THE IMPACT OF PLANNED RURAL DEVELOPMENT

A CASE STUDY OF KUNDASANG HIGHLAND VEGETABLE CULTIVATION IRRIGATION PROJECT IN SABAH, EAST MALAYSIA

by

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ACknowledgement

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Declaration

Except where otherwise indicated,

this thesis is my own work.

Imam Ali

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I am grateful to many people who have assisted me in the course of preparing the thesis. Their names are too numerous to be mentioned here. In particular, I wish to express my gratitude to the Research School of Pacific Studies of the Australian National University for the scholarship, Professor Harold Brookfield for his assistance and guidance during the initial stage and Professors Gerard Ward, John Overton and Randolf R. Thaman for their supervisory assistance. My thanks also go to Professor William Clarke for reading and commenting on the draft chapters and Dr Peter Rimmer and Elizabeth Lawrence for their invaluable advice and guidance while I was at ANU. Appreciation for cartographic assistance is due to Keith Mitchell and Ian of ANU and George Saemane of the University of the South Pacific. Very sincere thanks also go to Barbara Hau’ofa for proof reading, Sharon McGowan and Loraini Korodrau for helping with typing and printing and Mohini Singh for type-setting and printing the final copy.

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Finally, I am deeply indebted to my wife, Rajeshni, and my three sons, Imraz, Zulfikar and Imran for their tolerance and moral support while I was writing the thesis. Without their sympathy, support and encouragement this thesis might not have been completed.
ABSTRACT

This study investigated the economic, social, and environmental impacts of the Chinese government's "Three Norths" poverty alleviation project in Heilongjiang Province. The study aimed to explore the best strategy for poverty alleviation in the region. It focused on the concept of sustainable development, combining economic and social benefits.

The project focused on the following aspects:
2. Promoting rural development, improving the living conditions of farmers.
3. Developing small-scale industries to promote economic growth.
4. Implementing poverty alleviation and sustainable development policies.

The project's success is attributed to the implementation of sustainable development concepts and the adoption of modern agricultural practices. These measures have significantly improved the livelihoods of farmers in the Three Norths, leading to sustainable poverty alleviation.
ABSTRACT

This thesis examines the economic, social and environmental impact of a state-initiated in-situ rural development project at Kundasang in Sabah, East Malaysia. Rural development as a strategy for development planning in the Third World grew out of a general disenchantment with the technocratic and growth-oriented policies of the 1950s and 1960s. Under rural development programmes, specific approaches were adopted to raise rural productivity, accelerate commercial development of agriculture and to improve social services and institutional and infrastructural arrangements essential to the success of such approaches.

Two contrasting approaches have characterised efforts to bring rural development to smallholder farmers: 1) land development and resettlement schemes, and 2) in-situ agricultural development. In Malaysia both of these systems were promoted during the late colonial period, and continued to be central in Malaysian post-independence rural development policy for rural development. Despite concerted efforts, evidence indicates that, with the exception of a few land-development and resettlement schemes in West Malaysia, most smallholder schemes have failed to perform to expectations.

An exception was the Kundasang in-situ project, which was judged to be a success by government agencies. This study investigated the reasons for Kundasang’s success. Archival research, in-depth interviews, observations, questionnaire surveys, field measurements and crop inventories were carried out during nine-month fieldwork from December 1989 to August 1990 to gather relevant information. Research findings indicate that local Dusun land owners, the main target population, adopted modern technology, new crops and more intensive cultivation practices. The provision of infrastructure by government, and availability of suitable environmental conditions, particularly cool temperatures and moderate to high soil fertility assisted the successful adoption of temperate vegetables as cash crops. The success of commercial vegetable farming has provided a key to increased incomes and lifestyle changes. It has also enhanced the value of land, given the original land owners cash to buy new commodities and services, and increased their access to new opportunities in education, business and off-farm employment.
The thesis found that despite rapid development, the area has not suffered from many of the negative consequences often chronicled in the literature. Although some land has been sold, and land degradation and some social and economic differentiation have occurred, there is little evidence as yet of a concentration of benefits of development among the rich, and of increasing landlessness and unemployment among the poor, as has happened in many parts of Malaysia and elsewhere in the Third World.

However, the thesis argues that if land degradation and land sales continue, there may soon be scarcity of suitable land for cultivation for Dusun land owners. Some Dusun could even become landless. In order to maintain the long-term success and sustainability of the project, it is suggested that measures should be instituted to prevent land degradation, to limit land alienation and to encourage the long-term viability of increasing Dusun involvement in both commercial vegetable farming and off-farm entrepreneurial activities. If such measures are implemented, Kundasang could serve as a model for sustainable rural development in Malaysia and the Third World.
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CHAPTER ONE
INTRODUCTION

In many developing countries, attempts to induce sustained rural development have failed in spite of capital intensive programmes and projects. Explanations for these failures and attempts to devise more appropriate strategies to improve the lives of the rural poor remain mired in uncertainty despite many years of experience on the part of international agencies, national governments, and academic planners and researchers. My involvement in the issue of rural development began with the research I carried out for a Masters thesis on smallholder sugar cane farms in Fiji. That research convinced me that increasing specialisation on smallholder sugar cane farms had led to several deleterious impacts (Ali 1986). In the present study, I examine further the effects of planned rural development but in an area where the experience had generally been beneficial. It is my hope that lessons learned from this area can be used to improve rural development planning elsewhere or at least to lessen harmful impacts like those I found in the sugar belt in Fiji or that are widely chronicled in the literature about other areas (see Chapter 2).

1.1 RURAL DEVELOPMENT

Planned intervention by the state to increase rural incomes and improve the standard of life of the rural poor has a long history. It has been studied widely in the last 30 years, resulting in a large volume of literature, which divides into two broad approaches. The first approach takes a positive view and
the second a negative view. The former approach suggests that rural development has brought considerable social and economic benefit to rural people. It is claimed that rural development programmes have led to an increase in the provision of physical infrastructure and social welfare facilities such as piped water, electricity, access roads, schools, basic medical facilities and social and cultural institutions in previously isolated rural areas (Cheema 1985:3).

In economic terms the positive approach asserts that rural development programmes in most developing countries have led to increased agricultural productivity for export and local markets, which in turn has benefited both the nation and its rural areas (Hinderink and Sterkenberg 1987; Hossain and Jones 1983). At the national level an increase in food production has reduced food imports thus saving foreign exchange through import substitution. Exports are enhanced enabling the country to increase its foreign exchange earnings. Locally, cash incomes and overall standards of living of the rural people have improved considerably (Meier 1989; Richards 1985; Cheema 1985; Simpson 1987; Long 1968).

The positive approach also asserts that rural development programmes lead to geographical changes that facilitate overall development and prosperity in rural areas. The most important among these are changes in land use, settlement patterns and linkages between the area of development and other places. With the implementation of rural development programmes in some areas, a more sedentary form of land use replaces the shifting cultivation. The area under
cultivation expands and cultivation practices become more intensive, resulting in greater productivity. The adoption of cash crop production on a sedentary basis necessitates establishment of more dispersed and permanent residences by the farmers. Instead of living together in temporary settlements or nucleated villages farmers may establish permanent homesteads on individual farms, a change that allows them to cope with the increased volume of farm work required by new crops and more intensive techniques. Moreover, it encourages the farmers to build better quality homes. Transport networks established in the course of development link previously isolated rural areas with other parts of the country and facilitate the flow of people, material goods and ideas. This expands the market for rural produce and enables the farmers to acquire material goods (Rutherford et al. 1969; Morrill 1970).

The negative approach claims that rural development programmes, while increasing agricultural production, introduce many adverse social, economic and environmental changes. The most significant and pervasive among these are accumulation of land by the rich, increasing landlessness and unemployment among the poor, concentration of the benefits of development among the rich, and land degradation resulting from adoption of new crops and cultivation practices. The major outcomes of these changes are persistence or accentuation of rural poverty, widening of social and economic gaps between the rich and poor, rural-urban migration and environmental degradation.
Land tenure is a central element of the negative case (Cheema 1985:3). After the implementation of rural development programmes the potential for the generation of wealth from the land increases, pushing up land prices and rents. A few land owners with surplus land sell some of it to take advantage of high prices. Because of high prices the poor are left out of this newly created land market (Anan 1988). The high profitability and introduction of new labour-saving technology encourages many land owners to withdraw their land from leasing, share-cropping or labour tenancy arrangements and farm it themselves, sometimes employing wage labour. Sitting tenants, who generally include landless people or holders of very small plots, are forced out of tenancy arrangements (Shrestha 1988). Moreover, many poor farmers are forced to sell their land holdings owing to indebtedness, natural disasters and inability to cope with new crops and farming practices (Thiele 1990:9; Swan 1983:137; Anan 1989:119; Hossain and Jones 1983: 167). All of these tenure changes contribute significantly to increasing landlessness among the rural poor. The poor who are forced to sell their land or are evicted as tenants become landless labourers either within the rural areas or migrate to urban centres in search of employment (Chambers 1987; Swindell and Mammon 1990).

Several authors have argued that the rich have been the major beneficiaries of development projects because of their favourable access to land, labour and capital and also through their political connections and influence (Husken 1979; Feder 1987). Rich landlords with large land holdings are able to acquire substantial subsidised loans using their land titles as collateral (White and
Wiradi 1989). These loans and the rich land owners’ own savings enable them to adopt new technologies and crops, hire outside labour to work on the land and benefit more from government facilities and programmes than the poor farmers and landless labourers (Husken 1979). Moreover, the local elites and the rich are also able to use their political connections and influence to ensure that they are the first ones to adopt new innovations and benefit from them (Rigg 1991; Isikawa 1975).

Loss of employment among the poor and landless results from changes in labour relations that accompany rural development programmes in many developing countries. Several studies have shown that more jobs are created in the initial stages of rural development programmes. However, increasing individualisation, breakdown of patron-client relationships and changes in technology due to increasing commercialisation and modernisation of agriculture, at a later stage, result in loss of employment and deterioration of terms of employment and wage rates of landless labourers in the rural areas (Hart 1986, Husken 1989; Rigg 1991). The consequence of all these processes is a widening of social and economic disparities within the rural communities whereby the rich become richer and stronger. The poor including small farmers, poor tenants and landless labourers, are further impoverished.

Studies also show that land use changes adopted in the process of commercialisation and modernisation of agriculture may also lead to environmental degradation. Farmers affected by rural development programmes
may adopt unsound cultivation practices to increase their incomes and profits in the short term. They intensify the use of existing lands, either by shortening or eliminating fallow periods. They till the land completely, plant single stands of crops and maintain production through the use of chemical fertilisers. Frequently, cultivation is expanded onto newly-cleared forest land on marginal soils and steep slopes which are highly susceptible to erosion (Blaikie and Brookfield 1987a; 1987b; Torress-Zorilla and Rausser 1990). The ecological costs of these agricultural strategies are accelerated soil erosion, leaching of nutrients, increased flooding, siltation of rivers, compaction and overall deterioration of land quality (Hardjono 1983; Thiele 1990; Bernstein 1979).

In terms of geography, the negative view claims that rural development results in exploitation of rural resources, and spatial concentration of development in central locations, with isolation of marginal areas. Some authors claim that production for market under rural development programmes leads to removal of resources from place of origin to place of demand. This form of production results in disturbance of an ecologic equilibrium that had been maintained by older communities and the depletion of resources. Moreover, the development of transport technology brings about variations in terms of rural-urban links within a country. The centrally located areas participate increasingly in the fruits of economic growth. By contrast, the peripheral-placed areas come to participate in an increasingly inefficient manner in the mechanism of growth, resulting in heightened spatial inequalities (Broek 1966; Sauer 1967; Rutherford et al. 1969)
A more detailed description of rural development programmes and their impacts in developing countries in general, and Malaysia in particular, will be presented in Chapter 2.

1.2 THE KUNDASANG STUDY AREA

The area I have chosen for this study is the Kundasang Highland Vegetable Cultivation Irrigation Project (KHVCIP) in Sabah, East Malaysia. It is located on the slopes of Mt Kinabalu at an altitude of approximately 1250 metres above sea-level (Fig. 1.1). Kundasang is the only region of Sabah that experiences the cool climatic conditions conducive to the production of temperate vegetables on a large scale.

The area was formerly devoted to subsistence crop production under a regime of shifting cultivation by local Dusun farmers. Commercial vegetable farming was first introduced into the area by the colonial government in 1955 under its smallholder assisted scheme. Between 1955 and 1970, although most farmers adopted vegetable cash crops, changes in the production system and adoption of new technology were rather slow. In 1971 the Sabah state government intensified its efforts to commercialise and modernise agriculture in Kundasang with the implementation of an in-situ development project. Since then Kundasang has been transformed into a large-scale temperate vegetable, cash-cropping area.
Although planned rural development in Kundasang is relatively recent, it has had considerable impact on the geography of the area, its agricultural systems and the standards of living of the local farmers. The majority of the farmers have become specialised producers of commercial vegetables utilising hired labour and modern technology such as hybrid seeds, sprinkler irrigation and chemical fertilisers and pesticides. Some well-off farmers have also adopted more advanced technology including polythene sheds and drip irrigation to cultivate...
high-value crops. Production has burgeoned to the extent that the state of Sabah has become self-sufficient in temperate vegetables. Farmers have experienced vast increases in cash incomes and their standards of living have improved significantly. The study area will be introduced in more detail in Chapter 3.

All these changes and improvements indicate that the experience of the project has generally been positive. Several government departments and the rural development institutions classify the Kundasang project as the most successful in Sabah. In spite of this, the area has not been studied in detail before, so my attempt to provide an objective assessment of the project is timely.

1.3 AIMS AND STRUCTURE OF THESIS

The main aim of this thesis is to investigate whether the rural development experience initiated under the Kundasang Highland Vegetable Cultivation Irrigation Project (KHVCIP) has been generally positive or negative for the targeted population. More specifically, the thesis aims to: 1) see what ideas about rural development are available from the literature and test these in Kundasang; 2) trace the history of rural development at Kundasang and identify what rural development strategies have been adopted; 3) examine the impacts of rural development on land use, to see whether there has been land degradation; 4) examine the process of land tenure change to see whether there has been displacement of original land owners and accumulation of land among the rich; and, 5) analyse the patterns and processes of labour utilisation to find out what, if any, forms of differentiation of labour have emerged.
These five aims give six substantive chapters of the thesis. Chapter 2 explains the meaning of rural development and what it involves. It also examines the historical background on theory and practice of rural development in developing countries. Chapter 3 examines the history of rural development in West Malaysia and Sabah. The final part of the chapter sets out the major research questions. Chapter 4 outlines the physical, environmental and demographic conditions of the Kundasang study area. It also discusses the history of rural development in the study area and its special characteristics.

The findings of the field research are presented in Chapters 5, 6 and 7. Chapter 5 traces land use changes in the Kundasang study area from the mid-1950s to the present and attempts to identify whether these changes have resulted in environmental degradation. Chapter 6 deals with land tenure changes that have taken place after the introduction of commercial agriculture and the rural development project. The impacts of these changes are also discussed to see whether some original Dusun land owners have been rendered landless as a result of these land tenure changes. Chapter 7 explores changes in labour organisation adopted by Kundasang land owners at different stages of development. The reasons for labour reorganisation and their consequences are discussed in detail.

Lessons and implications of the Kundasang experience form the basis of chapters 8 and 9. Chapter 8 looks at lessons learned from Kundasang experience. It also raises questions as to whether or not Kundasang can continue to be successful and whether or not its success can be reproduced elsewhere. Finally, Chapter 9 looks at implications of Kundasang development experience.
for the developing world. It discusses the positive experience and demonstrates what Kundasang findings can add to existing theory.

1.4 METHODOLOGY

Most of the data used in the study were collected between November 1988 and September 1990. In the following section I first explain how the study site and sample land owners were selected and then describe the methods used to collect relevant data.

1.4.1. Selection of Study Site and Sample

Both the study site and sample were selected after gathering basic background information on the Kundasang Highland Vegetable Cultivation Irrigation Project (KHVCIP) from development institutions and conducting a reconnaissance survey. On my arrival in Kundasang in November 1989 for my actual fieldwork I spent the first week with the two main development institutions involved in the development of the area: the Farmers’ Organisation (FO) and Korporasi Pembangunan Desa (KPD). From these institutions maps of the project area, lists of land owners, and information on the history of the project were collected. The information gathered showed that the KHVCIP covered an area of approximately 1000 hectares, comprising 540 plots owned by some 370 individual land owners. Of these plots, 198 had on-farm sprinkler irrigation provided by the KPD.
In the following two weeks I visited 60 KPD irrigated plots and talked to about 30 land owners and field staff of FO and KPD about changes in production systems that had taken place since the implementation of the irrigation project. The information gathered showed that the plots that had received irrigation facilities at the start of the irrigation project in 1983 and 1984 had undergone greater change than plots that received irrigation at a later stage. It was found that the 1983-1984 irrigated plots not only experienced more significant land use changes but had also undergone several forms of tenure rearrangements. It was also found that a majority of 1983-1984 irrigated plots lay in a particular part of the project area where major government efforts had been concentrated from the beginning of the project (Chapter 4; Fig. 4.1). Moreover, all irrigated plots that lay in this particular area had been surveyed and their boundaries clearly demarcated.

I decided for two reasons that this part of the project area should be the main focus of the field survey. First, since this area had received major innovations from the start of the development project, changes were more marked there than in other parts of the project area. Second, because all land was surveyed, individual plot boundaries could be easily located, thus facilitating sampling and in-the-field mapping and inventories. This portion of the project area comprised 403 individually owned plots. Of these, 151 had sprinkler irrigation facilities installed by the KPD. Of these irrigation facilities 108 dated from between 1983 and 1984 and the remaining 43 between 1985 and 1989.
Before selecting the sample for in-depth study a quick reconnaissance survey was conducted of all the 108 1983-1984 irrigated plots using a short questionnaire (Appendix 1) to gather information on ownership, tenure arrangements and use of land. The survey showed that ten of the 108 plots were sold to outsiders who lived in other parts of Sabah. Of the 98 plots owned by local Dusun 17 were not farmed, 41 were cultivated by the land owners, 17 by relatives of land owners, 13 by share-croppers and 10 by lessees.

From the owners of these 98 plots a sample of 50 land owners was selected for in-depth study. The sample was stratified to include approximately 50 per cent of the land owners whose land was under each of the four different categories of tenure arrangements mentioned above and also 50 per cent of those land owners whose land was not cultivated. The following procedure was used to select the sample: names of the owners of all the 41 owner-occupied plots were placed in a hat and 20 were picked to be included in the sample. The same procedure was repeated for the owners of uncultivated land and land under other forms of tenure arrangements. The final sample of 50 included owners of land under the following categories of land tenure arrangements: 20 land owners who cultivated their own land, eight whose land was not cultivated, nine whose land was cultivated by their relatives, seven whose plots were cultivated by share-croppers and six land owners who had lessees on their land.
1.4.2 Data Collection

Data collection included: 1) a literature survey; 2) personal interviews; 3) investigative research carried out in various government departments at Kundasang, Ranau and Kota Kinabalu in Sabah; and 4) two detailed in-the-field questionnaire surveys.

1.4.2.1 Literature Survey

Aside from an examination of the literature on the theory and practice of rural development in the developing world and Malaysia, I surveyed the literature available in the Sabah State Archives and libraries of the Agriculture Department, Yayasan Sabah (Sabah Foundation), Sabah Research Institute and the Korporasi Pembangunan Desa. These searches revealed historical information on customary land tenure systems in West Malaysia and Sabah at the time of colonial intervention. Information was also gathered on colonial development policies and their impacts on land tenure and land use, and on the post-colonial development policies and their social, economic and environmental impacts.

