts and theories, it emerged that intervention is a problematic concept which means different things to different people according to their orientations. Three intervention approaches were reviewed, namely Transfer of Technology, Farmer First and Beyond Farmer First. Thus, having introduced multiple viewpoints of intervention and models for intervention, the author proposed a framework to study intervention viewed as a soft system. Crucial in this view is the realization that intervention can only have an impact through shared learning and collective decision making by its constituent actors with respect to problem situations. At this point, the author offered the following definition of intervention. *Intervention is an interaction or a negotiation process where intervening agencies, intervened parties and other actors bring in different (rather than a different level of) expertise and analytical capacity to facilitate mutual learning, joint action, negotiation, accommodation, consensus building and so forth.*

The aforementioned four cases were examined using the knowledge systems perspective as a diagnostic tool. The case study was the method of research. Of the four cases, the case on agroforestry was a pilot case which helped to refine data collection plans in terms of both the content of the data and procedures to be followed for the next cases, permaculture, community forestry and agricultural extension.

Each of the four cases illustrated that unless all components of the knowledge systems are calibrated appropriately, innovation cannot realize its full potential. The findings indicated that development efforts are likely to be unsustainable or fail, no matter which governmental or non-governmental agency promotes them, if social variables remain unaddressed or not handled properly. The cases revealed the improved thinking and attitudes concerning the intervening agencies on the need to give considerable attention to farmers' needs and priorities, although some problems were noted. Likewise, factors such as means-ends confusion, inadequate communication structure and lack of inter-institutional coordination and linkages were identified. The cases show that the projects have slipped back into a TOT mode of working despite the fact that they disapproved of TOT or recognized its problems.

This research argued against the pessimistic view of projects or development intervention. For this, two examples from Nepal were presented. It was contended that neither intervened parties (e.g. farmers) nor intervening agencies are part of problem, but rather that both of them are part of the solution. People are likely to come to a platform when problems become visible to them or are made visible to them. The problems can be made visible to them through language, sense making and other mental exercises, as people are knowledgeable, capable and sense makers. Hence, the need is to shift our emphasis from things (plants, water, animal, fodder) to people. The research concluded that mechanistic models of intervention are too rigid and too specialised to address messy real-world problems, and reductionism too small and too thin to understand intentional, sense-making human beings. Hence, based on the soft systems perspective a skeleton of theory of

intervention to support sustainable agriculture is presented. The need is now to fill it with flesh, blood and soul. This, an alternative view of intervention, provides answers to many questions raised earlier.

Last, but not least, this research draws implications from the findings to provide some recommendations for policy and implementation. As the recommendations provide a proposal or a framework for discussion and debate in order to initiate action in the future, they are not prescriptions. This research argues that as long as national policy is sectoral, it cannot be expected that people from different disciplines will think holistically, through a systems perspective. In view of this, it calls on policy makers to reconsider the objectives of the Eighth Plan (1992-97). They are not likely to bring together multiple actors and stakeholders in a common platform or enable them to view the problem situation through a systems perspective.

Samenvatting

Dit proefschrift richt zich op interventieprocessen die de ontwikkeling van een duurzame landbouw ondersteunen. Er wordt beargumenteerd dat we weinig weten over hoe te interveniëren om tot een duurzame landbouwontwikkeling te komen. Dit geldt vooral voor die gebieden waar de Groene Revolutie bijna geheel onopgemerkt aan voorbij is gegaan, en waar degradatie van natuurlijke hulpbronnen eerder regel is dan uitzondering. Duurzaamheid is een sociaal geconstrueerd, contextueel en ingewikkeld begrip. Hierdoor is het moeilijk aan te geven wat duurzaamheid precies is, hoe het ontstaat en waar het toe dient, hoewel het concept al bijna een decennium bovenaan de agenda staat. Ondanks de grote aandacht die aan duurzame landbouw is gegeven, zijn er tot dusverre geen substantiële biologische of sociaal-institutionele doorbraken of innovaties gerealiseerd. Echter, het woord duurzaamheid is zulk een krachtig symbool geworden dat de gedachte aan een niet duurzame landbouw meteen beelden oproept van armoede, menselijk lijden en uiteindelijk massale hongersnood.