1.4.2.2 Personal Interviews

During the fieldwork, persons interviewed included: 1) fifty sample Dusun land owners; 2) nine relatives of sample land owners who granted use-rights to some of their land; 3) five retired Dusun farmers; 4) four village headmen; 5) three middlemen; 6) six urban-based land buyers; 7) ten lessees; 8) fifteen sharecroppers; 9) the current and past managers of the Kundasang Farmers' Organisation and KPD, and the field staff of these institutions; 10) officials of
Agriculture and Lands Departments; and, 11) other people including officials of other government departments, Sabah Foundation, managers of hotels and commercial banks and other individuals with background information on the study area (Appendix 4). Information gathered from these sources supplemented historical and ethnographic information collected from documentary sources. Moreover, interviews provided information and opinions on transformations in land tenure, land use, labour organisation, economic activities, incomes and standards of living of the local Dusun and other social and economic changes to support or verify information obtained from the questionnaire surveys and documents.

1.4.2.3 Investigative Research

Investigative research was carried out to gather statistical data on the amount of land transferred to outsiders, land prices, production and prices of vegetables, and rainfall and temperature. These data were needed as indicators of trends in land market, prices, land tenure, land use, vegetable production, price fluctuations and environmental conditions. Most of these data were collected from the Lands Department, Agriculture Department, Sabah State Planning Unit, Kundasang Farmers' Organisation and the KPD and from markets directly.

1.4.2.4 In-the-field Survey

In order to collect the information required, the following field strategies were used: 1) outline sketch maps of all cultivated plots of the sample land owners were drawn using the KPD map as a base; 2) using pacing and in-the-
field observation, areas under vegetables, fallow, forest, polythene sheds and other structures were mapped; and, 3) two detailed structured questionnaires (Appendices 2 and 3) were administered to all 50 sample land owners to gather in-depth information on labour organisation, production, off-farm economic activities, present and past farming practices, area under commercial vegetables, subsistence crops and fallow land. Information on attitudes and opinions about changes in agricultural practices, land tenure, labour organisation, demographic composition and economic activities were also gathered using the same questionnaires and informal interviews.

At the end of each day sketch maps, land use inventories, and information on the questionnaires were checked and completed. After my return to Canberra, the data were analysed and tables, figures and maps constructed to illustrate the trends and changes that had occurred.

1.4.3 Problems with Data Collection

Some problems were encountered in the process of data collection. The most important were a lack of documentary data on pre-1982 land use, reluctance among Dusun land owners to provide information on land sales and farm incomes and unwillingness among the lessees and outside land buyers to be interviewed.

Neither the Agriculture Department nor the development institutions (FO and KPD) had any documentary data on pre-1982 land use practices, particularly
in terms of areas cultivated. In order to acquire this information farmers were asked to recall what and how much they had planted in that earlier period. Although such questions often fail to yield data of the same precision as current records, the large sample size seems to have provided a reasonable basis for evaluating trends. Moreover, Kundasang farmers are not strangers to land measurements, and their estimates of areas cultivated on their land at the time of study were found to be almost the same as the measurements taken in the field.

However, a more problematic task was to elicit accurate information on land sales either from sellers or from buyers. Both parties wanted to keep the deals a secret primarily because, to avoid paying land tax, some land sales had not been registered with the Lands Department. Moreover, many sellers did not want others to know they had sold their land because the village committees, at least publicly, discouraged sales to outsiders. Therefore, information on land sales had to be collected from both the Lands Department Office in Ranau, and from the 50 sample land owners, as well as from the Farmers’ Organisation, which conducted a survey of land tenure in the project area in July in 1990. These figures are unlikely to be complete as there is undoubtedly an understatement of land sales to outsiders in all these sources.

Data on farm incomes could not be collected because farmers either refused to provide this information or deliberately gave wrong figures. This was done to avoid having to pay income tax. During the interviews a majority of the sample land owners refused to discuss their farm incomes. A few who did
discuss them gave farm incomes that were less than their cost of production. It was, thus, clear that they were not providing the correct figures. Consequently, it was necessary to gain an approximate indication of incomes by estimating their material possessions and standards of living.

Moreover, most of the Chinese, who made up a majority of lessees in the study area, refused to be interviewed. Some Chinese lessees even prevented their workers from talking to us. However, the Chinese lessees on sample land owners’ land gradually came to know me through the land owners and became cooperative. Consequently, all Chinese farmers interviewed were lessees on sample land owners’ plots. These lessees provided information about themselves and other lessees whom they knew well.

In spite of these problems sufficient useful qualitative and quantitative data were collected to make generalisations and draw conclusions on the overall impacts of the rural development project in the area. The data collected are sufficient to test some of the ideas about rural development discussed in Chapters 2 and 3.
CHAPTER TWO
RURAL DEVELOPMENT, COMMERCIALISATION AND THEIR CONSEQUENCES

2.1 INTRODUCTION

Rural development has become a popular field of research over the last two decades, and a large, still rapidly expanding literature exists on the subject. Most literature points out that the integration of rural development strategies into development planning has stimulated commodity production in rural areas and brought about both national and local benefits in terms of foreign exchange earning and improvements in rural incomes and living conditions. In many cases, however, these policies have also created or accentuated problems of unequal distribution of productive resources, differentiation in rural incomes and living conditions, breakdown in social relationships and environmental degradation.

This chapter contains a brief history of the emergence of rural development as a strategy. Attention is then turned to the meaning of rural development, what it involves, and what its impacts are. For heuristic reasons the material presented provides a largely critical view of rural development, despite counter evidence, as an aid to formulating hypothesis for testing at Kundasang.
2.2 HISTORY, MEANING AND ELEMENTS OF RURAL DEVELOPMENT

2.1.1 History and Meaning of Rural Development

Rural development as a strategy for development planning grew out of a general disenchantment with technocratic and growth oriented policies of the 1950s and the 1960s (Harriss 1982:15; Lea and Chaudhri 1983:1). Several authors including Lea and Chaudhri (1983), Chenery (1984), Lewis (1986), and Reitsma and Kleinpenning (1985) claim that in the 1950s and 1960s development planners in the newly independent developing countries believed that economic development could be achieved through industrialisation and urbanisation as had happened in colonising metropolitan countries.

Many developing countries went so far as to neglect their agricultural sector. Countries that did focus on agricultural development did so with the aim of feeding rural and urban people, providing raw materials to industries in their own countries, and producing exports to finance the purchase of capital goods from developed countries. Little attention was paid to alleviation of poverty or the distribution of social and economic benefits (Misra and Bhoosan 1981:24). Development planners saw development as a ‘trickle down’ process, whereby economic growth through industrialisation and resulting gains in per capita incomes would create new jobs and other favourable conditions, which would result in wider distribution of the social and economic benefits of growth to all sectors of the nation. Relief of poverty was also seen as coming from ‘trickle down’ effects, or else it was believed that an increase in income inequality was
the unavoidable price of economic growth (Hardaker 1991; Misra and Bhoosan 1981).

In the 1960s and early 1970s most developing countries realised that the results of such development policies were disappointing, with little progress having been made through the over-emphasis on industrialisation and urbanisation. Instead of benefits ‘trickling down’ bringing a more even distribution of income, many countries experienced greater income disparities. The ranks of the poor were rapidly increasing and inequalities in distribution of income, land, resources and access to services were becoming more marked as local elites took over from colonial settlers and capitalists (Lea and Chaudhri 1983; Srinivasan 1984; Reitsma and Kleinpenning 1985).

With such outcomes it became clear that a new approach to development was necessary to achieve growth in productivity, employment and incomes and to address the problems of inequality. Moreover, from the early 1960s, agricultural economists started to point out the potentially positive role of agriculture in economic development. The ability of the agricultural sector to contribute to the accumulation of investment capital, supply labour to the industrial sector, and produce cheap food for a non-agricultural labour force were recognised (Johnston and Mellor 1961). Schultz (1964) advanced his ‘poor but efficient’ theory about farmers in developing countries, implying that investments were needed in agricultural research, education and training. Furthermore, agricultural research demonstrated a capacity to increase productivity (Hardaker 1991).
In the meantime, international organisations and funding agencies such as the International Labour Organisation (ILO), Food and Agriculture Organisation of the United Nations (FAO), and the World Bank began to advocate rural development. This prompted Third World development planners and politicians to place greater emphasis on rural development in their overall development plans (Lea and Chaudhri 1983; Srinivasan 1984). Thus rural development became an integral element of development strategy in the Third World from the early 1970s and still remains central to most development programmes.

2.2.2 Rural Development Defined

Rural development is concerned with promoting change toward high levels of productivity, consumption, welfare and social organisation for the rural poor (Donaldson 1991). It has an important social dimension and is concerned with equity objectives of several kinds. In particular, a major concern has emerged for the alleviation of poverty and reduction of inequalities in income, employment, and access to productive resources, public goods and services (Harriss 1982; Meier 1989:82-86; Hardaker 1991:4). The World Bank defined rural development as:

... a strategy designed to improve the economic and social life of a specific group of people - the rural poor. It involves extending the benefits of development to the poorest among those who seek a livelihood in the rural area. The group includes small-scale farmers, tenants and the landless... (World Bank 1975:3).
On the basis of this definition, 'rural development' refers to a specific approach to state intervention in the economies of developing countries to raise productivity and improve the quality of rural life. This approach is broader and more specific than 'agricultural development'. It is broader because it is concerned with development of the rural economy and society as a whole rather than just with development of agricultural production. As a strategy, rural development is expected to promote overall economic development of developing countries by increasing domestic food supply, enlarging the size of the domestic market for the manufacturing sector, increasing the supply of domestic savings and providing foreign exchange earned by agricultural exports (Myint 1975). It is more specific because it focuses specifically on poverty and inequality in rural areas (Harriss 1982). A major concern under rural development has emerged for improved or more equitable income distribution leading to a notion of 'redistribution with growth' (Meier 1989:82-86; Hardaker 1991:4).

2.2.3 What Does Rural Development Involve?

To facilitate desired changes in rural life, rural development strategies usually involve provision of necessary infrastructure, land parcels of an economic size, and modernisation of agriculture (Hardjono 1983; Donaldson 1991; Krinks 1983; Berry 1975; Misra 1985).

Under rural development programmes, infrastructural development is seen as a means not only of increasing agricultural productivity but also of achieving a broadly based improvement in the welfare of the rural population (Johnston and
Kilby 1975:129; Kulp 1970:126-127). In addition to developing productive infrastructure necessary for development of agriculture special attention is paid to providing infrastructure required for improvement of social welfare of the rural people and increasing their access to public goods and services (Reynolds 1975:9; Myint 1975:333; Goldberg 1984). Among the social welfare facilities provided are main roads, water supply, electricity, telephones, schools, health clinics, market and shopping facilities and community centres.

In many developing countries unequal distribution of land in favour of local elites and rich landlords has been recognised as a major cause of poverty and inequality in rural areas (Mackenzie 1989; Misra and Bhoosan 1981; Isikawa 1975; Mafeje 1979). Under rural development programmes most Third World governments embarked on land reform programmes to provide economic-sized holdings to the landless and near landless rural dwellers. This was done, first, because most governments believed provision of economic-sized holdings would increase farmers' incomes and help alleviate poverty. Moreover, there was a general feeling among many Third World governments that giving control of land to the producers through the issue of registered titles guaranteed by the state would improve productivity and promote more sustainable production systems. The farmers would have access to credit and better incentives to invest in farming and farm improvements (Attwood 1990; Haugerud 1989; Shipton 1988).

The two basic strategies adopted by the Third World governments to provide economic-sized land holdings to the landless and farmers with inadequate
land were: (1) appropriation and redistribution of land owned by large land owners, and (2) development and distribution of state-owned land. Under the first strategy some countries such as Pakistan and Sri Lanka embarked on radical land reform exercises whereby legislation was enacted to impose ceilings on the size and number of land holdings an individual could hold. Any land in excess of the stipulated limit was to be expropriated by the government and redistributed to the needy farmers (Grigg 1970; Swan 1983). In reality, very few non-socialist countries (Japan and Taiwan) were fully successful in implementing such land redistribution policies because of political pressure from landowning groups, and ability of the land owners to evade stipulation about excess land and absentee ownership (Eckholm 1980; Vyas 1983; Lea and Chaudhri 1983; Ranis 1983; Hinderink and Sterkenberg 1987; Mafeje 1979). Consequently, land distribution has remained non-egalitarian in nature in most areas despite widespread attempts at land reform (Cheema 1985).

The second strategy involved establishment of capital intensive resettlement schemes on state-owned land. Under such schemes state land was developed using funds from international funding agencies, national governments or subsidiary government bodies. Subdivided into individual plots, the land was settled with people from land short areas (Misra and Bhoosan 1981; Chantachaeng 1988). Apart from providing land to the farmers, these schemes often involved the establishment of new forms of agricultural and social organisation, and attempted to promote a break with the existing peasant systems of production in terms of scale of operations, production techniques and socio-
legal structures (Long 1977; Ghai 1983; Krinks 1983). They also tended to create new geographies of settlement, transport and agriculture, and a new relation between people and land.

The modernisation of agriculture and improvements in productivity were to be achieved through provision of necessary physical infrastructure, agricultural support services and technological innovations. The physical infrastructure provided to modernise agriculture and increase agricultural productivity included irrigation and drainage, access roads, marketing and primary processing. These services were designed to facilitate increased productivity through the transfer of technology and to distribute its benefits equitably in the agricultural sector (Antle 1983: 181-182). Irrigation and drainage facilities were established to provide irrigation water during dry seasons to promote double cropping in rice growing areas, particularly in Southeast Asia (Hardjono 1983; Krinks 1983; Hossain and Jones 1983). Access roads including main roads linking rural and urban areas and feeder roads within rural areas were constructed or upgraded to lower transport costs, improve market accessibility, information flow and access to social services (Barlow and Jayasuriya 1986; Antle 1983).

Main technological innovations in the agricultural sector under rural development programmes were of two types: 1) mechanical, and 2) biological and chemical. The mechanical innovations include machines such as combine harvesters, tractors, power tillers and threshers. These machines made farm operations easier and quicker and economised on labour. The biological and
chemical innovations included yield-enhancing inputs such as chemical fertiliser and pesticides and hybrid seed and livestock varieties (Hart 1989; Hardjono 1983; Hossain and Jones 1983; Reynolds 1975). The most impressive examples of these were adoption of Mexican dwarf varieties of wheat in India and Pakistan and dwarf and semi-dwarf varieties of rice in Southeast Asia. Along with the hybrid varieties of crops the farmers also adopted the use of chemical fertiliser, pesticides and irrigation water (Barlow and Jayasuriya 1986). Mechanisation with machines ranging from mechanical tooth weeders to tractors and combine harvesters also occurred (Hossain and Jones 1983; Swan 1983).

To enable the farmers to adopt new crops and technological innovations and to benefit from rural development programmes, various forms of agricultural support services were provided. These included access to credit, price subsidies, marketing, primary processing and research and extension (Krinks 1983; Berry 1975; Hardjono 1983; Misra 1985; Barlow and Jayasuriya 1986). Access to credit and price subsidies were provided to facilitate purchase of farm equipment and inputs necessary for the cultivation of hybrid varieties of crops. Research and extension provided advice and assistance on the selection of appropriate varieties of crops to suit different ecological conditions and on adoption of new technology. Primary processing and marketing facilitated the processing, storage and marketing of produce and provided incentives to the farmers to participate in cash crop production (Hinderick and Sterkenberg 1987; Barlow and Jayasuriya 1986; Hardjono 1983). To provide these support services rural development institutions such as farmers’ associations, rice centres, rural cooperatives and
rural banks were formed (Hardjono 1983; Hossain and Jones 1983; Krinks 1983). Thus it can be seen that rural development has many different strategies. Frequently many of these strategies operate side by side but do not always give the intended results.

2.3 IMPACT OF RURAL DEVELOPMENT

2.3.1 Economic Impact

Economically, rural development has led in most cases to significant increases in agricultural productivity (Cheema 1985; Hart 1989). The number of households involved in commercial agriculture has increased at a rapid rate, leading to significant expansion in areas under cash crops and increase in output of crops for local and export markets (Swan 1983; Krinks 1983; FitzGerald 1985). As a result, many developing countries have been able to enhance agricultural exports and achieve self-sufficiency in some food items. These achievements have had both national and local benefits. At the national level expansion in exports and reduction in food imports have improved the balance of payments (Krinks 1983; Hardjono 1983; Richards 1985; Srinivasan 1984; Simpson 1987).

At the local level increased production of cash crops has brought about a significant rise in real incomes leading to general improvements in the standards of living of most farmers and overall prosperity of rural areas (Long 1968; Swan 1983). A few larger farmers have been able to invest in agricultural businesses such as rice mills, farm machinery hire and haulage, and non-farm economic activities including grocery shops, restaurants and taxi businesses. A majority of
farmers have adopted modern farming methods using chemical inputs and machinery and begun to use hired labour to supplement the household labour to carry out farm work (Long 1968; Abdel-Fadil 1975; Anan 1989; White and Wiradi 1989; Simpson 1987).

2.3.2 Social Impact

Social impact of rural development has been the major focus of recent studies. On the beneficial side a majority of these studies point out that rural development programmes have made available such improvements as piped water, electricity, access roads, schools, basic medical facilities and social and cultural institutions in the previously isolated rural areas (Chapter 1). At the individual level rural people have been able to build better houses and acquire other assets and luxury items (Cheema 1985; Long 1968).

On the detrimental side, a number of studies present evidence that rural development policies have initiated changes in land use, land tenure and labour organisation that have disadvantaged sectors of rural communities. These changes have led to a concentration of the benefits of development among the rich, thus widening the social and economic gaps between the rich and poor, creating or accentuating the problems of landlessness and unemployment and poverty among a significant proportion of the rural population (Husken 1979; Thiele 1990; Rigg 1991; Isikawa 1975).
Benefits to the Rich

One of the major concerns of rural development is to raise agricultural productivity through intensification of land use and adoption of green revolution technology. Rural development programmes attempt to facilitate the adoption of new technology and increased yields through provision of subsidised farm credits, productive infrastructure, extension services and inputs. However, several studies in Asia (Anan 1989; Husken 1979; White and Wiradi 1989; Feder 1987) and elsewhere (Thiele 1990; Hinderink and Sterkenberg 1987; Byres 1982; Lipton 1982) suggest that the major beneficiaries of green revolution technology and government-provided productive infrastructure are the richer, larger and landed farmers. These authors contend that the rich are able to benefit more from rural development because of their superior access to productive resources (land, labour and capital), political connections and the biases of development institutions and government policies towards them. The social and economic status of the poor deteriorates further.

Access to productive resources helps benefits of development to accrue to the rich in several ways. A majority of the farmers with large land holdings usually has some savings. They also find it easy to acquire substantial amounts of subsidised agricultural loans using their land as collateral (White and Wiradi 1989). The new technology and crops under green revolution, are very demanding (Husken 1979). The improved varieties of crops require large quantities of chemical fertiliser, well controlled supply of irrigation water, intensive cultivation and proper protection against weeds and pests. The
successful adoption of these crops requires substantial cash outlay. The rich farmers with readily available cash and easy access to credit are able to afford the new crops and technology and meet the input and labour requirements (Reitsma and Kleinpenning 1985:82).

Literature also suggests that the availability of cash, and large size holdings with good quality better irrigated land reduces the risks for rich farmers of experimenting with new technology and crops whose potential characteristics are not well understood (Feder 1987; Just et al. 1982; Chambers 1987). In addition, when green revolution technology is in short supply, especially at the early stages of introduction, the rich farmers often use their political links to ensure that they are among the first people to adopt innovations. By doing so the rich farmers become the earlier adopters of new crops and technology and major beneficiaries of rural development programmes (Rigg 1991; Isikawa 1975).

Moreover, with easy access to credit and their own savings the rich farmers acquire more capital intensive machinery and equipment such as combine harvesters, tractors, modern mills and large irrigation pumps (Chambers 1983). With the use of these machines and equipment the rich farmers increase the area under cultivation while economising on labour. This enables them to increase their farm productivity, yields and incomes. The ownership of farm machinery such as combine harvesters and tractors also enables the rich farmers to earn substantial cash incomes by hiring out their equipment out to other farmers (Hardjono 1983; Anan 1989).
Apart from these advantages the bias of state policies and development institutions also plays a major role in enabling the rich to be the major beneficiaries of development programmes. Several studies have shown that extension services, credit, seeds, fertiliser, tools, machinery and other inputs are concentrated on better-off farmers (Vyas 1983; Ghai 1983). This is so because the rich farmers with fertile land and readily available finance are the only ones who are able to purchase high-yielding inputs and are more likely to adopt new crops and technology successfully than small farmers. In addition, ambitious agricultural advisers spend more time helping large farmers because it is to their personal advantage if agricultural production is increased dramatically in a short period of time in their areas (Reitsma and Kleinpenning 1985).

2.3.2.2 Land Tenure Changes and Landlessness

As discussed above, land ownership generally remains skewed in favour of rich farmers and landlords due to the failure of governments' land reform measures. However, land tenure changes that do take place after the implementation of rural development programmes often cause increasing landlessness among the rural poor.

With the introduction of cash cropping under rural development programmes land becomes an increasingly important commodity for generation of wealth. For some rich land owners land becomes a capital asset to generate incomes from sales and dues from tenants. The demand for land increases, pushing land prices and rents higher (Anan 1989; Shrestha 1988; Feder 1987;
Scott 1985). Subsequently, land owners adopt several forms of land tenure changes including sales, leasing, share-cropping, expropriating land from tenants and postponing inter-generational land transfers to take advantage of new economic opportunities (Swindell and Mammon 1990; Srivastava 1989; Shrestha 1988; Slatter 1985).

There are examples where such transfers have been prevented after the introduction of rural development projects. One such example is Federal Land Development Authority (FELDA) schemes in Malaysia where farmers do not get transferable title to the land. These schemes also start with equitable land distribution whereby each household is allocated a set amount of land. However, in some in-situ development projects, although efforts have been made to give farmers economic size holdings, no restrictions have been placed on tenure re-arrangements. Consequently, several forms of tenure changes continue to take place.

Several studies point out that land is sold by both rich and poor farmers but for different reasons. Rich farmers generally sell land for the following reasons. Some with surplus land sell part of it and use the revenue derived to improve housing and other facilities. Others sell simply to accumulate savings, taking advantage of high prices (Thiele 1990). More commonly, however, rich farmers and landlords sell some of their land to raise capital to invest in other enterprises such as trucking businesses, grocery shops, marketing of farm produce and purchase of farm machinery for hire, which they consider are more profitable
than farming (Morrison 1980; Banzon-Bautista 1989; Anan 1989). Such lands are usually sold at very high prices, thus excluding the landless and other poor villagers from land markets (Anan 1988:125).

Poor farmers who own small pieces of land, on the other hand, are often forced to sell it as a result of indebtedness, natural disasters, family misfortune, uneconomic size of holdings and inability to cope with new farming practices. Swindell and Mammon (1990), Chambers (1983), Ghai (1983) and Swan (1983) have shown that most poor farmers do not have buffers against such contingencies. They raise loans from local money lenders, merchants and traders at usurious interest rates for urgent needs such as paying for weddings, funerals, school fees and treatment of illness. Frequently, land is used as security for such loans. When these farmers fail to repay loans on time because of crop failures, death of the household bread winner or some other misfortune they are forced to sell the land to the creditor or another bidder. Similarly, after natural disasters such as droughts, floods and famines when the poor have nothing to eat they sell either part or all of their land to obtain food for subsistence (Chambers 1983).

In certain societies growth in population and inheritance rules also lead to subdivision of land and fragmentation. Sometimes fragmentation reduces the size of the holdings to such an extent that it becomes extremely difficult to produce high enough yields to sustain a tolerable standard of living (Vyas 1983:54). Such plots are also too small to take advantage of new technologies such as tractors and combine harvester. Moreover, some poor farmers cannot adopt new methods
of farming because they are unable to meet the input and labour requirements of new crops and/or keep to schedules demanded by the development institutions. Both these groups of land owners typically sell their land in response of debt burdens (Anan 1989; Swan 1983).

These forms of sales by poor farmers may render a significant proportion of the rural population landless, so that they become fully dependant on making a living through selling their labour (Mafeje 1979; Chambers 1987). The land is generally bought by local and urban-based wealthy landlords, businessmen or civil servants who already own large land holdings. This results in concentration of land among the more well-off sector of the society and the growth of absentee ownership (Dike 1989; Downs and Reyna 1988; Swindell and Mammon 1990).

Leasing and giving out land for share-cropping by poor farmers also contribute to landlessness among the rural poor. Some poor households find it difficult to cope with new farming practices and crop schedules due to lack of technical know-how, capital and labour resources. These land owners have no choice but to lease out or share-crop their land with better off local or immigrant farmers to ensure production efficiency (Srivastava 1989; Morrison 1980). After leasing or share-cropping their land these farmers either become labourers on others’ lands or migrate to urban centres in search of employment (Swindell and Mammon 1990).
Changes in leasing and share-cropping arrangements adopted by rich land owners after the implementation of development projects is another important factor contributing to landlessness among the rural poor. The well-off land owners, particularly those with family businesses or off-farm employment, commonly leased or share-cropped their land prior to the implementation of rural development programmes for one or a combination of reasons: shortage of household labour to work on farm or supervise farm labourers, uncertainty of outside labour supply, and/or lack of interest in farming (Anan 1988). They generally leased their land to poor landless farmers and to farmers with insufficient land who originated from the same area. This form of tenancy arrangement benefited both the rich land owners and the rural poor. The rich land owners managed to keep their land under cultivation and derived some income from it while occupied in off-farm economic activities. The poor had access to land from which they made their livelihoods (Morrison 1980; Slatter 1985).

However, after the implementation of successful development programmes, farm profits and demand for land from outsiders increase. Typically rich land owners raise rents and ask for payments in advance. They also prefer to lease the land on a long-term basis (Hart 1989). This puts the rich and middle farmers in an advantageous position because they are the only ones able to raise the capital for this form of leasing arrangement (Slatter 1985; Anan 1989; Husken 1979). The poor farmers, who formerly leased or share-cropped the land, are forced to relinquish the land and become landless (Cheema 1985; Wong 1983).
Moreover, mechanisation and improved technical inputs made available under the rubric of rural development make farm operations such as land preparation, weeding and harvesting much easier and quicker and less labour intensive. Many land owners are enticed to withdraw their land from the renting and share-cropping market and cultivate it themselves using machines and seasonally hired labour (Wong 1983; Shrestha 1988). The introduction of new technology also enables some land owners to retain control over the land as they grow older. This practice prevents inter-generational transfer of land from aging parents to their adult children, thus keeping a large proportion of the rural population landless (Hart 1989).

2.3.2.3 Labour Re-organisation and Unemployment

Loss of employment by the poor is a common consequence of transformation in labour organisation necessitated by emphasis on commercialisation and modernisation of agriculture under rural development programmes. Studies by McNetting et al. (1989) in Latin America, Carmen and deJanvry (1979) in Nigeria, Benjamin (1977a) in Peru and Anan (1989) in Thailand imply that at the start of a rural development programme the labour utilised for farming is mostly from household and cooperative work groups of friends and neighbours organised on a reciprocal help basis. These forms of labour relations help to alleviate households’ occasional labour and food shortages and prevent the emergence of classes of rich and poor in the society.
In the early stages of rural development programmes, although new crops and more intensive forms of cultivation are introduced, the technology used for farm operations such as land preparation, transplanting, application of fertiliser and pesticides, weeding, harvesting and post-harvest treatment remains labour-intensive (Hart 1989; Banzon-Bautista 1989; Jayasuriya and Shand 1983; Husken 1989). The existence of labour-intensive technology and the introduction of official schedules of farm operations intensifies the demand for farm labour (Banzon-Bautista 1989). These changes in farming practices make household labour insufficient, the organisation of cooperative labour problematic, and the use of hired labour essential. Consequently, household labour becomes more heavily employed and specialised. Inter-household cooperative work declines and frequently stops. The use of hired labour and share-croppers becomes more dominant, with money rather than mutual self-help and co-operation becoming the currency of repayment (Gudeman 1978; Saul 1983; Grossman 1984; Anan 1989).

As development progresses, distinct groups of rich and poor farmers and landless labourers emerge as a consequence of uneven distribution of productive resources, land tenure changes and concentration of benefits of development in favour of the rich (Lenin 1982; Byres 1982; Hart 1989) (discussed above). The incomes of farmers, particularly of larger farmers, increase significantly through the rise in productivity of cash crops. The increased cash incomes and availability of farm labour among the landless and near landless groups of rural poor facilitate labour re-organisation in various ways.
Rich farmers send their adult children away for higher education. These children stay longer at school rather than participate in farm production activities (Castillo, et al. 1986; Fegan 1989). On leaving school the better educated children find employment in non-agricultural salaried jobs (Fegan 1989). Those children who fail to obtain higher qualifications are occupied in family businesses such as operating combine harvesters, driving trucks and vans, marketing agricultural produce and running grocery shops (Husken 1989). A majority of rich farmers also prefer that their wives and children stay at home rather than participating in farm work (deVries 1983; Fegan 1989). They hire rural poor to work on the land while they assume roles as farm managers (Anan 1989; Castillo, et al. 1986). This form of labour re-organisation provides employment to a large number of rural landless (Hart 1986; Husken 1989). It also provides opportunities to poor farmers with land insufficient for their labour to hire themselves out to supplement their meagre incomes from small plots (Carmen and deJanvry 1979; deVries 1990; White and Wiradi 1989).

However, the period of intensification of labour and increased employment opportunities for the rural poor is often short-lived. The stress of official schedules of planting and harvesting activities and increasing labour costs leads to adoption of labour-saving devices such as farm machinery and some institutional changes. Such labour-saving devices enable the large land-owners and rich farmers to expand their scale of operation while economising on labour costs by reducing the use of hired labour (Hart 1989; Castillo, et al 1986; Jayasuriya and Shand 1983). The adoption of labour-saving devices has serious
impacts on unemployment and under-employment of the rural poor. These are very well documented in studies conducted in rice areas of Asia and Southeast Asia.

Mechanisation of land preparation, planting, weeding, harvesting, threshing and winnowing in rice areas, displaces a large number of farm labourers (Jayasuriya and Shand 1983; Fegan 1989). The use of tractors makes land preparation faster and easier but displaces a considerable amount of hoeing labour, draft animals and hired ploughing operators (White and Wiradi 1989). Moreover, the replacement of the manual transplanting of rice seedlings with broadcasting of germinated seeds in prepared fields or using mechanical transplanters eliminates the need to hire labour, for uprooting seedlings and transplanting (Fegan 1989; Banzon-Bautista 1989). Similarly, combine harvesters, mechanical threshers, petrol driven winnowing machines, rotary push weeders and chemical weedicides displace a significant proportion of farm labour (Fegan 1989; Hart 1989; Castillo, et al. 1986; Jayasuriya and Shand 1983).

The introduction of labour-saving devices has also led to a dramatic restructuring of agrarian relations. The rural elites have begun to disengage themselves from patronage relations with small farmers and landless labourers now that the latter’s labour has become increasingly irrelevant. The breakdown in such patron-client relationships has further exacerbated problems of unemployment, under employment and deterioration of wage rates of the rural poor (Hart 1989).
Institutional changes have also resulted in loss of employment and subsistence among the poor. Changes in the rice harvesting system in Java are an excellent example of one such institutional change. The works of Hart (1986), Husken (1979) and Stoler (1988) show that rice harvesting in Java was traditionally a community activity in which everybody had a right to participate and receive a share of the harvest (*bawan* system). Recently this system of harvest has been replaced by the *tabasan* system, in which standing padi crop is sold to middlemen, who organise the harvest themselves, mostly hiring their own relatives and friends, or who bring in outsiders to harvest the crops. The local poor lose an important source of subsistence and become more vulnerable to poverty and exploitation by the rich.

The poor who lose their jobs in the agricultural sector are forced to make a living from non-farm employment either locally or in nearby urban areas. Many, unable to migrate, abandon the agricultural sector or fully depend on wage earnings for subsistence (Rigg 1988; deJanvry *et al.* 1989). As a result, there exist large masses of surplus labour, low labour productivity and poverty for a large share of the rural population, who become relatively and absolutely poorer and weaker (Chambers 1983).

### 2.3.4 Environmental Impact

Several researchers and academics including Blaikie and Brookfield (1987a, 1987b, 1987c), Bernstein (1979), Boserup (1965), Stonich and deWaltz (1989), Thiele (1990) and Torres-Zorrilla and Rausser (1990) report that land use
changes adopted in the process of commercialisation of agriculture often lead to environmental deterioration. Studies in developing countries show that before the implementation of rural development programmes, agricultural production systems are usually semi-subsistence in nature, and are involved in the production of subsistence and limited, often diversified cash crops (Dalton 1982; Barlow and Jayasuriya 1986). These are low-input, low-cost systems in which minimal inputs of human labour, fertilisers, draft power and cash are expended to produce crops under natural soil fertility and rainfed conditions (Slattery 1979).

Rural development programmes change this form of agriculture to high-input, high-output and high energy systems of production with emphasis on cash cropping and modern technology. As development progresses the population also increases as a result of natural increase and in-migration of farmers from other economically depressed areas (Morvaridi 1990; Thiele 1990; Stonich and deWaltz 1989; Dike 1989).

The combined forces of commercial agriculture, new technology, desire among farmers to accumulate profits and increasing population pressure lead to drastic changes in land use. The two most common changes that take place are intensification of cultivation on existing farm lands and extension of cultivation on previously unutilised and forested marginal land. Both of these changes may have serious degrading consequences on the environment (Thiele 1990; Torres-Zorilla and Rausser 1990; Blaikie and Brookfield 1987a; 1987b).
Intensification on existing farm lands is effected through modification in cultivation practices. On land under crops, fallow periods are either shortened or eliminated in order to facilitate double or multiple cropping (Torres-Zorrilla and Rausser 1990; Thiele 1990). The land is tilled completely during the preplanting land preparation stage and a monoculture of soil-exhausting cash crops such as groundnuts, tobacco, coffee, sugar cane and maize are planted in rows. Crops such as pigeon peas and cow peas that have good soil protection qualities are sometimes removed from cropping cycles as rotation crops. Such cultivation practices provide poor ground cover in the early growing season and make the soil highly susceptible to accelerated erosion, oxidation and leaching (Brookfield 1984; Blaikie and Brookfield 1987b).

The extension of cultivation on marginal land, especially on forested steep slopes, takes place because of population growth, the introduction of highly profitable cash crops in lowland areas, fluctuating returns from cash crops and the introduction of high-value highland crops. The need to feed the growing number of people and the addition of cash crops in traditional subsistence farming systems result in a shortage of agricultural land in plains and valleys, forcing people to cultivate previously unutilised forested marginal lands (Mearns 1991; Palte 1989; Blaikie and Brookfield 1987b; Ali 1986).

The introduction of highly profitable cash crops also leads to monopolisation of better quality agricultural land by large farmers through purchase, renting and eviction of tenants (see above). Poor farmers with insufficient land and those made
landless in the process of land accumulation are forced onto marginal lands (Lewis 1992; Mearns 1991; Thiele 1990). Fluctuating returns from cash crops also force farmers to expand cultivation onto marginal lands. Lewis (1992) and Thiele (1990) claim that when prices of cash crops are unfavourable due to a combination of oligopolistic marketing system and unequal exchange the farmers over-exploit their land and relocate onto marginal land to survive. When prices are favourable the farmers once again expand cultivation on marginal land and intensify exploitation of all available land in order to accumulate profits (Ali 1986; Thiele 1990).

The introduction of high-value highland crops does not only result in extension of cultivation but also lead to intensification of cultivation on marginal upland areas. The high-value highland crops in the tropics generally include tobacco, cut flowers and temperate vegetables such as cabbages, potatoes, carrots, leeks, peas, cauliflower, broccoli, and shallots. The physical requirements for these crops are a high level of natural soil fertility stemming from recent volcanic deposits, sufficient and well distributed rainfall, and low temperatures. These conditions are confined to a few specific highland areas situated above 1000 metres altitude. Over the last three to four decades commercial cultivation of high-value temperate crops has increased significantly on these highlands (Willis 1992; Hardjono 1991; Palte 1989). In Southeast Asia the main areas of temperate vegetable production are uplands in Philippines, North Thailand, Malaysia and Java.

The expansion of cultivation onto marginal lands and intensification of upland cropping systems have devastating effects on the environment. Works of Willis (1992) in uplands of Philippines, Hardjono (1991) in west Java and Palte (1989) in central and east Java show that extension on marginal highlands and adoption of more intensive cultivation practices have led to degradation of land resources through deforestation, rapid leaching of nutrients and accelerated soil erosion. These in turn lead to destruction of watersheds, increased silting and associated severe flooding during rainy season and diminished water supplies in dry seasons in lower areas.
Apart from land shortage and changes in cultivation practices, other social and economic factors such as insecurity of tenure and fear of increase in land rents also contribute significantly to land degradation in some areas. Tenants with insecure tenure do not take soil conservation measures such as digging drains or constructing bunds or contour terraces on land they cultivate. The fear that landlords might withdraw the land from tenancy arrangements discourages tenants from taking care of the land. They tend to exploit the land to obtain maximum benefits without due regard to conservation measures. They also do not make improvements that may benefit the landlord in case the land is taken back (Thiele 1990; Clarke and Morrison 1987). Moreover, tenants such as Indo-Fijians on native land in Fiji are hesitant to make improvements for fear of demands of higher rents by landlords (Ward 1965). In addition, the tenants also rarely see benefit in tree planting or protection or other long-term commitments to sustainability.

Sometimes low population density and abundance of land also lead to land degradation. A lack of demographic pressure in land surplus areas creates conditions of abundant land availability at low costs. Capitalist farmers seek to maximise short-run returns without paying attention to the effects of their crude farming practices. They adopt the attitude that when one plot of land becomes unproductive they can move on to a new more fertile plot (Thiele 1990).

To maintain production on land under more intensive cultivation (and also on rapidly degrading marginal land) farmers use high-yielding inputs such as improved irrigation systems, chemical fertiliser and pesticides, tractors and other forms of machinery (Parker and Fryer 1975; Davies 1981; Hammerton 1981; White and Wiradi 1989; Morvaridi 1990). These high-yielding inputs have had serious long-term degrading consequences on the environment and human health (Bevenue et al. 1971; Weir and Shapiro 1981; ven den Bosch 1978; Thaman 1984).

Water resources are degraded due to the unprecedented expansion in fertiliser and pesticide use. These inputs enter streams, rivers and ground water
through leaching and surface run-off, thus increasing the concentration of toxic substances and frequency of eutrophication (Lewis 1992; Louloudis et al. 1989; Preston 1974). With the overuse of pesticides, pest resistance has increased enormously in many parts of the world, resulting in a pesticide treadmill, greater environmental pollution and increased health hazards (ven den Bosch 1978; Georgiou 1981). Moreover, deaths and severe sickness due to pesticide poisoning have become common throughout the Third World. People become victims of pesticide poisoning either because they do not follow directions and do not use the pesticides according to prescription or do not wear appropriate protective clothing or equipment when using them (Davies 1981; Weir and Shapiro 1981; Thaman 1984).