Deze studie is een poging tot het beantwoorden van de volgende vragen: Hoe te interveniëren, waar te interveniëren en met wie te interveniëren om de ontwikkeling van een duurzame landbouw te ondersteunen? Welke effecten zouden kunnen optreden als gevolg van ontwikkelingsinspanningen die gericht zijn op het introduceren van een duurzame landbouw? Welke factoren zijn gerelateerd aan de effecten van deze inspanningen?

Het onderzoek voor deze studie heeft plaatsgevonden in Nepal. In de studie kunnen twee fases worden onderscheiden. De eerste fase bestaat uit een kennismaking, waarvan het doel tweeledig is. In de eerste plaats is het doel probleemsituaties in duurzame landbouw te verkennen. Ten tweede is deze fase er op gericht percepties van boeren en andere actoren over duurzame en niet duurzame landbouw, en de daarmee gepaard gaande reacties, te begrijpen. Het onderzoek is uitgevoerd in zes dorpen in de districten Gorkha, Tanahu en Nawalparasi in het westen van Nepal. Deze drie districten zijn respectievelijk gesitueerd in de bergen, de heuvels en het laagland van het koninkrijk.
Deze eerste fase heeft de onderzoeker enerzijds een goed inzicht gegeven in het selecteren van onderzoekscases voor de tweede en belangrijkste fase van de studie. Anderzijds heeft de genoemde verkenning een aantal duurzaamheidsproblemen van de Nepalese landbouw zichtbaar gemaakt. Terwijl degradatie van natuurlijke hulpbronnen een belangrijk probleem vormt voor de landbouw in de bergen en de heuvels, kunnen de problemen in het laagland gezien worden in termen van post-Groene Revolutie landbouw. Daarbij geven de bevindingen aan dat enkel het concept duurzaamheid boeren niet zal aantrekken of motiveren vrijwillig deel te nemen aan elk programma dat gericht is op verandering of innovatie. Het verbeteren van het netto boeren inkomen en het vergroten van de produktiviteit zullen vanuit een boeren perspectief ook deel moeten uitmaken van de definitie van duurzaamheid, willen zij vrijwillig deel nemen aan dergelijke programma's. Daarnaast heeft de onderzoeker geconstateerd dat er een interrelatie tussen landbouw en cultuur bestaat.

Op basis van de bevindingen uit deze eerste fase zijn vier case studies voor de tweede fase van het onderzoek geselecteerd, te weten: 'agroforestry, permaculture, community forestry and agricultural extension'.

Deze studie neemt een aantal concepten en benaderingen van duurzaamheid onder de loep. In dit opzicht kiest de onderzoeker voor het perspectief van een school die duurzaamheid ziet als een dynamisch onderdeel van een zacht systeem.
Doelen als produktiviteit en duurzaamheid zijn doelstellingen van mensen. Zij komen met andere woorden, voort uit zachte systemen, ofwel menselijke activiteitssystemen, en niet uit natuurlijke of ontworpen systemen (bijv. ecosysteem, computersysteem). De onderzoeker heeft gekozen voor een benadering die pleit voor een fundamentele paradigmaverschuiving met betrekking tot de wijze waarop we denken over en handelen ten aanzien van duurzame landbouw. Volgens deze benadering is het noodzakelijk de betrokken kennissystemen consistent en coherent aan te passen en uit te breiden met de logica van duurzame landbouw. Hierbij is het cruciaal het dominante standpunt, dat duurzaamheid een doel is dat bereikt kan worden door standaard ontwikkelings modellen aan te passen, los te laten. Vanuit dit standpunt zijn concepten en theorieën over interventie beschouwd.