2.4 RESUME

This chapter has examined how rural development as a strategy for development planning came to be formulated and implemented in Third World countries, what it has involved and its economic, social, technological and environmental impacts. In the 1950s and 1960s many newly independent countries attempted economic development through industrialisation and urbanisation following examples of their colonial metropolitan countries. The main emphasis of this technocratic and growth oriented strategy was economic growth, assuming that the gains would 'trickle down' thus resulting in wider distribution of social and economic benefits. However, the consequences of such policies were disappointing, leading to greater income disparities, higher incidence of poverty and inequalities in access to resources, goods and services.
By the late 1960s there was general disenchantment with the technocratic and growth-oriented policies. In the meantime, agricultural economists began to highlight the potentially positive role of agriculture in economic development. The international organisations and funding agencies also started prompting Third World countries to place greater emphasis on rural development. Consequently, from the early 1970s rural development has become an integral part of development strategy in the Third World. The main concern of rural development strategy has been to promote change towards higher levels of productivity, consumption, welfare and social organisation of the rural poor. The strategy involves increasing agricultural productivity and raising incomes and standards of living of the rural people through provision of social and physical infrastructure and agricultural support services.

This strategy resulted in growth in rural productivity and incomes and brought increased access to goods and services for rural people. However, it has failed to bring about equitable distribution of productive resources or to solve the problems of landlessness, unemployment and poverty in rural areas, thus leading to increasing social and economic gaps between the rich and the poor. In some cases rural development has led to accentuation of many of these problems and created environmental problems.
CHAPTER THREE

MALAYSIAN RURAL DEVELOPMENT EXPERIENCE

3.1 INTRODUCTION

Several studies point out that Malaysia exemplifies a successful case of a developing country. It has achieved an impressive and sustained rate of economic growth since independence, a success attributed to a purposeful strategy of agricultural modernisation and industrial development adopted over a series of five-year plans beginning towards the end of the colonial era in 1955. However, these studies also claim that, despite achieving remarkable economic growth, the Malaysian development policy has failed to reach the expected goals of eradicating mass poverty, equalising opportunity for all or narrowing gaps in income distribution between the rich and poor.

This chapter reviews the colonial and post-colonial development experience of West Malaysia and Sabah and analyses the consequences of the policies implemented at different stages of development planning. The aim of the chapter is to lay the foundation for a detailed analysis of the rural transformations that have emerged in the Kundasang study area as a result of its development project.
3.2 WEST MALAYSIAN RURAL DEVELOPMENT EXPERIENCE

3.2.1 Colonial Development Policy

The British phase of the colonial period in Malayan history began with the occupation of Penang in 1786, Malacca in 1795, and the island of Singapore in 1819. These places later became the centres of exploitation of the Malay Peninsula as a supplier of raw materials for Western industrialised countries (Snodgrass 1980:15). At the onset, the economy of the British colony of Malaya was characterised by a small population, rich deposits of tin ore and vast areas suitable for plantation agriculture (Schatzl 1988: 27). A majority of the Malays and other indigenous people lived in small nucleated settlements or kampongs located in river valleys and were engaged in small-scale subsistence agriculture producing rice, coconuts, fruits and vegetables on communally owned land. Other economic activities included hunting and fishing (Lee 1973; Lim 1977; Overton 1994a).

The British colonial intervention in the economy of Malaya started with the introduction of a new set of land laws based on the Torrens system of land registration developed in Australia. Registration under the Torrens system established indisputable rights of ownership. The Land Codes also introduced assignment of land on a leasehold basis, usually from 60 to 99 years, as an alternative to a grant in perpetuity. The new land laws were introduced to facilitate the creation of plantation estates and regularise tin mining operations (Ness 1967). Such land laws were also applied to Malays and other indigenous groups who were given long-term leases or outright ownership of their pre-

With the consolidation of indisputable ownership of land and security of tenure, tin mining and plantation agriculture began to prosper. From 1850 onwards tin mining on the west coast was actively pursued by Chinese and British companies, with immigrant labour from China providing the main part of the work force (Schatzl 1988:28). Plantation agriculture was first started by Chinese and later involved European planters and British merchant houses (Overton 1994b).

Thus from the time of colonial intervention Malay agriculture became divided into two broad sectors: a foreign-owned plantation sector and a local indigenous smallholder sector (Onn 1989; Ness 1967; Jomo 1986). These two types of agricultural systems persisted throughout the history of Malaysian development. The Chinese initially grew pepper, gambier (Uncaria gambir), tapioca and sugar cane on their plantations, which were small operations (Hill 1982; Jackson 1968). With the advent of rubber (Hevea brasiliensis) in the late nineteenth century, the plantation sector began to grow in the west and south of the Peninsula and expanded considerably following the first rubber boom in 1905 (Schatzl 1988:28; Barlow 1978). The ownership of rubber plantations and estates gradually began to be dominated by European planters and by large British merchant houses such as Guthries and Sime Darby (Overton 1994b:35-62).
Various strategies were used by the colonial government to promote rubber plantations. First, it alienated and cleared large tracts of good agricultural land at low premiums to British and other immigrants from Straits Settlements to open extensive rubber estates (Jomo 1986; Hill 1982; Baharuddin 1979). The Agriculture Department provided extension services and technical advice to assist modern rubber plantation development (Overton 1994b). In 1922 the colonial government established the Rubber Research Institute of Malaya (RRIM), which played an important role in increasing productivity of rubber plantations and protecting them from pests and diseases (Overton 1994b).

In terms of physical infrastructure, road and railway networks were established to link principal towns and ports of the country and most of the rubber and tin mining districts. Sea ports, such as Port Weldt, Port Swettenham and Port Dickson were also established close to tin and rubber regions. Nearly every plantation had its own factory where sap was coagulated, pressed and dried into latex sheets before exporting (Chong-Yah 1967; Baharuddin 1979; Snodgrass 1980; Overton 1994a). Other services such as communication, power and medical and educational facilities were also developed in plantation and tin mining areas (Ness 1967). The colonial government also oversaw the importation and use of cheap Indian labour (Overton 1994a).

With these forms of government support the plantation sector became characterised by a high level of technical inputs and dominance of foreign capital and labour. It was well served with basic infrastructure (Baharuddin 1979:438).
In 1953, 822,000 hectares were under plantations. These accounted for about 40 per cent of the total cultivated land in Malaya. Of these 822,000 hectares, 70 per cent were owned by Europeans, 20 per cent by Chinese and 10 per cent by Indians (Onn 1989:40-42).

The subsistence-based smallholder system of farming that was practised by Malays prior to colonial intervention underwent a gradual transformation towards peasantry after the colonial administration was established. Cash crops were adopted to meet the farmers' growing need for cash impelled by the imposition of various kinds of taxes, the introduction of manufactured goods by traders, and the newly imposed necessity to pay for the education of their children (Lee 1973; Lim 1977; Baharuddin 1979).

In the early days colonial government encouraged smallholders in Perak, Selangor, Negri Sembilan and Pahang, to plant cash crops such as pepper, tapioca, gambier, tobacco, coffee and coconuts. However, farmers' interest in these crops declined as prices fell. The only encouraging development in peasant cash cropping was in production of coconuts because they were in constant demand in the local market, thus providing an important source of cash income (Lim 1977; Lim 1973; Hill 1982). The colonial administration also encouraged those who were not peasant farmers to produce surplus rice for sale to feed the growing number of people engaged in non-agricultural pursuits. But these efforts were not continuous and progress was slight (Overton 1989; Lim 1977).
After the Second World War, the colonial government intensified its activities and efforts to modernise peasant rice farming and increase productivity (Overton 1989). Investments were increased in major irrigation schemes such as the Krian and Tanjong Karang to encourage double cropping and to extend the area under cultivation. Other measures taken subsequently included mechanisation of rice cultivation, implementation of more irrigation schemes in other rice areas, offer of premium prices and credit, development of rice mills, establishment of a Padi Research Station and provision of more vigorous extension services to distribute new seed varieties (Overton 1994b; Snodgrass 1980).

In spite of these efforts progress made in commercialisation and modernisation of rice production was not significant, mainly because the price of local rice was not sufficiently high to make its cultivation as remunerative as other economic activities. Most farmers continued to produce rice for subsistence plus a small surplus to pay taxes and to trade for other foodstuffs (Overton 1994b; Lim 1977; Lim 1973). The techniques of rice production did not change much. By the end of the colonial era most of the rice grown was rainfed or irrigated with traditional small-scale irrigation systems. Double cropping was unusual. Chemical fertilisers were introduced but not used widely because most farmers could not afford them (Ness 1967:29-30).

However, a large number of Chinese, Indian and Malay smallholders entered rubber planting spontaneously without government support, motivated by
the comparative advantage of rubber over rice as a cash crop (Hill 1982; Ness 1967:35). After the rubber boom of 1905, and more particularly during the 1914-1918 War, rubber production on smallholdings expanded substantially. In some cases smallholders had even cut down their fruit trees and planted their padi fields with rubber trees (Lee 1973:446). A majority of the smallholders adopted rubber as an important cash crop alongside fishing and/or rice, vegetables, coconuts and fruit production (Lim 1977; Lee 1979; Overton 1994b).

The colonial administration disapproved of the smallholders’ participation in rubber production and discriminated against them from the beginning in order to protect the interests of the plantation sector (Ness 1967:35). As a result, smallholders were deprived of the benefits of research, new technology and credit that were available to the plantation sector (Lim 1977:76; Baharuddin 1979). To benefit the estates the colonial administration also put restrictions on smallholder production between 1922 and 1929, under the Stevenson Scheme (Overton 1994b; Lim 1977; Snodgrass 1980).

After the Second World War, the colonial government turned its attention to assisting rubber smallholders and introduced a replanting scheme to replace senile trees with hybrid varieties. But a majority of smallholders could not take advantage of this scheme because replanting grants were insufficient to cover the incomes foregone during the non-productive youth of the new trees or to pay the cost of labour required for replanting (Snodgrass 1980; Baharuddin 1979).
Despite these setbacks the smallholder mode of production became an important component of Malayan agriculture. Towards the end of colonial rule (1950) the smallholder sector accounted for 57.4 per cent or 1,113,000 hectares of cultivated land. Of these, Malays cultivated over two-thirds, and the Chinese and Indians the remaining one-third (Onn 1989:40-44). The average size of holdings among all three ethnic groups was less than four hectares. In terms of crops, 43 per cent of the Malay occupied land was planted in rice, 35 per cent in rubber and the remainder in coconuts, vegetables and other minor crops. The Chinese smallholders devoted almost all their land to rubber and market gardening while Indians were involved almost exclusively in rubber planting (Baharuddin 1979).

It should be noted that despite the adoption of some cash cropping and the colonial government’s post-war efforts to modernise agriculture, the smallholder sector remained largely traditional and economically backward. Consequently, at the time of independence, there existed a dualistic economy. On the one hand there was the traditional low-income and low-productivity smallholder sector generally deprived of the benefits of modern technological innovations, extension services and transport infrastructure. On the other hand there were the modern commercial and high-productivity plantation, mining and urban-based sectors, all well served with productive infrastructure and social facilities. The former was primarily occupied by poor Malays and other indigenous peoples, and the latter mainly by Europeans, Chinese and Indians (Lim 1973; Purcal 1975; Jomo and Shari 1986).
3.2.2 Post-independence Development

After independence the rural Malays, who were electorally the most important group, put strong political pressures on national leadership to accelerate growth and development in the peasant smallholder sector. Consequently, between 1956 and 1970 the policy instruments of the Malaysian government stressed rural development, a rapid expansion of the educational system, and heavy emphasis on public infrastructure investments (Schatzl 1988; Mehmet 1986; Snodgrass 1980).

The sectoral economic policy gave priority to agricultural development and diversification of agricultural exports. The two main forms of agricultural production systems of the colonial era, the large scale plantations and smallholdings, were retained. However, the main thrust of public policy was specifically aimed at increasing farm productivity, the economic prosperity of farmers in the smallholder sector, and increasing Malay participation in modern agriculture (Onn 1989; Halib 1985; Zulkifly 1982). The development of the smallholder sector focused on the two basic strategies adopted by the colonial government during the early 1950s: the expansion of cultivation on new land under land development schemes, and the improvement of production on existing farms through in-situ development (Fisk 1969; Schatzl 1988).

Land development started during the colonial era and became a central part of the Malaysian government’s rural development policy after independence. The prime objective of land development was to alleviate the land shortage
experienced in densely populated rural areas by providing farmers with economic-sized farm holdings. Other objectives were to combine the efficiency of the highly capitalised plantation system under FELDA management with small-scale individual ownership, and to enable the Malays to move out of rice into plantation crops (Wilcox 1968; Higgins 1982; Jomo and Shari 1981).

Most land development schemes concentrated on tree-crop agriculture. They provided production and management inputs, capital, and technology, and were designed to achieve economies of scale, in both cultivation and processing. Such schemes provided basic social infrastructure, such as housing, roads, community amenities, piped water, electricity, marketing network, and centralised processing plants (Ching 1984; Abeyrama and Weber 1983; Majid and Majid 1983; Wafa 1975; Emrich 1973).

Two major government agencies, the Federal Land Development Authority (FELDA) and Federal Land Consolidation and Rehabilitation Authority (FELCRA) were established to undertake land development. The FELDA, which was founded in 1956, developed new land and settled farmers in estates with individual holdings of between 3.2 and 4.0 hectares (Ching 1984:371; Snodgrass 1980:179). The Federal Land Consolidation and Rehabilitation Authority (FELCRA) was formed ten years later in 1966. Its main role was to develop and rehabilitate abandoned land (Ching 1972). By 1970 FELDA had opened up 90 schemes, settled 20,700 settler families and planted 125,000 hectares with rubber, oil palm, sugar cane and cocoa. Various other land development schemes
undertaken by the state governments and FELCRA developed about 75,000 hectares (Khera 1975: 144; Onn 1989: 134).

From independence in 1957 to 1969 major efforts in in-situ agricultural development had been concentrated in rice and rubber smallholdings, which were occupied predominantly by rural Malays. Government planned to improve productivity on these smallholdings by providing necessary physical infrastructure, support services, improved planting materials and technological innovations (Tamin 1981). To improve the social and cultural life of the smallholders, social infrastructure including schools (primary and secondary), health centres, clinics, playing fields, community halls, mosques, piped water and electricity were also provided (Lim 1973).

In rice-growing areas the main physical infrastructure provided included roads, irrigation and drainage facilities. Between 1961 and 1965 two giant irrigation schemes, Muda and Kemubu, were constructed. Pre-independence irrigation schemes in Krian and Tanjong Karang were also expanded. By 1970 about 251,000 hectares out of a total of 382,000 hectares of rice land had been provided with irrigation facilities. These improvements resulted in a massive increase in expenditure on irrigation and drainage works from M$38.3 million in the 1956-1960 period to M$328.5 million in the 1961-1965 period (Lim and Said 1989:185; Snodgrass 1980:186).
Government also provided other important support services such as agricultural extension, farm inputs at subsidised prices, a guaranteed price for rice, and marketing and credit facilities (Ismail 1975; Ismail 1990; Mutalib 1991). Extensive research and development activities were also undertaken resulting in breeding and introduction of short-term high-yielding hybrid varieties (HYVs) which facilitated double cropping (Courtenay 1983; Government of Malaysia 1976:287; Tamin 1981). On rubber smallholdings the Malaysian government continued its post-war programme to increase production by replacing senile trees with high-yielding clones (Baharuddin 1979; Jomo and Shari 1981).

These development strategies stimulated considerable economic growth but failed to address adequately the more difficult and fundamental social and economic problems inherited from the colonial era (Jomo and Shari 1981). In particular, the development policy failed to achieve the expected goals of closing the social and economic gaps between the individuals, groups and regions and reducing poverty. Rather, the socio-economic disparities between the poorer Malays and richer non-Malays became more marked (Nor 1981; Hadi 1994). The proportion of households living in poverty did not change substantially, while the absolute number increased. In short, the state was unable to eradicate rural poverty and to resolve the ethnic dimensions of the socio-economic class structure inherited from the colonial period (Purcal 1975; Snodgrass 1980; Jomo and Shari 1981; Nor 1981; Jomo and Shari 1986).
The racial conflicts of May 1969 indicated that a change in development planning strategy was needed. The New Economic Policy (NEP) was proclaimed in 1971. The long-term aims of the NEP were contained in the Outline Perspective Plan 1971-1990. The NEP aimed to eradicate poverty among all racial groups and to restructure society in terms of assets, occupation, education and economic opportunities (Government of Malaysia 1971; 1976; Salleh and Osman 1982; Hadi 1994).

Under the Outline Perspective Plan (1971-1990) social development was given a definite emphasis. Educational and health services were given special attention as were the provision of electricity and piped water to the rural population. All rural development projects placed special emphasis on social needs, and the poor were to be made the specific target of all efforts at socio-economic improvement (Nor 1981; Schatzl 1988).

In the agricultural sector the Outline Perspective Plan was intended to modernise and improve productivity of smallholder agriculture and thereby contribute to the fight against poverty among the Malays. The main problem recognised in the traditional smallholder sector was low productivity because of inadequate infrastructure, lack of technological innovation and uneconomic-sized landholdings. To overcome these problems the state took definite steps towards providing land to landless and near-landless people and improving productivity on existing smallholdings. Consequently, smallholder development proceeded more vigorously along the two basic strategies adopted during the 1957-1969.
period, that is new land development schemes and in-situ development (Fisk 1969; Schatzl 1988).

3.2.2.1 Land Development Schemes

Under the NEP, state investment in land development and settlement schemes was increased considerably to alleviate the rising problems of land shortage among the bumiputera (the indigenous people of Malaysia) (Aljunid 1984). To spearhead and diversify land development the FELDA was expanded and given a more activist mandate. Its work was complemented by the FELCRA, the Rubber Industry Smallholders' Development Authority (RISDA) and numerous other state and federal agencies (Johari 1983; Mehmet 1986).

With additional government investment land development proceeded rapidly after 1970. By the end of 1981 FELDA alone had developed 556,000 hectares of land and had settled 52,706 families totalling 370,000 people on 262 land development schemes in Peninsular Malaysia. Of the total developed area, about 283,000 hectares were planted with oil palm, 158,000 hectares with rubber, 8,700 hectares with cocoa, 5,300 hectares with sugar cane and 1,500 hectares with coffee (Zulkifly 1982:214). By the end of 1985 FELDA had planned to settle 90,000 families or some 540,000 people (Ching 1984:375).

Despite providing a large number of landless and near landless people with ownership of economic-sized holdings, and a capacity to earn an income well above the average for Malay rural households, the land development
schemes had two problems: high costs, and failure to address adequately problems of land shortage and rural poverty. The costs incurred were very high, ranging from M$26,400 to M$53,000 per family settled (Jomo and Shari 1981:243; Courtenay 1988:252). Despite the rapid rate of land development, less than 15 per cent of the rural Malay population benefited from these schemes. Hence, while land development schemes had expanded the supply of cultivated land, the impact of the land development programmes on income distribution in the country had been ambiguous because the expensive programmes had benefited only a small proportion of the rural population (Ali 1983; Jomo and Shari 1981).

3.2.2.2  In-situ Agricultural Development

Government intervention in in-situ development after 1970 became more vigorous and involved state-supported structural improvement in the traditional smallholder agricultural sector. The objectives were to improve productivity, raise farmers' incomes and contribute to the fight against poverty. The in-situ programmes became more area- and project-specific by the formulation of more specific approaches to meet the needs of particular areas and crops.

Agricultural institutions such as the Agricultural Bank of Malaysia (Bank Pertanian Malaysia -BPM), the National Padi and Rice Authority (Lembaga Padi dan Beras Negara - LPN), Farmers' Organisations (FO), the Rural Development Corporation (Korporasi Pembangunan Desa - KPD), the Rubber Industry Smallholder Development Authority (RISDA), the Department of Veterinary
Services and Animal Industry (DOVSAI), the Department of Fisheries (DOF) and the Drainage and Irrigation Department (DID) were involved in the implementation of these area-specific projects. Special project managers were assigned to supervise and coordinate the implementation of these projects (Yapp et al. 1988; Mehmet 1986; Johari 1983).