Bij de beschouwing van concepten en theorieën over interventie blijkt dat interventie een problematisch concept is dat verschillende betekenissen aanneemt voor verschillende mensen, afhankelijk van hun oriëntatie. Drie interventiebenaderingen zijn bekeken, namelijk 'Transfer of Technology', 'Farmer First' and 'Beyond Farmer First'. Na een van een aantal uitgangspunten en modellen van interventie, geeft de onderzoeker een raamwerk voor onderzoek waarin interventie gezien wordt als een zacht systeem. Cruciaal in dit uitgangspunt is het bewustzijn dat interventie alleen een impact kan hebben via gemeenschappelijk leren en collectieve besluitvorming door de gezamenlijke actoren. Hierbij dient de probleemsituatie in acht genomen te worden. In dit stadium stelt de onderzoeker de volgende definitie van interventie voor: *Interventie is een interactie of een onderhandelingsproces waarin de interveniërende instituties, geïntervenieerde groeperingen en andere actoren verschillende soorten expertise en analytische capaciteit (in plaats van verschillende niveaus van expertise en capaciteit) inbrengen om wederzijds leren, gezamenlijke actie, onderhandeling, aanpassing en consensus vorming, enzovoorts, te bevorderen.*

De eerder genoemde vier cases zijn aan de hand van het kennissysteem perspectief als diagnostisch instrument, bestudeerd. De methode van onderzoek is de case studie. De case over 'Agroforestry' is een zogenaamde 'pilot-study', die van nut was voor het verbeteren van de inhoud en de te volgen procedures van het veldwerkplan voor de volgende cases: 'permaculture, community forestry and agricultural extension'.

Elk van de vier cases illustreert dat innovatie alleen zijn volle potentieel kan bereiken, als alle componenten van het kennissysteem weloverwogen worden. De bevindingen geven aan dat als de specifieke sociale variabelen niet in acht worden genomen of niet goed worden gehanteerd, ontwikkelingsinspanningen zeer waarschijnlijk niet duurzaam zullen zijn of zelfs zullen mislukken. Hierbij maakt het niet uit of een overheidsinstantie of een niet-gouvermentele organisatie de projecten uitvoert. De cases laten zien dat er een verbetering heeft plaatsgevonden in de aandacht, het denken en houding van de

interveniërende organisaties ten aanzien van de behoeften en prioriteiten van boeren, ondanks het feit dat er een aantal problemen gesignaleerd zijn. Evenzo zijn er factoren zoals verwarring over doeleinden, niet-adequate communicatiestructuren en gebrek aan institutionele coördinatie en verbanden geïdentificeerd. De cases tonen aan dat de projecten opnieuw zijn vervallen in een 'Transfer of Technology' manier van werken, ondanks het feit dat zij dit model afkeurden of de problemen ervan herkenden.

Dit onderzoek bekritiseert het pessimistisch standpunt over projecten of ontwikkelingsinterventie. Om dit te illustreren worden twee voorbeelden uit Nepal gepresenteerd. Uit deze voorbeelden blijkt dat zowel de interveniërende partijen als de geïntervenieerden (boeren) geen deel uitmaken van het probleem, maar dat beiden deel uitmaken van de oplossing. Mensen zijn bereid om een platform te vormen wanneer problemen zichtbaar worden of zichtbaar voor hun gemaakt worden. Problemen kunnen zichtbaar gemaakt worden door taal, zingeving en andere mentale oefeningen, omdat mensen capabele zingevers zijn, die in staat zijn kennis aan te wenden voor het handelen. zijn. Daarom is het noodzakelijk om de nadruk te verschuiven van dingen (planten, water, dieren, veevoer) naar mensen.

Het onderzoek concludeert dat mechanische modellen van interventie te rigide en gespecialiseerd zijn om de rommelige 'echte-werkelijkheidsproblemen' te lijf te gaan. Reductionisme is te klein en te iel om intentionele, zingevende mensen te begrijpen. Daarom is er een skelet van een interventietheorie geschetst om duurzame landbouw ontwikkeling te ondersteunen. Nu is er de noodzaak om dit skelet op te vullen met vlees, bloed en ziel. Dit is een alternatieve kijk op interventie die gebaseerd is op het zachte zachte systeem perspectief. Deze benadering zal hoogstwaarschijnlijk in staat zijn de vele eerder gerezen vragen te beantwoorden.

Ten slotte zijn er, voortkomend uit dit onderzoek, een aantal aanbevelingen voor beleid en implementatie geformuleerd. Ondanks het feit dat deze aanbevelingen een voorstel of een kader voorstellen om discussies en debat over toekomstige acties te initiëren, moeten zij niet beschouwd worden als zijnde voorschriften. Dit onderzoek geeft aan dat zolang het nationaal beleid sectoraal georganiseerd is, er niet verwacht kan worden dat mensen van verschillende disciplines meer holistisch, via een zacht systeem perspectief, zullen gaan denken. Vanuit dit gezichtspunt bezien, worden beleidmakers opgeroepen het Achtste Ontwikkelingsplan (1992-97), dat door de Nepalese overheid geformuleerd is, te heroverwegen. Zij zullen immers niet in staat zijn om een veelheid aan actoren en belanghebbenden samen te brengen in een gemeenschappelijk platform of hen in staat te stellen om de probleemsituatie te bekijken door middel van een zacht systeem perspectief.

About the author

Birendra Bir Basnyat was born in Dharmasthali, Kathmandu, on June 12, 1952. After graduating in 1973 from the Govind Ballabh Pant University of Agriculture and Technology, Pantnagar, India where he was awarded a B.Sc.(Honours) in agriculture and animal husbandry, he joined the Ministry of Agriculture, and worked as an agricultural instructor for Kitini Secondary Vocational School, Lalitpur. In 1974, he joined the Nepal Resettlement Company as an agricultural officer and worked for two years in Nawalpur, Nawalparasi district, western Nepal. In 1976, he rejoined the Ministry of Agriculture and worked as a Fruit Development Officer in the Fruit Development Division of the Department of Agriculture. In 1978, he was appointed as an agricultural development officer for Ramechhap district. In 1982, he was transferred to Sindhuli district. In 1986, he received his M.Sc. in Extension Education with a minor in Rural Development Management from the University of Philippines at Los Banos, the Philippines through a DSE (German Foundation for International Development) fellowship. In 1988, he was back in Kathmandu from Sindhuli to work for the Central Agricultural Training Centre. Since then, he has worked in the fields of extension and training for the Ministry of Agriculture. The author received agricultural extension education training in Japan for three months in 1983 and training in management of training from the Royal Institute of Public Administration (RIPA) in UK for three months in 1989.

During his service period, the author has served several consultancies for international and national agencies through local consultancy firms. This includes the World Bank for which, in 1988, the Agricultural Projects Services Centre conducted a study on Sustainability of Training and Visit System of Agricultural Extension in Nepal. He has also co-authored three books: a textbook on horticulture published in three volumes by the Tribhuwan University of Nepal; a Handbook for Training Managers and a Manual on Training Needs Assessment published by the Manpower Development Agriculture Project (MDAP)/GTZ. In addition to the above, he has authored two books: Agricultural Extension System in Nepal, published by Development Pioneer in 1990, and the Trainers' Manual on Extension Education published by the MDAP/GTZ in 1991.

The author is often consulted by the Ministry of Agriculture on policy decisions with respect to training and extension activities. In 1989, he was a member of a task force formed by the Ministry of Agriculture to review the functioning of agricultural extension and suggest necessary changes. In 1991 and 1993, the author coordinated a team entrusted with designing a development plan for the Agricultural Training Centre Network of the Department of Agriculture, HMG/Nepal. Also, in 1991, the author was involved in preparing two sets of guidelines, the agricultural extension implementation guidelines and the agricultural training implementation guidelines for the staff of the Department of Agriculture. In 1994, the author worked in a task force team formed by the Ministry of Agriculture to recommend a national agricultural extension strategy.

The author is a life-member of the Trainers' Association of Nepal, a member of the Agricultural Extension Association of Nepal, the UK based Research and Extension Network of the Overseas Development Institute and the Nepal-based Participatory Rural Appraisal Network of the Winrock Institute for Agricultural Development.