To increase productivity of smallholder rice farmers government efforts were continued in Muda and Kemubu irrigation projects. More vigorous extension services were provided to encourage the use of new technology and adoption of the latest HYVs. Moreover, nation-wide price subsidies for rice through the Guaranteed Minimum Price Scheme were introduced in 1971. Between 1971 and 1980, over 100,000 rice farmers received state assistance within the framework of in-situ development (Schatzl 1988:39).

In the smallholder rubber sector, replanting activities were actively encouraged. In addition to replanting aids, loan facilities were made available to enable smallholders to start small businesses which could provide income during replanting periods. Some rubber areas were also replanted in other high-value crops such as oil palm, coffee, cocoa and fruit crops (Jomo and Shari 1981; Johari 1983; Onn 1989). The RISDA also introduced a new loan scheme specifically for small farmers, under which special six-year interest-free loans were provided to farmers with less than four hectares of rubber (Mehmet 1986).
Technological improvements, improved husbandry, diversification and intensification have also been brought into areas under coffee, cocoa, coconuts and vegetables. During the Fourth Malaysia Plan (1981-1986) some 6 million hectares of land were brought under replanting and rehabilitation projects and provided with drainage and irrigation under the in-situ development in the whole of Malaysia. Some 694,350 families benefited (Government of Malaysia 1986: 306-308).

Despite more vigorous government intervention since 1971 the non-organised smallholder sub-sector, particularly in areas devoted to main-season rice and some rubber, coconut and pepper areas had stagnated by the early 1980s. The main causes for this stagnation were uneconomic-sized holdings, low-return crops, inefficient methods of production, inadequate infrastructural support and labour shortage (Teik 1985; Courtenay 1988).

Many farms owned by rice and rubber smallholders and vegetable gardeners were not big enough to tap the economies of scale. Moreover, in the smallholder sub-sector, the main crops were rice, rubber, coconuts and pepper. All of these except rubber generated insufficient rates of return. In addition, manual labour and old planting techniques predominated on most of these smallholdings. In many of the main-season rice areas the supply of irrigation water was not regular. More recently, labour shortage became a major constraint because large numbers of younger people had migrated to towns, cities and FELDA and other land schemes. As a result, thousands of hectares of old
farmland had been abandoned, resulting in drastic reductions in the cultivated area. Those farms that were not abandoned were worked by an ageing labour force (Courtenay 1988; Teik 1985).

Government’s answer to the stagnation was the formulation of the National Agricultural Policy (NAP) during the mid-term review of the Fourth Malaysia Plan (FMP). The NAP aimed at commercialising agriculture and maximising farm incomes through expanded production of export crops (rubber, cocoa and oil palm) and increasing the production of food crops. Moreover, farmers were encouraged to gain economies of scale by amalgamating abandoned smallholdings (Courtenay 1988; Teik 1985).

3.3 IMPACT OF POST-INDEPENDENCE DEVELOPMENT POLICY

There is an extensive literature on impact of both post-independence settlement schemes and in-situ development projects. Since this study is concerned with the latter, the following discussion is confined to impact of government policy on in-situ development programmes. Critical studies have pointed to negative and positive impact of in-situ development: economic, social, and environmental.

3.3.1 Economic Impact

There is general agreement among scholars and researchers that in-situ development in West Malaysia, particularly in the rice and rubber sectors, resulted in increased rural productivity, higher incomes and improved standards.
of living for the participants. In the rice sector very impressive gains were achieved in terms of both overall production and yields per unit area. At the national level the rice acreage increased from 269,700 hectares in the 1950-1955 period to 382,000 hectares in the Second Malaysia Plan period (1971-1975) (Lim and Said 1989:185). Total rice production in West Malaysia registered a 33 per cent increase from 1,434,000 tonnes in 1970 to 1.913 million tonnes in 1980. Major production rises were registered in the main irrigation areas of Muda, Kada 1 and Besut. In these areas the average yield per hectare rose from 3270 kilograms to 3906 kilograms between 1971 and 1980, and average real household incomes rose between 47 and 300 per cent during the same period (Mehmet 1986:57). Smaller but significant improvements are also noted in the smallholder rubber sector. The area under rubber on smallholdings outside settlement schemes increased from 758,000 hectares in 1960 to 805,900 hectares in 1980 (Ching 1984:371). The total production on smallholdings under in-situ development increased from 753,000 tonnes in 1973 to 850,000 tonnes in 1977 (Zulkifly 1982: 217).

3.3.2 Social Impact

There has also been considerable improvement in the provision of social facilities. Most rural areas affected by in-situ development were provided with schools, health centres, clinics, playing fields, community halls, churches, mosques, piped water and electricity. These facilities and rising agricultural productivity and incomes resulted in considerable improvements in the living conditions of rural households (Ali 1983; Nor 1981).
The social and economic improvements discussed above were a product of a larger process of rural transformation, including changes in land use, land ownership and tenure arrangements and labour organisation. These transformations, while improving overall productivity and rural incomes, also led to negative social and environmental consequences.

Firstly, the benefits of technological innovations and government subsidies and incentives were not evenly distributed among all farmers. Works by Said (1989), Ahmad (1988), Mehmet (1986), Aljunid (1984), Kassim (1984), Ali (1983) and Purcal (1975) in rice and rubber areas show that large farmers, rich landlords and people with political connections were the major beneficiaries.

In padi areas the majority of farmers operated farms of less than half a hectare, which is too small to tap the economies of scale or to produce viable incomes for the farm households. Moreover, since the state fertiliser and price subsidies were based on area cultivated and amount of padi produced, the small farmers received only a small share of these subsidies (Kassim 1984; Lim and Said 1989). On the other hand, rich farmers, who planted large areas and produced large quantities of padi, qualified for large amounts of subsidised fertiliser and substantial price subsidies amounting to tens of thousands of dollars annually (Said 1989; Hart 1989).

Mechanisation of ploughing and harvesting operations in rice areas also proved advantageous to the rich and larger farmers because they were the only
ones who could afford investment in combine harvesters and tractors, which enabled them to expand the size of their operations and economise on labour use. They also gained considerably by contracting out their machines to other farmers (Hart 1989; Said 1989; Mehmet 1986; Aljunid 1984).

Political linkages also strengthened the position of the larger farmers. The ownership of means of production and political influence had always been mutually reinforcing in rural areas of Malaysia. The large land owners, who were also political leaders at village levels, controlled Farmers' Associations and other state institutions such as Village Development Committees. They ensured that the distribution of credit and other handouts and extension services were often restricted to them and their supporters (Said 1989; Mehmet 1986).

Government replanting grants in the rubber sector also benefited the rich and large farmers. The poor and small farmers could not take full advantage of these grants because of their inability to forego incomes from land cleared of old rubber trees, and lack of labour and financial resources to undertake replanting. Many did not even qualify for the grants because they lacked legal titles to the land they occupied (Ahmad 1988; Mehmet 1986; Aljunid 1984; Lee 1973; Jomo and Shari 1981). The large and wealthy farmers, and also farmers with off-farm incomes who could bear the loss of income incurred by cutting the old trees on part of their land successfully undertook replanting programmes and benefited from government assistance (Jomo and Shari 1981; Snodgrass 1980; Baharuddin 1979; Purcal 1975; Lee 1973).
Other significant changes with long-term social implications were changes in land ownership and tenure arrangements. The rapid development of productive forces under in-situ development programmes resulted in increased competition for land, pushing up land prices and rents. Subsequently, land sales, appropriation of land by landlords and delay in inter-generational transfer of land became more common. The most common consequences of these changes were the creation of a complex and dynamic land tenure system, leading to accumulation of land by the wealthy landlords and large-scale farmers and expropriation and proletarianisation of the rural poor (Lim 1989; Said 1989; Lim and Said 1989).

Studies in West Malaysia show that land was sold by both the rich and poor land owners. The incidence of and reasons for land sales differed considerably between the two groups. Among the rich farmers, relatively few sold their land because many opted to earn higher incomes from the land either by farming it themselves or leasing it out on higher rentals. Those who sold part of their land did so either to invest in non-farm enterprises or simply to accumulate savings taking advantage of high prices (Lim 1989; Said 1989).

A relatively larger proportion of poorer farmers sold their land and a majority did so under constraints of indebtedness and/or small size of holdings. According to studies conducted by Halim (1980), Said (1989), Lim (1989), Ali (1983) and Baharuddin (1979), many poor farmers took loans, using land as security, for urgent needs such as paying for weddings, funerals, treatment of illness, pilgrimages to Mecca and even for subsistence. When they failed to repay
the loans on time they were forced to sell the land to creditors or to other interested parties.

Small size of holdings was another common reason for land sale. Many poor farmers who owned plots that were too small to provide adequate subsistence for their families, sold them (Jomo, 1986; Baharuddin 1979). These forms of land sales proletarianised two groups of poor: those who sold the land, and landless tenants on land sold by rich farmers. Both groups were removed to make way for the new masters of the land (Said 1989; Kassim 1984).

Appropriation of land from sitting tenants either to farm it themselves or lease or rent it on higher rentals to other tenants also became a common practice among rich land owners after the implementation of development projects. Poor tenant farmers who were proletarianised by this process faced the cruel choice between degradation in the countryside or in towns (Wong 1983; Kassim 1984; Hart 1989; Said 1989).

The delay in inter-generational transfer of land that accompanied the shift from labour-intensive to capital-intensive technology in farming also caused considerable landlessness among the rural poor. In the past it was a common practice among ageing parents to hand over the operation of land to their children. After the implementation of in-situ development programmes and subsequent introduction of labour-saving technology it became easier for the land
owners to retain control over the land as they grew older, thus depriving the younger generation of access to land (Hart 1989).

Trends in labour re-organisation in West Malaysia were similar to those observed elsewhere in the Third World (Chapter 2). Studies conducted among the rice and rubber smallholders show that prior to the implementation of development programmes, farm work was done by household members and cooperative work groups of friends and neighbours organised on reciprocal help basis (Ahmad 1988; Halib 1985; Halim 1980). The adoption of labour-intensive farming practices and imposition of official schedules of farm operations after the implementation of development programmes, rendered household and cooperative labour insufficient and problematic. A majority of farmers began to utilise household and hired labour to carry out the increased volume of farm work (Huang 1983; Baharuddin 1979).

With the passage of time further changes in labour organisation were adopted. These changes varied from one place to another depending on the rate of development and population density. In areas with high population densities and more rapid development, such as the double-cropping rice schemes, the need for farm labour intensified and distinct groups of rich and poor farmers and landless labourers emerged (Said 1989). A majority of the large farmers began to diversify into non-farm business enterprises. These farmers hired a large number of labourers and share-croppers to do the farm work while their household labour was occupied in non-farm enterprises (Lim 1989; Said 1989). The other middle
farmers also began to hire outside labour to help with farm work. Poor farmers who owned insufficient land, but had surplus labour, and landless labourers hired themselves out as farm labourers or worked as share-croppers for the large farmers (Athreya et al. 1987; Baharuddin 1986; 1979; Halim 1980; Huang 1983).

However, this situation did not last long. In order to economise on labour, and comply with official schedules of farm operations, increasing numbers of large and middle range farmers began to use labour-saving machinery such as tractors, mechanical threshers and combine harvesters (Hart 1989). In the process a large proportion of farm labourers lost their employment and livelihoods in the rural areas. Many were forced to migrate to urban areas in search of work to keep themselves and their families alive (Lim 1989; Said 1989; Kassim 1984).

In districts and regions where development was slow, particularly in areas focusing on single-cropping of main-season rice with uneconomic-sized landholdings, poor soil conditions and inadequate irrigation facilities, labour shortage became a major constraint. In these areas low incomes forced a large number of farm workers to move out of farming. Most of the younger people migrated either to towns in search of employment or to settlement schemes, leaving only the aged and very young children behind, thus creating a shortage of farm labour (Rigg 1988; Ching 1984; Kassim 1984). Consequently, a large proportion of rural agricultural land was abandoned (Tamin 1981).
3.3.3 Environmental Impact

Compared with the attention given to economic and social effects, relatively few studies have been conducted on the environmental impact of rural development. However, works of Brookfield (1994), Blaikie and Brookfield (1987c) and Overton (1994a) throw some light on environmental impacts of the promotion of commercial tree cropping and rice cultivation in West Malaysia. In the tree crop areas Brookfield (1994:268-278) and Blaikie and Brookfield (1987c:158-163) point out that clearing land from forest, especially by bulldozer, results in severe erosion and land slipping. They also claim that replacement of dense forest canopy by lighter canopied rubber and other tree crops provides less protection from rain drop impact. Consequently, even after full establishment of tree cover, erosion is still higher than under forest. Moreover, the practice of keeping the land under tree crops, especially rubber, clear of ground vegetation leads to erosion and runoff and rapid impoverishment by removal of the nutrient-rich part of the soil profile. The ultimate results are poor returns and even death of trees.

In lowland rice areas environmental impacts have been considerable because of high rates of application of inorganic, largely oil-based, fertilisers and pesticides, herbicides and fungicides. The most obvious deleterious effects of chemical fertiliser and pesticide use are pollution of rivers and ground water; the killing or reduction of off-season crops and edible weeds and aquatic fauna of irrigated rice fields (by pesticides and herbicides); and the upsetting of the biological control of pests (Brookfield 1994; Overton 1994a).
From the foregoing it is established that the rural development experience of Malaya and later West Malaysia is similar to that of many other developing countries. The colonial development policy led to the emergence of a dualistic economy, inter-ethnic income disparities, rural poverty and spatial disparities, with Europeans and Chinese being the major beneficiaries. The post-independence policies directed towards overcoming the problems inherited from the colonial era resulted in improved economic growth, but failed to eradicate rural poverty and to resolve the ethnic dimensions of the socio-economic class structure. In fact, some existing socio-economic and environmental problems were accentuated and new ones created as a consequence of implementation of post-colonial development policy.

3.4 RURAL DEVELOPMENT IN SABAH

3.4.1 Pre-independence Development

Prior to British rule Sabah (formerly North Borneo) had approximately 100,000 people, comprising three indigenous groups: Kadazan-Dusuns, Bajaus and Muruts (Leng 1961:202). Early literature by Leng (1965), Tregonning (1965), Rutter (1922) and Alcock (1886) and more recent work by the Sabah Foundation (1974) establish that about half of the population was concentrated in the western lowlands and the other half lived in the highland plains, river valleys and eastern coastal strip. Small-scale rice growing was the primary economic activity on the coastal and inter-montane plains. This was supplemented by fishing and gathering by those near the sea and hunting and gathering for those near the forests.
British intervention in Sabah started in 1882 with the establishment of the British North Borneo Chartered Company. Sabah remained under the Company’s administration until Japanese occupation in 1940. From 1946 to 1963 the state came under colonial rule. The Chartered Company encouraged new economic activities in plantation agriculture and the extraction of timber. These enterprises were reserved for expatriate planters and private companies. The indigenous people of Sabah were relegated to a continuation of their traditional activities in primary food production with little participation in the new economic developments.

This form of development, as was the case for the rest of Malaysia, led to the emergence of two distinct agricultural sectors: plantations and smallholdings (Sabah Foundation 1974). Establishment of plantations initially started under Chartered Company rule on the east coast in the 1880s. Various plantation crops boomed at different times and then receded due to price fluctuations. The first crop was sugar cane, followed by tobacco and rubber. Labour to work on the plantations was brought from China and Java (Rutter 1922; Leong 1982; Sabah Foundation 1974).

The Chartered Company facilitated plantation agriculture by providing land and infrastructure. It alienated large tracts of land to expatriates to establish plantations. Initially, land was alienated to colonial settlers on the east coast. After the rubber boom at the turn of the twentieth century large tracts of vacant land on the west coast were also taken over by expatriates (Leong 1982;
In terms of infrastructure, railway network began to be established in the western part of the state starting from 1896. In 1902 a railway line connecting Beaufort and Jesselton (now Kota Kinabalu), passing through the major rice and rubber areas, was completed. The railway had a significant effect on opening up new areas for exploitation. Settlements and plantations sprang up alongside the railway. Ports were also constructed at Sandakan and Kota Kinabalu for ocean-going vessels to facilitate overseas trade (Gudgeon 1981; Leng 1961).

The colonial government took over the administration of Sabah in 1946 in the aftermath of the war. In the first few years of its rule the colonial government concentrated on rebuilding infrastructure, redevelopment of timber and rubber industries, and re-establishment of trade (Voon 1981; Ongkili 1972). After this recovery was completed the colonial government embarked on a rural development programme as a social necessity. It undertook a programme of road construction to connect hinterlands with towns (Wai 1989), a process that opened new land for settlement, enabling more indigenous people to participate in rubber production.

However, the major emphasis of rural development during the post-war period was centred around the settlement of shifting cultivators in land settlement schemes and increasing productivity of the traditional smallholder sector under its smallholder assisted scheme. Under the resettlement scheme shifting cultivators from hills were settled in the plains by the colonial government and assistance
was provided for planting rubber and irrigated rice. The first such scheme was the Binaong settlement scheme in the fertile plains of Bingkor in the Keningau District, which was started in 1953. Subsequently several other settlement schemes were established in numerous locations (Yapp et al. 1988; Leng 1965; Colony of North Borneo 1956).

In areas of smallholder assisted schemes the colonial government provided farmers with assistance in the form of tools, planting materials, fertilisers and chemicals to develop their farms. Rubber smallholders were provided with grants to replant their land holdings with high-yielding varieties of rubber. In some rice areas irrigation projects were started to increase production. Assistance was also provided to expand and improve the production of other cash crops (Yapp et al. 1988; Gudgeon 1981; Sabah Foundation 1974; Colony of North Borneo 1956). However, according to Baker (1962), these efforts effected few changes in the pattern of production and quality of life of the rural people.

At the end of the colonial era the agricultural production system was clearly divided into two sectors similar to that of West Malaysia. These were the modern, large-scale plantation sector units operated solely by expatriates, and the traditional smallholder sector farms occupied by the indigenous people and a few Chinese who had bought land from the natives. In 1960 a total of 32,000 hectares were under plantations. Of this only 425 hectares were planted in oil palm the rest in rubber, coconuts and cocoa (Colony of North Borneo 1961:2-5; Gudgeon 1981:218-219; Sabah Foundation 1974:64).
In the smallholder sector the locals generally planted rice and rubber whereas the Chinese devoted their land to rubber and market gardening. In 1960 smallholders cultivated 39,230 hectares of rubber and 18,600 hectares of padi (Colony of North Borneo 1961: 2-5). Most of these smallholdings were beset with several limitations including low return crops (especially rice), traditional methods of production, inadequate access to assistance and support services and lack of credit and marketing facilities. The inter-play of these constraints had resulted in low productivity and low income and a resultant high incidence of poverty among the traditional small-scale farmers (Yapp et al. 1988).

3.4.2 Post-independence Development

Rural development in the post-independence era was based on federal government policy as contained in a series of Five-Year Plans (Voon 1981). More vigorous rural development programmes were initiated to increase productivity and living standards of the rural population. Increase in commodity production was emphasised through expansion of infrastructure, extension services, and agricultural modernisation in the existing smallholder sector and through new land development schemes (Voon 1981; Sabah Foundation 1974; Government of Malaysia 1971).

However, after the implementation of the New Economic Policy (NEP) in 1971, rural development in Sabah was given new impetus and new policy directions. This was in line with the two-pronged NEP which aimed at restructuring society and eradicating poverty. Development programmes were
specifically designed to create employment opportunities and raise the incomes of the rural poor. The two basic approaches to rural development, namely large-scale land development and in-situ development schemes, that had been followed by the colonial government, were retained but pursued more vigorously, (Chandler 1989; Yapp et al. 1988; Gunting 1987).

Both approaches were supplemented by the establishment of socio-economic and rural development institutions to promote effective agricultural support services. The most important among these were Farmers’ Organisation (FO), Korporasi Pembangunan Desa (KPD), Sabah Rubber Fund Board (SRFB), Sabah Agricultural Marketing Authority (SAMA), Bank Pertanian (Agricultural Bank) and Sabah Padi Board. The existence of these institutions was significant in acquiring and deploying available resources and in providing avenues for access to technical, financial and other forms of requirements that could improve farm productivity (Zulkifly 1985; Ismail 1990; Government of Malaysia 1976).

Land development and settlement schemes were continued after independence by the Ministry of Agriculture. In 1969 the Sabah Land Development Board (SLDB) was established to take over the responsibility of land development and accelerate the planting of cash crops. Other state and federal agencies which subsequently became involved in land development were the Sabah Rubber Fund Board (SRFB), the Sabah Paddy Board, the Korporasi Pembangunan Desa (KPD), the Sabah Forest Development Authority (SAFODA) and the Federal Land Development Authority (FELDA) (Voon 1981; Sabah
Foundation 1974). These agencies established large-scale land development schemes which concentrated on tree crop agriculture, primarily rubber, oil palm, cocoa, and coffee. In the Fourth Malaysia Plan (1981-1985) period alone, 42,870 hectares of land were developed in the state benefiting some 21,297 settlers (Yapp et al. 1988:23). Some examples of large-scale settlement schemes in Sabah are the Nabawan wet rice scheme, the Tenom rubber scheme, the Apas Balung oil palm scheme and the Klias oil palm scheme (Ongkili et al. 1990; Zainal and Hoh 1987; Sutton 1977).

Since the implementation of NEP, in-situ development efforts were expanded to intensify land use and to diversify existing agriculture through rehabilitation, cultivation of unutilised small plots of land, intensification of irrigation and other on-farm development. Investment of resources was largely aimed at correcting the defects in agricultural production systems which gave low returns. The spread of new technology and the use of modern inputs were complemented by the provision of incentives and other forms of financial and technical assistance. Combined efforts of several rural development and socio-economic institutions were utilised to implement these schemes (Ongkili et al. 1990; Yapp et al. 1988)

During the Fourth Malaysia Plan (1981-1985) some 42,800 hectares of land were brought under in-situ agricultural development programmes. Under these programmes land was developed and planted with perennial crops such as cocoa, coffee, fruit trees, coconut and high-yielding rubber or short term crops
such as vegetables, grains and other food crops (Ongkili et al. 1990; Yapp et al. 1988; Government of Malaysia 1986).

3.5 IMPACT OF RURAL DEVELOPMENT IN SABAH

The limited number of studies carried out in Sabah indicate that in-situ development had succeeded in exposing rural people to modern farming practices, provided them with social amenities and increased production of a variety of crops (Ongkili et al. 1990; Yapp et al. 1988). It is also acknowledged that the various strategies and policies adopted for rural development had many short-comings. As a result many of the programmes fell short of expectations. In particular, in some of the settlement schemes the settlers had actually failed and the schemes had little impact on the well-being of the majority of the intended beneficiaries. In some cases the schemes had been abandoned (Ongkili et al. 1990; Yapp et al. 1988; Chandler 1989; King 1988; Zainal and Hoh 1987).

3.6 RURAL DEVELOPMENT IN KUNDASANG

Kundasang was the target of an in-situ development project. The development strategies followed in Kundasang were similar to those followed elsewhere in Malaysia. However, Kundasang had certain distinct characteristics in terms of environmental conditions, crop types and availability of land, labour and off-farm economic activities (Chapter 4). As a result the outcomes were significantly different.
This thesis aims to see what has happened to land, land use and labour in what had been considered to be a more successful project at Kundasang. In particular, this study aims to answer the following questions: 1) what has happened to land use - has there been intensification, expansion onto marginal land and land degradation?; 2) what has happened to land in terms of access and ownership - has there been increasing inequality and landlessness?; 3) what happened to labour - has there been proletarianisation and unemployment of the poor?; 4) what are the major impacts of the changes from communal and subsistence to commercial utilisation of land, labour and production system - has there been increasing social and economic differentiation?; 5) are the individual responses different from the state’s plans - if so, then what are the differences?; and, 6) have the major benefits of development accrued to the rich or immigrant non-target population?

If the answers to these questions are ‘yes’ then it validates the general trends in land accumulation, landlessness, proletarianisation and poverty among the poor, as pointed out in most Malaysian literature. However, if the answers are different then we need to start questioning whether these results are different in special cases.
CHAPTER FOUR

THE KUNDASANG PROJECT AREA

4.1 INTRODUCTION

The Kundasang Highland Vegetable Cultivation Irrigation Project (KHVCIP) is set in an unusual environment for Malaysia and has a relatively short and recent history of major agricultural change. It has also achieved resounding success in terms of improving the incomes and standards of living of the target population. Consequently, the project provides an excellent opportunity to study the impact of a successful rural development on land use, land and labour. Elements of the success and problems of the project owe much to the physical environment and social and economic contexts of the study area, and to the historical course of events since its beginning in 1955. But the project was not the only agent of change in the area. Other forms of development took place nearly in the same period and complemented agricultural development efforts in transforming land use, land tenure and labour organisation within the project area.

4.2 PHYSICAL ENVIRONMENT

The Kundasang Highland Vegetable Cultivation Irrigation Project (KHVCIP) covers an area of approximately 1000 hectares in the sub-district (mukim) of Kundasang, in the administrative district of Ranau, West Coast Residency of Sabah (Fig. 1.1). Hereafter the (KHVCIP) is referred to as the project area and Kundasang sub-district as Kundasang District and the shopping
centre at Kundasang as *Kundasang town*. The project area is located at 6° 10' North Latitude and 116° 33' East Longitude on the slopes of the Crocker Range, south east of Mt Kinabalu at an altitude of approximately 1250 metres above sea-level. The entire area is hilly and steep, interrupted by a few small stretches of undulating land, and drained by several rivers and creeks. By road this area lies about 15 kilometres from Ranau town and some 100 kilometres from Kota Kinabalu, the capital of Sabah. The East-West highway connecting Kota Kinabalu, Tamparuli, Ranau and Sandakan and other towns on the east coast (Fig. 1.1) is the major route by which agricultural products from Kundasang are transported to other places.

The area chosen for in-depth study occupies the core portion of the project area (Fig. 4.1) and is referred to as the *study area*. It includes about 750 hectares of the total 1000 hectares under the project. Of the 750 hectares, approximately 565 hectares are taken up by 403 plots of agricultural land. The remaining 185 hectares are under rivers, streams, roads, settlements, government reserves and other service structures. This particular portion of the project area was chosen for in-depth study for three reasons. First, major development efforts by the government in terms of physical infrastructure such as roads and irrigation facilities were concentrated in this portion from the beginning of the development programme and it is possible here to trace some 35 years' experience of land reform and associated agricultural development. Second, because this was the area into which modern irrigation was first introduced, it contains all of the earliest irrigated plots. Third, all land in this portion of the project has been
surveyed and mapped, which facilitated identifying the farms and exact boundaries.

Figure 4.1. Location of Kundasang Highland Vegetable Cultivation Irrigation Project and the study area

Sources:

i. Raja and Gabongan, 1984:93.

Of the other 250 hectares lying in the project area but not included in the study, 120 hectares were not irrigated at the time of study (Fig. 4.1: A). Another 63 hectares located by the main highway close to Kundasang town (Fig. 4.1: B) come under the project area but are either too steep for cultivation or irrigation or had been taken over by residential and other service structures. An additional area of 67 hectares between Kouluan and Pinosuk villages (Fig. 4.1: C), some parts of which are irrigated, is not included in the study area because most of this land received irrigation only recently and had not been fully surveyed or mapped.

4.2.1 Climate

The climatic data for the project area were obtained from records kept at Kundasang Research Station and Tuaran Research Centre. The cooling effect of altitude combined with cool air draining from the massif of Kinabalu give temperature levels similar to those of more temperate countries. Temperature varies little over the year, with the hottest month (May) having a maximum of 23.5° Celsius and the coolest (January) a maximum of 20.6° Celsius (Table 4.1). The minimum night temperatures are always below 18° Celsius, varying from 17.1° Celsius in June to 15.5° Celsius in January. The overall low temperatures with small monthly variation enable year-round production of many types of temperate vegetables.
Table 4.1. The mean monthly minimum and maximum temperatures for Kundasang from 1972 to 1989

<table>
<thead>
<tr>
<th>Month</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>15.5</td>
<td>20.6</td>
<td>5.1</td>
</tr>
<tr>
<td>February</td>
<td>15.6</td>
<td>20.1</td>
<td>5.4</td>
</tr>
<tr>
<td>March</td>
<td>15.7</td>
<td>21.9</td>
<td>6.3</td>
</tr>
<tr>
<td>April</td>
<td>16.4</td>
<td>23.0</td>
<td>6.6</td>
</tr>
<tr>
<td>May</td>
<td>17.1</td>
<td>23.5</td>
<td>6.4</td>
</tr>
<tr>
<td>June</td>
<td>17.1</td>
<td>23.3</td>
<td>6.4</td>
</tr>
<tr>
<td>July</td>
<td>16.9</td>
<td>23.4</td>
<td>6.5</td>
</tr>
<tr>
<td>August</td>
<td>17.0</td>
<td>23.3</td>
<td>6.4</td>
</tr>
<tr>
<td>September</td>
<td>16.8</td>
<td>23.1</td>
<td>6.3</td>
</tr>
<tr>
<td>October</td>
<td>16.7</td>
<td>22.7</td>
<td>6.0</td>
</tr>
<tr>
<td>November</td>
<td>16.5</td>
<td>22.2</td>
<td>5.7</td>
</tr>
<tr>
<td>December</td>
<td>16.0</td>
<td>21.4</td>
<td>5.4</td>
</tr>
<tr>
<td><strong>Annual Mean</strong></td>
<td><strong>16.4</strong></td>
<td><strong>22.4</strong></td>
<td><strong>6.0</strong></td>
</tr>
</tbody>
</table>

*Source: Tuaran Research Centre, Sabah.*

The mean annual rainfall over the period 1971 to 1989 was 2300 mm. Rainfall is mainly orographic brought by the southwest monsoon from May to October and northeast monsoon during the rest of the year. Though Kundasang lies on the leeward side of the Crocker Range, during May to October its altitude and proximity to the windward side results in precipitation of up to 200 mm during the southwest monsoon season (Table 4.2). March, with a mean rainfall
of only 99.6 mm and averaging only 11 days of rain, is the driest month. October is the wettest month with a mean rainfall of 274.9 mm and 23 rainy days. However, monthly rainfall varies significantly from year to year, with water stress due to low precipitation being experienced from February to May (Raja and Gabongan, 1985:3). Rainfall is also unevenly distributed during the wet months, with even the wet months of June and July receiving rain on only five to six days in some years.

Table 4.2. Mean monthly rainfall and number of rainy days per month for Kundasang from 1971-1989.

<table>
<thead>
<tr>
<th>Month</th>
<th>Mean rainfall (mm)</th>
<th>Number of rainy days</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>203.5</td>
<td>19.3</td>
</tr>
<tr>
<td>February</td>
<td>186.7</td>
<td>14.8</td>
</tr>
<tr>
<td>March</td>
<td>99.6</td>
<td>11.0</td>
</tr>
<tr>
<td>April</td>
<td>122.9</td>
<td>14.0</td>
</tr>
<tr>
<td>May</td>
<td>202.8</td>
<td>18.1</td>
</tr>
<tr>
<td>June</td>
<td>173.8</td>
<td>17.2</td>
</tr>
<tr>
<td>July</td>
<td>157.7</td>
<td>16.1</td>
</tr>
<tr>
<td>August</td>
<td>210.0</td>
<td>18.3</td>
</tr>
<tr>
<td>September</td>
<td>210.6</td>
<td>19.2</td>
</tr>
<tr>
<td>October</td>
<td>274.9</td>
<td>23.2</td>
</tr>
<tr>
<td>November</td>
<td>230.0</td>
<td>20.9</td>
</tr>
<tr>
<td>December</td>
<td>230.1</td>
<td>19.8</td>
</tr>
<tr>
<td>Annual Mean</td>
<td>2302.6</td>
<td>211.9</td>
</tr>
</tbody>
</table>

Source: Tuaran Research Centre, Sabah.
4.2.2 Soil

Detailed reports on soil types within the study area could not be found. The following general description is compiled from district level surveys by Allen (1967), Jacobson 1970a, Raja and Gabongan (1978a) and McCredie (1971), and surveys conducted just outside the study area by George (1986) and Molukun (1982). The soils are classified according to the Sabah soil classification of 1975 (Acres et al. 1975).

According to these survey reports the soils of the study area consist mostly of orthic acrisols of Tanjong Lipat and Kapilit families (Fig. 4.2). The Tanjong Lipat soil, found on slopes of less than 20 degrees, is formed from sandstone parent material and has soil depth ranging from 10 to 60 cm depending on the steepness of slope. It is yellowish brown to reddish yellow in colour with less than 25 per cent clay and is considered highly suitable for vegetable cultivation. The Kapilit soil, which is more predominant in the area, is generally found on slopes in excess of 20 degrees and also derived from sandstone parent material. Yellowish brown to strong brown in colour, it has a clay content of 25 to 40 per cent. The depth of this soil type is generally less than 45 centimetres and is considered moderately suitable for vegetable cultivation.

From the foregoing description it is clear that the environmental conditions, especially temperatures, are suitable for cultivation of temperate vegetables. However, year round cultivation of a wide variety of vegetables on a sedentary basis does require irrigation, and use of chemical fertilisers. Cultivation of steep slopes also requires soil conservation measures.
Figure 4.2. Soil types of the Kundasang study area


4.3 SOCIAL AND ECONOMIC BACKGROUND

4.3.1 Population

The population of the project area is ethnically mixed. The people residing in the area include both Kadazan Dusun, who are referred to as Dusun in the rest of the thesis, and non-Dusun who come from other parts of Malaysia and
overseas. The data on the Dusun population were obtained from the Community Development Office, Ranau (State of Sabah, 1989). No official records are kept for the non-Dusun population, particularly for the temporary residents. Therefore, the figures given for the non-Dusun population were estimates based on my observation, the sample survey and information obtained from development institutions. The Dusun are one of the indigenous groups of Sabah and the descendants of the original residents of Kundasang District. At the time of the study there were 2857 Dusun living in 341 households scattered on farms or located in eight villages inside and on the periphery of the study area (State of Sabah 1989; Fig. 4.1). Approximately 50 per cent of these were children under 16.

The non-Dusun numbered about 700, including approximately 550 adult males, 100 women and 50 children. Most of them lived on farms. However, a few also resided in the settlements in or near the study area. The adult male population included 19 Chinese, one Bangladeshi, 10 Pakistanis, and approximately 420 Timorese\(^1\) and 100 Bugis (from Sulawesi in Indonesia). Of the Chinese, three worked for the Agriculture Department and Kinabalu National Park, and 16 farmed as lessees. Some of the latter also ran businesses. The Bangladeshi farmed as a lessee and also traded in vegetables as a middleman. Nine of the Pakistanis were involved in small businesses such as hawking and restaurants, the other was a middleman trading in vegetables in partnership with the Bangladeshi lessee. Among the Timorese and Bugis approximately five per cent were lessees, 30 per cent worked as share-croppers and the rest as farm

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\(^1\) Timorese is the local name for the immigrant Indonesian population in Kundasang. Most of them, in fact, are 'Florinese' people from the Island of Flores.
labourers. Most were men who had come, sometimes illegally, to Malaysia in search of work.

4.3.2 Land Ownership

The Kundasang study area has 565 hectares of agricultural land divided into 403 plots. Of these plots 81 had been sold to development institutions (Farmers' Organisation and Korporasi Pembangunan Desa) and individuals from outside the Kundasang District (Chapter 5). The outsiders who bought land in the study area included both indigenes of Sabah (Dusun, Kadazan and Muruts) who were classified as 'natives' of the country but were not original residents of the area, and members of other ethnic groups such as Chinese, Part-Europeans, Indians, and Bangladeshis (from Bangladesh). The Chinese and others were also not original residents of Kundasang, and most of them still lived elsewhere. They might or might not have been 'natives' of Sabah according to the legal classification. Legally, a 'native' is a 'person whose parents were or are indigenes of Sabah, or any aboriginal inhabitant of the Malay Archipelago and the children of such an inhabitant by any union with any native or alien' (Colony of North Borneo 1948: 63). In order to be classed as natives all people who were not indigenous to Sabah had to produce documentary evidence to prove their relationship to an aboriginal inhabitant of Sabah or the Malay Archipelago. All people from outside Kundasang District, whether legally 'natives' or not, were classified as 'outsiders' by the local Dusun and they are referred to as such in this thesis. The Dusun from nearby villages within Kundasang District who had
moved into settlements in and around the study area and acquired land in the study area in the late 1950s and early 1960s were regarded as locals.

The remaining 322 plots (450.3 hectares) were owned by local Dusun. All of the 341 Dusun households living within or on the periphery of the study area owned land in Kundasang District. However, not all of the land owned by these 341 households is within the study area or the project area, with their land being scattered over the wider area of Kundasang District (DO01-50; FO01 1990; VH04: pers. comm.). Exact information on the amount of land owned by all these households and the locations of all the plots could not be obtained. However, such information was gathered for the sample of 50 land owners. These 50 owned 204 plots with a total area of 274.3 hectares. Of these 73 plots (97.1 hectares) lay within the study area and 131 plots (177.2 hectares) in the surrounding areas. These land tenure aspects will be examined in more detail in Chapter 6.

4.3.3 Facilities and Services Available

The study area is reasonably well provided with basic facilities. The whole of the study area has a well developed network of feeder roads which connect all settlements with Kundasang shopping centre (Kundasang town) and a market place located beside the East-West highway. The Kundasang shopping centre, with 12 individual shops, satisfied most of the day-to-day shopping needs of the people of the Kundasang district. Other institutions serving the social needs of the people in the study area included a secondary and two primary
schools, two mosques, two churches, a health clinic, a kindergarten and a police sub-station. All of these except the police sub-station and the health clinic were located inside the study area. The latter were situated just outside the study area (Fig. 4.1). All households in the study area, including the farm houses where share-croppers and farm labourers resided, were supplied with piped water by the irrigation project. Five of the eight settlements close to the Kundasang town (Fig. 4.1) also have electricity and telephone cables, although some households in these settlements did not have these facilities installed. There was also an Agricultural Research Station and two rural development institutions: the Farmers’ Organisation (FO) and Korporasi Pembangunan Desa (KPD).

4.4 HISTORY OF AGRICULTURAL DEVELOPMENT IN KUNDASANG

The account given here is based on interviews with Brother Snoweren, a Catholic priest from nearby Bundu Tuhan Catholic mission station, who has worked there since 1955; officials of the Agriculture Department, Farmers’ Organisation (FO) and Korporasi Pembangunan Desa (KPD), including those who had worked in Kundasang in the past; the older village heads; and some retired farmers who were farming in the area in the 1950s (chapter 1). The accounts of these interviews are supplemented by references from official documents, reports by consultants, papers presented at seminars and conferences and other available literature.

Prior to the introduction of vegetables as a cash crop in the mid-1950s the Kundasang Dusun practised subsistence farming under a regime of shifting
cultivation. Their main crops were hill padi (dryland rice), sweet potato, cassava and vegetables such as giant cucumber and gourds. Tobacco was planted for sale (Leng 1965: 102; Baker 1965: 111-117). Until the end of 1959, before a jeep track to Kota Kinabalu was completed, tobacco and surplus root crops and vegetables produced by the farmers were sold at the market at the neighbouring town of Ranau, and at tamu (periodic markets) at the more distant towns of Kota Belud and Tamparuli, approximately 30 to 40 kilometres away via bush trails and bridle paths. Most of the farmers carried the produce themselves, with some occasionally using pack animals to transport larger quantities. The return journey to Kota Belud and Tamparuli took three to four days and was made every two to three months. With the money received from sales, farmers bought salt, sugar, dried fish, clothing and cooking utensils.

Government intervention in Kundasang started in 1955. Over the period from 1955 and 1990 government policies and strategies were changed a number of times and influenced agricultural development in several ways. On the basis of changing strategies three phases can be identified in the development of agriculture in the study area. These phases can be demarcated by the periods 1955 to 1970, 1972 to 1982 and 1983 to 1990.

4.4.1 Phase One: 1955 to 1970. Introduction of Commercial Vegetable Farming

During the first fifteen years from 1955 to 1970 government policy emphasised commercialisation and modernisation of traditional Dusun agriculture. In 1955 the colonial administration sought to introduce commercial vegetable
production among the local Dusun shifting cultivators under its smallholder assisted scheme with two basic aims: 1) to improve the standards of living of Dusun farmers through eliminating the shifting cultivation and encouraging them to adopt commercial vegetable farming on a sedentary basis; and, 2) to reduce Sabah’s dependence on imported temperate vegetables from Hong Kong and Australia (Colony of North Borneo 1956:34-44; State of Sabah 1965:31; Leng 1965:60; Ongkili et al. 1990:18).

A shift from a subsistence shifting cultivation system to sedentary commercial farming was thought to require security of land tenure, trials and experiments, farmer education, extension services and incentives such as cash grants and free farm inputs. At the time of government intervention Dusun cultivated communal land without registered titles. In order to provide security of tenure national land laws were introduced whereby Dusun farmers were encouraged to obtain registered titles to the land they occupied so that they would have better incentives to invest in agriculture and adopt sedentary farming (LD01; FO01 1990: pers. comm.2; Weinstock 1979; Yapp et al. 1988; Leng 1965; Ongkili et al. 1990). Dusun farmers responded positively to this encouragement and to the concept of individual ownership of land with registered titles (see chapter 6).

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2 Codes used here and elsewhere in the thesis denote people interviewed to gather information. Their full names and designations are provided in Appendix 4.
To undertake trials and experiments, farmer education, extension services and provision of cash grants and free inputs, the colonial government established an agricultural research station in Kundasang in 1955 (Colony of North Borneo 1956:44). At this station trials and experiments were conducted with various types of temperate vegetables, tobacco, coffee and soft fruit to identify the species and cultivars most suited to local environmental conditions. The production of a wide variety of temperate vegetables proved more successful than the other crops. With this initial success government began to encourage Dusun farmers to adopt commercial vegetable farming on a sedentary basis beginning in 1956. Specific efforts in this direction included training of farmers in the use of modern farming techniques, provision of extension services, free high-yield inputs such as chemical fertilisers and pesticides and hybrid seeds, and cash grants for construction of terraces.

Under its training programme the Kundasang Agricultural Research Station ran month-long courses to teach farmers the techniques of commercial vegetable production. In these courses, participants were taught how to build bench terraces, make compost and other techniques relevant to temperate vegetable cultivation (Colony of North Borneo, 1960: 26). Information on the number of farmers trained in this manner could not be obtained from official sources but according to older farmers some 50 farmers received training until 1962 after which the training programme was discontinued.
Extension officers based at the research station visited the farmers on a regular basis to advise and assist them in growing vegetables for sale and to distribute hybrid seeds, fertiliser and pesticides. The government also provided a terracing grant of M$500 per hectare to those farmers who built terraces on the steeper portions of their cultivated land (Colony of North Borneo 1960:26; Samad and Lim 1965:4; State of Sabah 1965:31). To qualify for these grants farmers had to construct terraces on their land under the supervision of either the Agriculture Department field staff or other farmers who had undergone training with the Agriculture Department. When construction work was completed the officer-in-charge of the Research Station checked the terraces and authorised the payment of grants if the work was considered satisfactory (DO14; DO15; VH04; AG09 1990: pers. comm).

In addition to the assistance and incentives provided at the farm level major efforts were also made to improve road systems and to establish and strengthen marketing networks. In the late 1950s the main road system in Sabah was extended to make more isolated inland areas such as Kundasang more accessible. By the end of 1959 a jeep track connecting Tamparuli with Ranau was completed. The construction of feeder roads in the study area was also undertaken. Work on a jeep track from Kundasang town to kampong Kouluan started in 1965 (Fig. 4.1). More feeder roads connecting settlements in the study area with the Tamparuli—Ranau road were also constructed in the 1960s.
Improvements in the road system both within the study area and in Sabah as a whole facilitated marketing of locally produced vegetables, although government was not directly involved in the actual marketing. Initially, marketing was handled by the Kinabalu Vegetable Growers' Co-operative Society Limited formed in 1959 based on an initiative of the Catholic Mission at Bundu Tuhan (Colony of North Borneo, 1960: 55). Two or three Chinese jeep operators from Kota Kinabalu also bought vegetables from the local farmers. However, both the jeep operators and the Co-operative could not market all the produce; vegetables rotting on the farms and roadsides was a common sight in 1960-61. By 1963 a few local Dusun farmers within the study area had also bought vehicles and became middlemen marketing their own and other farmers' produce. About a year later about 15 farmers from Kundasang District had become middlemen and the number of Chinese middlemen from Kota Kinabalu also increased considerably (Samad and Lim 1965:5-7). These middlemen provided regular marketing services, increased the farmers' cash incomes and provided them further incentives to increase vegetable cash cropping (AG02; OT06 1990: pers. comm).

The adoption of commercial vegetable farming among the Dusun farmers was rather slow at the start of the smallholder assisted scheme but increased rapidly after the construction of roads and improvement in marketing. In 1958 about four hectares were planted in temperate vegetables in the whole of Kundasang District. Of these about two hectares were planted in the study area by six farmers (Colony of North Borneo 1959: 26; VH04 1990: pers. comm).
Interviews). However, after the opening of the Tamparuli-Ranau road in 1959 vegetable farming assumed increasing importance as a source of cash income and spread rapidly throughout the Kundasang district. Vegetables commonly grown by the farmers included English cabbage, Chinese cabbage, lettuce, tomatoes and spring onions. In 1965, 320 tonnes of vegetables were sent to Tuaran and Kota Kinabalu from Bundu Tuhan and Kundasang (State of Sabah 1966:6). The area under vegetables in Kundasang District increased from four hectares in 1958-59 to 236 hectares in 1970, by which date some 1000 farmers became involved (Raja and Gabongan 1978a:3-3). Most of the commercial vegetables were cultivated along with subsistence crops in shifting agricultural areas although farmers who owned land close to Tamparuli-Ranau road used it solely for commercial vegetable cultivation (Dept. of Agriculture 1971). On roadside land commercial vegetables were generally planted in rotation with grass fallow (Chapter 5).


After the implementation of the New Economic Policy (NEP) in 1971 (Chapter 3), government efforts to modernise traditional agriculture throughout Malaysia were intensified. The development strategies followed in the 1950s and 1960s through the provision of subsidised inputs such as fertiliser and pesticides, hybrid seed and irrigation were pursued more vigorously (Zulkifly 1985:82-85). In addition, new rural development institutions were formed and the combined efforts of several institutions were utilised to carry out rural development programmes.
In Sabah rural development was given a new policy direction and specific programmes were instituted to increase agricultural productivity through the transfer of technology (Gunting 1987:3; Golingi and Gunting 1984:3; State of Sabah 1975:2). The Kundasang project, which had existed under the smallholder assisted scheme, now came under an in-situ development scheme and was continued more vigorously with the establishment of two rural development institutions: the Farmers’ Organisation (FO) and Korporasi Pembangunan Desa (KPD). The establishment of these institutions marked the beginning of more concerted efforts by the government to promote commercial vegetable production and to improve the standard of living of local farmers through elimination of shifting cultivation (FO01 1990: pers. comm.; Limuddin 1980; KPD 1988:17). After the establishment of the FO, the Agriculture Department began concentrating full-time on research and trialing new varieties of crops.

From its inception in September 1970 the FO supplied seed, fertiliser and pesticides to the local farmers at subsidised prices and on a credit basis and provided free transport for farm inputs and farm produce. In addition, it established demonstration vegetable plots to show farmers the advantages of sedentary farming over shifting cultivation in terms of higher yields and better quality crops. The FO extension staff provided technical advice to farmers to encourage them to adopt modern farming techniques. Village level committees were formed and regular meetings held between these committees and FO officials to discuss and sort out farm-related problems. At a later stage it also
provided marketing for farmers' produce but had to stop because of competition from middlemen (FO01 1990: pers. comm.).

Korporasi Pembangunan Desa (KPD) was established in Sabah by the government in 1976 to encourage modern and progressive commercial farming in order to help the rural poor improve their economic and social well-being (Yapp et al. 1988:14). In Kundasang the KPD started its operations in 1977 with a joint-venture vegetable farming programme with local farmers. Under this venture KPD leased land from about 40 farmers in and around the study area at a monthly rental of M$75 per hectare, (KPD01 1990: pers. comm.; Anon. nd: 19). Land owners were employed on their own land by the KPD as paid workers during the whole process of commercial vegetable production, from land clearance to cultivation, harvesting and marketing. While the joint venture lasted, profits from the sale of farm produce were to be shared equally by the land owners and the KPD. The main aim was to train farmers in modern techniques of farming and farm management and to hand the land back to the owners when they had fully adopted the new farming and management techniques (KPD01 1990: pers. comm.; Voon 1981).

However, the farmers' interest in this form of joint-venture farming started to decline after the first year because they felt that they had already learned the techniques used by KPD from the Farmers' Organisation. Moreover, few profits were made by farmers because of the capital intensive nature of farming adopted by the KPD. Thus by 1980-81 all of the farmers in the joint-venture had
stopped working with KPD and begun to concentrate on farming other pieces of land they owned. The KPD continued farming about half of the leased plots using hired Dusun labour from villages within Kundasang district but kept paying the rents on all the leases until the term of the leases expired in 1982 (KPD03 1990: pers. comm.).

In 1982 KPD started another form of joint-venture farming with 20 local farmers under the same conditions as before but using a new high-valued crop, asparagus (KPD01 1990: pers. comm.). This venture failed because, first, asparagus proved to be a very labour intensive crop, and second, other vegetables planted by the same farmers on their other pieces of land competed for labour. The farmers preferred other vegetables to asparagus because they gave quicker returns due to shorter maturing time and much lower labour and technological inputs. As a result KPD abandoned joint-venture asparagus farming in 1987 (KPD03 1990: pers. comm.). At the time of the study most of the plots that had been planted with asparagus during this joint-venture were no longer cultivated by the land owners. They were either leased out, left in fallow or planted in other vegetable crops.

Apart from these unsuccessful attempts at joint venture farming the KPD’s extension staff also provided an advisory service to encourage vegetable farmers to use proper agronomic practices such as bench terraces, crop rotation and the appropriate use of chemical fertilisers and pesticides. The KPD’s Human Development Section was also involved in training farmers to become self-reliant
by teaching them organisational, management and resource use skills. From the time of its establishment in Kundasang in 1977 the KPD also constructed feeder roads, especially in areas where it had established the joint-venture farming programme (KPD02 1990: pers. comm.)

Through the provision of such services, the FO and KPD facilitated the adoption of commercial vegetable production and the adoption of modern technology among the local farmers. Moreover, by providing a more vigorous extension service and making the necessary inputs available they helped many farmers to move towards sedentary farming. The cultivation of vegetables in rotation with hill padi and other subsistence crops on swiddens began to decline. Vegetable cultivation on a semi-permanent basis, that is in rotation with grass fallow on the same plot, expanded gradually on land previously under shifting cultivation, especially on land located near feeder roads (FO01 1990: pers. comm.).

The period 1971 to 1982 also saw significant developments and improvements in road networks in the Kundasang district and Sabah as a whole. The Tamparuli-Ranau road was tarsealed and the East-West highway was completed (Fig. 1.1). This greatly improved links between the study area and outside markets. Within the study area the jeep track from Kundasang town to Kampong Kouluan was completed, upgraded to an all-weather road and extended to connect to the Tamparuli-Ranau road at kampong Pinosuk (Fig. 4.1). More feeder roads connecting settlements in the study area with the Tamparuli-Ranau
road were also constructed between 1972 and 1980 (OT01; KPD01 1990: pers. comm.).

Thus by the late 1970s most of the basic prerequisites for the development of commercial agriculture had become available. An extensive marketing system had developed with the improvements in road systems, FO’s participation in marketing and the increase in the number of middlemen. High-yield inputs such as fertilisers, seeds and pesticides became readily available to farmers on a subsidised price and credit basis. Higher profits from vegetable sales provided further incentives to farmers to increase production of commercial vegetables. However, unreliable and uneven distribution of rainfall remained a major constraint to production of vegetables on a year-round basis. Farmers suffered frequent crop losses from droughts, so that there were acute shortages of vegetables during the dry season and gluts during the wetter parts of the year, accompanied by seasonal price fluctuations. To overcome this constraint an irrigation project was planned in the mid 1970s and implemented in the early 1980s.

4.4.3 Phase Three: 1983 to 1990. The Spread of Irrigation Facilities

The State intervened directly to establish an irrigation project in 1979. This project was intended to enable farmers to produce vegetables on a year-round basis thereby eliminating seasonal price fluctuations, improving farmer incomes and helping to reduce Sabah’s dependence on imported vegetables. The idea of an irrigation project was first mooted in 1976 by Datu Harris Mohammad
Salleh, then Chairman of KPD, who later became the Chief Minister of Sabah. Planning for the project began in 1977. The project was to be constructed and extended in stages. In the first stage it was to cover an area of approximately 800 hectares of which 400 were to be irrigated for vegetable cultivation. The project was also supposed to supply municipal water to farm households, villages, Kundasang town, schools, health clinic, other government institutions, hotels and motels within the vicinity of the project area (KPD 1983:1).

Construction works by the engineering firm of Raja and Gabongan commenced in 1979 (KPD 1983). After the completion of the major works on diversion structures, laying of main pipelines and installation of storage tanks by the engineering firm, the KPD took over the responsibility for installation of on-farm sprinklers, extension, maintenance and the overall management of the project from 1983 (KPD02 1990: pers. comm.).

The project cost the Sabah government around M$9 million. The capital cost of the construction of the irrigation system from the diversion structure to the individual fields was financed by the State government through the KPD. The farmers themselves bore the cost of installation of the irrigation system on their fields, which ranged between M$2000 and M$4000 depending on how far the plots were from the main pipe lines. Arrangements were made for farmers to obtain loans for their field irrigation, with KPD providing the security. The farmers were supposed to repay the KPD in three years at a rate of M$100 per month (KPD 1983). Most of the farmers had paid off their loans by 1990.
The project became operational in May 1983 and by the end of 1983, 98 plots had been installed with on-farm sprinklers irrigating an area of approximately 40 hectares. Subsequent sprinkler installation by KPD proceeded slowly. By the end of 1989 only 198 plots in the whole of the project area were equipped with in-farm sprinklers by the KPD. Of these 155 plots lay in the study area (KPD 1989). During 1987 and 1990 the project area was extended by another 200 hectares (Fig. 4.1: A). In the extended area construction work was still in progress at the time of study.

Although installation of sprinklers by KPD proceeded slowly, the actual area irrigated increased considerably over the years, as farmers with KPD-installed sprinklers extended the area under irrigation on their plots by fitting additional sprinklers, and farmers on a further 98 plots (93 in the study area) installed sprinklers without KPD assistance. They established irrigation facilities by diverting water either directly from KPD main pipes or from neighbouring irrigated plots. Approximately 120 hectares are irrigated in this way. At the time of study a total of 296 plots and some 300 hectares of land in the project area were under irrigation using project facilities (KPD01 1990: pers. comm.). Of these, 248 plots lay in the study area. Thirty of these plots were not cultivated. The project also supplied municipal water to farm homesteads and eight villages in the vicinity of the project area. Moreover, municipal water was supplied by the project to the Kundasang shopping centre, housing areas, Agriculture Department, other development institutions, and schools close to the shopping centre along the main road on the south western edge of the project area (Fig. 4.1).
4.5 DISTINCT CHARACTERISTICS OF KUNDASANG PROJECT

The strategies used in Kundasang project were similar to those adopted in in-situ development projects elsewhere in West Malaysia and Sabah. However, the success rate of Kundasang project in terms of increasing productivity, incomes and standards of living of the targeted population was much higher. This success can be partly attributed to government development efforts. However, Kundasang has certain distinct characteristics which have contributed significantly to its success. These include off-farm economic opportunities, environmental conditions, land and labour availability and the nature of crops planted.

4.5.1 Off-farm Economic Activities

Alongside development of commercial agriculture, other major developments also took place either within or close to the study area. These facilitated local Dusun participation in off-farm economic activities, the most important of which were the construction and upgrading of the Tamparuli–Ranau trunk road, development of tourism and mining industries and Sabah Government’s attempt to develop a substantial portion of Kundasang District.

From 1957 to 1970 construction and upgrading of Tamparuli—Ranau trunk road was carried out by the Public Works Department (PWD). This provided employment to 15 to 20 Dusun from the settlements within or close to the study area on both a regular and a casual basis. The Kinabalu National Park, which was established in 1964, was developed into an important tourist centre in
1983-84 after the upgrading of the East-West highway. To cater for tourists visiting the area, three hotels were established, one in the National Park and two nearby. Three motels were also built within the vicinity of the National Park. All of these were located within commuting distance from the study area. Together, they employed approximately 200 people on a regular basis as duty managers, drivers, secretaries, cleaners, housekeepers, waiters and labourers. Another 60 men were employed casually by the National Park as guides and porters. About 40 per cent of these employees came from the eight villages and settlements in or near the study area. The rest originated from other villages in the Kundasang District and nearby sub-district of Bundu Tuhan (OT08; OT09; OT10; OT11 1990: pers. comm.). Mamut Copper Mine, which is located about 15 kilometres from Kundasang town, had employed about 40 people from the study area since its establishment in the mid-1960s.

More recently, in the early 1980s, the Sabah government made an effort to develop a substantial portion of Kundasang District close to the study area for tourism, agricultural resettlement, and the establishment of educational, technical and agricultural institutions on 2,200 hectares within the land designated for the Kinabalu National Park Reserve on Pinosouk Plateau (Raja and Gabongan 1984: 33-60; 1985: 3-6; Fig. 4.1). A million dollar golf course was constructed and access roads were opened in many areas, with work on other projects beginning in the 1982-84 period. However, in April 1985 the ruling party was defeated in state elections and the incoming government shelved most of these latter projects.
While this project was in operation it provided employment to 50 to 60 people from the Kundasang District.

Institutions that were established to promote commercial agriculture also provided employment opportunities to local Dusun. The Agriculture Department research station has provided employment to ten to 15 Dusun from the study area and nearby areas to clear forest, prepare land for experimental vegetable plots, construct terraces, erect fences and do other day to day work since its establishment in 1955. The FO and KPD have employed 30 to 40 local Dusun as labourers, clerks, drivers and field assistants from the time of their establishment in Kundasang (FO01, AG01, KPD02, 1990: pers.comm.)

The development of commercial agriculture and the creation of wage employment led to an expansion in the demand for services. These provided opportunities to the local Dusun to participate in business enterprises. Initially, a few Dusun started small grocery shops and some started marketing vegetables as middlemen. Later, after the establishment of Kundasang town in the early 1980s, they established large-scale grocery stores, farm input shops, restaurants and transport businesses. All of these developments facilitated local Dusun participation in the cash economy and modern sector and enabled them to diversify their economic base, thus contributing significantly to the overall success of the project.
4.5.4 Environmental Conditions

Kundasang’s environmental conditions have been particularly favourable for successful rural development. Its cool location at a high altitude combined with cool air from the massif of Kinabalu give the Kundasang area two distinct economic advantages. It is possible to cultivate high-valued temperate vegetables all year, thus enabling farmers to earn higher cash incomes than farmers in other areas of Sabah and West Malaysia where year-long cropping is not possible. Moreover, the cool temperatures and the location of Mt Kinabalu within Kundasang District facilitated the development of a flourishing tourist industry, which provides employment to a large number of local people.

4.5.3 Land Availability

Kundasang project has an additional advantage in availability of land. Unlike other rural areas in West Malaysia where land is in short supply, Kundasang district has abundant land. All land owners own two or more plots of land. Moreover, the Dusun of Kundasang are able to acquire vacant State land or even State reserve land virtually free of charge and more easily than people in West Malaysia. This difference in ownership and availability of land has allowed the Dusun land owners to adopt several forms of tenure arrangements which enabled them to increase their farm productivity, cash incomes and standards of living.
4.5.4 Labour Availability

Most studies conducted in West Malaysia show that labour shortage caused by seasonal bottle-necks and out-migration of potential farm workers from both land owning and farm labourers’ households pose major constraints to successful development of commercial agriculture. In the study area labour shortage has not been a major problem. There is a large pool of immigrant labour from Indonesia and the Philippines who are hired on both regular and casual basis to do farm work. Immigrant labour has also helped free the Dusun land owners’ household labour from farm work, thus allowing them to diversify into off-farm economic activities.

4.5.5 Difference in Crop Types

In most in-situ development projects in Malaysia the focus has been on crops such as irrigated rice, rubber, oil palm, and other tree crops (Lim 1989; Halim 1980; Baharuddin 1979; 1986; Athreya et al. 1987; Huang 1983). These crops have the disadvantages of long pre-harvest periods of the tree crops and low returns from rice. Most tree crops require three to five years before giving returns. Many farmers who adopt tree crops become impatient while waiting for them to mature and lose interest in farming. Some even abandon the land planted in trees. Rice, on the other hand, gives two crops per year but the returns are not high relative to the efforts required to produce it in the adverse environmental conditions under which they have to work.
In Kundasang, temperate vegetables give comparatively high returns to farmers. If well planned and managed, the annual incomes derived from one hectare of vegetable land can be as high as M$20,000. Moreover, vegetable crops mature quickly, mostly in less than three months. If planting is well-planned, crops can be harvested weekly to enable farmers to derive incomes on a regular basis.

All of these special characteristics have supplemented the government’s rural development efforts to make the Kundasang project a success and made it a special case in Malaysia. Both the special characteristics and government efforts have also been fundamental to a wider process of transformation in land use, land tenure, diversification of economic activities and labour organisation. These transformations have had significant social, economic and environmental impacts.
CHAPTER FIVE

LAND USE CHANGES

5.1 INTRODUCTION

The environmental impacts of the spread of commercial agriculture along the margins of the global economy are well documented. Geographers and anthropologists have shown that traditional agricultural systems are low-input, low technology, low-cost and relatively environmentally sound. The products of such agricultural systems are geared towards meeting the subsistence and socio-cultural needs of the local societies (Barlow and Jayasuriya 1986; Dalton 1982; Slattery 1979). With planned rural development programmes governments have intervened to modernise and commercialise traditional agriculture. New crops, cultivation practices and yield-enhancing technologies such as hybrid planting materials, chemical fertiliser, pesticides, irrigation and mechanisation have been introduced. In the process traditional agriculture is transformed into high-input, high-technology, high-cost systems, the products of which are destined for national and global markets (Thiele 1990; Eastman 1990; Stonich and deWaltz 1989; Hayami and Ruttan 1985).

The introduction of new technologies and cultivation practices, and the desire among farmers to accumulate profits from cash cropping lead to intensification of cropping on existing farms and expansion of cultivation on marginal soils that are highly susceptible to erosion (Brookfield 1984; Levi 1976; Boserup 1965). These land use changes generally increase productivity both per
unit area of land cultivated and per unit of labour. However, such strategies can also result in serious degradation of the environment (Thiele 1990; Blaikie and Brookfield 1987b; Brookfield 1984; Weir and Shapiro 1981).

Upland areas are degraded through removal of forest cover, accelerated soil erosion, compaction and rapid leaching of soil nutrients resulting in depleted soils and poor yields. Lowland areas suffer from associated silting and severe flooding. The lowland ecological balance is also upset by fertiliser and pesticides that enter streams, rivers and ground water through leaching and runoff, which leads to concentration of toxic substances and eutrophication. Excessive and indiscriminate use of pesticides results in pest resistance to pesticides (Lewis 1992; Louloudis et al. 1989; Davies 1981; Weir and Shapiro 1981).

The key question addressed in this chapter is: 'Has rural development in Kundasang study area led to similar land degradation?' To answer this question, land use prior to 1956 is reviewed to illustrate the form of land use prevalent in the area before government intervention. Then, land use changes and the impact of these changes on the environment are considered over the three time periods that match the changes in government policy and strategies described in Chapter 4.

Information on pre-1956 land use, and changes up to 1982 are derived from records kept by the Agriculture Department, reports by consultants, a systematic survey of 50 sample land owners, and in-depth interviews with
government officials, Dusun farmers and other individuals (chapter 4). These sources are supplemented by comparative data from other areas of Sabah derived from the works of anthropologists and other researchers. The data on land use since 1983 are derived from interviews with the sample land owners and their tenants and relatives, and my field survey of 1990.

5.2 PRE-1956 LAND USE SYSTEM

Until the mid-1950s the Kundasang Dusun were largely subsistence farmers. They cultivated land close to their settlements and produced crops to meet the dietary and social needs of their families. Some surplus was sold at tamu (periodical markets) at Ranau, Kota Belud and Tamparuli. The surplus was sold not to accumulate cash or luxury goods, but to purchase items such as tools, clothing and domestic utensils and food items not produced on the farms such as salt, sugar and dried fish.

Shifting cultivation was the predominant form of land use whereby forested land was cleared, planted in crops for two to three years and then left in fallow under scrub and bush for five to ten years. A major portion of the cultivated land was planted in subsistence crops including hill padi, sweet potato, maize and vegetables, with small areas devoted to the production of tobacco for sale (Leng 1965: 102; Baker 1965: 111-117; OT06 1990: pers. comm.). Cultivation practices on shifting agricultural plots showed a high degree of intercropping, which ensured a year-round supply of food, discouraged development of plant-specific insect pests and provided soil cover and green manure.
After clearing forest and burning the debris farmers usually planted hill padi. Some parts of the hill padi crop were intercropped with vegetables and maize by sowing seeds of all three crops at the same time. About eight weeks after planting, the first weeding was done. The second and final weeding followed after another four to six weeks, after which parts of the hill padi crop not already intercropped with other crops were planted with sweet potato. After the first cycle of crops was harvested, a portion of the land was planted in tobacco and the rest in maize, vegetables and more sweet potato, all of which were harvested before the following hill padi planting season. Each new plot was cultivated in this manner for two to three years before being fallowed.

The technologies used were simple. The *parang* (steel knife) was used for clearing forest and scrub, and dibble sticks to dig holes in the ground to sow seeds or plant seedlings or cuttings. No tillage, in the sense of turning and working of soil, was practised. Most weed seeds were destroyed by burning the debris with any regrowth being removed manually. Insect pests and soil erosion did not present major problems because of the wide diversity of crops planted together, minimum tillage and presence of trees, stumps and roots in the ground. Soil fertility was maintained by fallowing. Burning of debris after clearing the land also provided the soil with nutrients such as potash.

This low-input system of production depended on natural soil fertility and rainfall rather than on artificial fertiliser and irrigation. The major inputs were locally available labour and traditional planting materials. No inputs from outside...
the system were used. It was an extensive form of land use with low population densities over a wide area, even if garden plots were cropped intensively for a period. Although yields were low, the system was not highly destructive, but generally sustainable.

5.3 1956 TO 1970: THE ADOPTION OF COMMERCIAL VEGETABLE FARMING

In 1956 commercial vegetable farming was introduced. Until 1958 very few changes in land use were adopted by the farmers despite the provision of various forms of incentives by the government. The traditional form of shifting cultivation remained the predominant form of land use. On the swidden plots major portions were planted in subsistence crops using traditional technology as was the practice prior to 1956. The only changes were the inclusion of vegetable cash crops and the use of chemical fertilisers and pesticides. A limited number of vegetable cash crops, such as English and Chinese cabbages, tomatoes, lettuce, carrots and leeks were planted on small portions of the swidden plots, with the chemical fertiliser and pesticides supplied by the Agriculture Department being used only on the vegetable cash crops.

After the opening of Tamparuli–Ranau trunk road at the end of 1959, a direct link was established between Kundasang and Kota Kinabalu. The market for Kundasang vegetables expanded and farmers' cash incomes increased, thus providing them with both the incentives and the resources to produce larger quantities of vegetables using modern technologies. Subsequently, several changes in land use took place, most importantly, an expansion in land under
cultivation, spatial specialisation of cash and subsistence crops, and adoption of new crops, cultivation practices and technology.

Although, from 1959, commercial vegetable farming had become an important economic activity in the study area, production of traditional food crops was maintained by all Dusun farmers. This contemporaneous planting of both commercial and subsistence crops necessitated an expansion of the cultivated area, which consisted mainly of the clearing of forested land along the Kundasang–Kouluan jeep track at increasing distances from the Tamparuli–Ranau trunk road as construction work on this track progressed (Fig. 5.1). Consequently, by 1970, approximately 360 hectares (almost 50 per cent) of the 750 hectares of land in the study area had come under cultivation. According to the estimates of older residents and staff of the Agriculture Department, this was an increase of over 100 per cent from the 1954-55 period (AG05; AG07; RF02; RF03; VH04 1990: pers. comm.). The remaining 50 per cent of the land remained under rotational grass, scrub fallow and forests (Table 5.1).

As commercial vegetable farming gained importance, spatial specialisation of commercial and subsistence crop production began to emerge. Starting from 1960, farmers who owned or occupied land close to the Tamparuli—Ranau trunk road began to devote this land solely to commercial vegetable production. A survey conducted by the land use section of the Agriculture Department in 1970 showed that out of a total of about 160 farmers in the study area, 60 who owned or occupied approximately 100 hectares close to Tamparuli—Ranau trunk road
had devoted the land solely to commercial vegetable production (AG02 1990: pers. comm.; Fig. 5.1).

Figure 5.1. Land under different categories of use in the Kundasang study area in 1970.

Source: Department of Agriculture, Sabah, 1971.

These farmers also planted subsistence crops on additional plots located farther away from the main road.
Table 5.1. Land under different categories of use in the Kundasang study area in 1970 and 1990.

<table>
<thead>
<tr>
<th>Category of land use</th>
<th>1970</th>
<th>1990</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area (Ha)</td>
<td>%</td>
</tr>
<tr>
<td>Permanent cultivation of commercial vegetables</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Fruit trees</td>
<td>10</td>
<td>1.3</td>
</tr>
<tr>
<td>Commercial vegetables in rotation with grass fallow</td>
<td>105</td>
<td>14.0</td>
</tr>
<tr>
<td>Commercial vegetables and subsistence crops under shifting cultivation</td>
<td>172</td>
<td>22.9</td>
</tr>
<tr>
<td>Newly cleared land</td>
<td>80</td>
<td>10.7</td>
</tr>
<tr>
<td>Grass and scrub fallow</td>
<td>150</td>
<td>20.0</td>
</tr>
<tr>
<td>State land, forest and rivers</td>
<td>213</td>
<td>28.4</td>
</tr>
<tr>
<td>Settlements, roads and other structures</td>
<td>20</td>
<td>2.7</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>750</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Sources:

i. Department of Agriculture (Sabah) 1970.

ii. Field survey conducted in 1990 with the help of the land use section of Agriculture Department, Sabah.

Two factors that contributed to the concentration of commercial vegetable production close to the trunk road were: the incentives and encouragement provided by the Agriculture Department, and easy access to market. Because this area was located near the main road and the Agriculture Department’s Research Station the efforts of the extension staff to modernise agriculture were heavily concentrated here. The extension staff visited the farmers in this area regularly, taught them the techniques of commercial vegetable production under more
intensive forms of cultivation and supplied them with more free inputs than were received by farmers in other areas. Most farmers responded positively to the assistance and incentives provided by the Agriculture Department and began to adopt a more intensive form of land use.

Moreover, since commercial vegetable production involved regular marketing, access to market also became an important consideration in the location of plots under cash crops. In the absence of all-weather feeder roads within the study area, farmers who planted vegetables away from the main road had to use household and hired labour to carry their farm produce up to three kilometres from their plots to sales locations by the trunk road, a time consuming and expensive task. In order to save labour time and costs it was logical for farmers who owned plots close to the trunk road to cultivate them in vegetable cash crops on a year-round basis and use the swidden plots located at greater distances from the main road to plant subsistence crops requiring neither inputs nor marketing.

Nevertheless, other farmers in the study area who did not own land close to the trunk road continued to cultivate both commercial vegetables and subsistence crops on more distant plots. Although a jeep track from Kundasang town to Kouluan settlement was constructed between 1965 and 1970 (Fig. 5.2) it could not be used to transport farm inputs and produce during wet seasons until it was upgraded in 1972. As a result farmers who owned land close to this feeder road did not use their land solely for commercial vegetable production.
Figure 5.2. Location, condition and date of construction of roads in the Kundasang study area

- Tar sealed road
- All weather gravelled
- Impassable in wet weather
- Impassable and abandoned
- Passable but dangerous in bad weather
- 1995 etc date of construction

Source: OT01; KPD01; VH02; VH04 1990. Personal Interviews.
By 1970 two distinct types of cultivated plots could be identified in the study area. These were more intensively cultivated plots close to the trunk road, specialising in commercial vegetable production; and shifting cultivation plots, planted either in mixed commercial and subsistence crops or just subsistence crops, located farther away.

Cultivation practices on these two types of plots were significantly different. On plots used solely for cultivation of commercial vegetables a more intensive form of land use was adopted whereby commercial vegetables were planted in rotation with short-term grass fallow. Approximately one-third of the area (0.2 to 0.4 hectares per plot) was planted in vegetables for one cropping cycle of about four months while the rest of the land remained under grass fallow. The second crop was planted on another one-third of the land, which was previously under grass fallow. During pre-planting land preparation weeds were dug out and burned to destroy the rhizomes. The soil was then tilled completely and vegetables planted in rows to facilitate cultivation (FO01; AG02; DO15; DO17 1990: pers. comm.).

This form of intensive cultivation increased the risks of soil erosion, loss of soil nutrients through leaching, and weed and insect pest infestations. To maintain soil fertility and crop yields, Dusun farmers had to use larger quantities of chemical fertilisers than they had previously used on vegetable crops planted on shifting cultivation plots. Weeds that emerged after planting crops were controlled manually. Insect pests such as caterpillars, diamond-back moth and
subterranean cutworm, which began to present serious problems for production of cabbages, were controlled by the use of Endrin, Deldrin, Malathion and DDT. These insecticides were supplied by the Agriculture Department (State of Sabah 1963: 25-26).

To reduce soil erosion, farmers were required to construct bench terraces on steeper slopes, under the supervision of extension staff utilising cash grants from the Agriculture Department. Despite the availability of cash grants only about 10 per cent of the farmers who cultivated land susceptible to erosion constructed bench terraces. The others did not either because they did not understand the importance of soil conservation or they could not afford the labour costs involved in the construction of terraces prior to the receipt of the grants (AG03; RF01; DO14; DO21 1990: pers. comm.). An agronomist based at Sandakan who visited Kundasang in 1966 also noted that a large number of farmers cultivated steep slopes, but only a few had built bench terraces. Consequently, soil erosion had become a potential environmental problem (Department of Agriculture 1966: File PT 18\4\ Volume 1).

On plots planted in mixed subsistence–cash crops or subsistence crops only, which accounted for approximately 60 per cent of the total cultivated land in the study area in 1970 (Fig. 5.1), relatively few changes were adopted in terms of cultivation practices and use of technology. The cultural practices on swiddens devoted solely to subsistence production remained almost the same as in the pre-1956 swiddens. However, on swiddens planted in mixed commercial vegetables and subsistence crops about 0.1 to 0.2 hectares were planted in
vegetable cash crops (Raja and Gabongan 1978a: 5-2) with the rest in subsistence crops. When a new plot was cleared the first crop of vegetables and subsistence crops was planted under minimum tillage, the seeds, seedlings and cuttings being transplanted into holes dilled in the ground.

For the succeeding vegetable crops, the land was tilled completely to loosen the soil and remove weeds before planting. Vegetable cash crops were never intercropped with the subsistence crops because from the start the Agriculture Department advised farmers to plant commercial vegetables separately from other crops to facilitate more frequent cultivation and to ensure that inputs provided free of charge were used only on commercial crops (DO14; DO15; DO36 AG01 1990: pers. comm.).

Practices related to the maintenance of soil fertility, pest control and soil conservation changed very little. Since all swiddens were established on land that was under either bush or forest fallow, loss of soil fertility and weed and insect pests did not become serious constraints to crop production. Chemical fertilisers and insecticides were used only on vegetable cash crops and not on subsistence crops. Soil erosion was not a problem on most plots because of minimum tillage and the presence of roots, stumps and trees on cultivated land. Even the farmers who tilled the soil completely on steep land to cultivate vegetables placed logs across the slopes to reduce soil runoff (DO14; DO15; DO17 1990: pers. comm.).
The varieties of crops planted by Dusun farmers showed considerable changes between 1956 and 1970. In the initial stages of commercial vegetable farming the Agriculture Department introduced English cabbage, Chinese cabbages (pak-choi and chihili), Mustard cabbage (kai choi), tomato, lettuce, potato, spring onion and leeks. The Dusun farmers adopted these crops while maintaining their traditional subsistence crops and the cash crop, tobacco (DO14; DO15; DO17 1990: pers. comm.; Department of Agriculture 1966: File No PT 18/4, Vol.1). This led to a significant increase in the variety of crops planted by the farmers in the early 1960s.

However, by the mid-1960s the range of crops had decreased as farmers became more selective with cash crops on the basis of cash returns received and the performance of the crops under the environmental and technological constraints prevalent in the area. From the nine new vegetable cash crops originally introduced a majority of the Dusun farmers retained only six: English cabbage, Chinese cabbages (pak choi and chihili), mustard cabbage, tomato and lettuce (Table 5.2). Most farmers planted the largest area in English cabbage, followed by Chinese cabbages, mustard cabbage, tomato and lettuce (DO14; DO17; AG05; AG07 1990: pers. comm.; Samad and Lim 1965). These crops were preferred by Dusun farmers because they gave higher yields with less labour and fewer technological inputs than leeks, spring onions and potatoes. Moreover, early blight of potatoes and leaf blight of leeks caused by Alternaria sobin and Alternaria brassicae respectively were other factors that discouraged Dusun farmers from adopting these crops widely (AG02; FO01; AG05 1990: pers. comm.; Colony of North Borneo 1961:30).
Table 5.2. Commercial vegetables planted in the Kundasang study area in 1965, 1976 and 1990.

<table>
<thead>
<tr>
<th>Crop</th>
<th>1965</th>
<th>1976</th>
<th>1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asparagus (Asparagus officinalis)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Beetroot (Beta vulgaris var. vulgaris)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Broccoli (Brassica oleracea var. italicca)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Capsicum (Capsicum annum var. grossum)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Carrots (Daucus carota)</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Cauliflower (Brassica oleracea var. botrytis)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Celery (Apium graveolens)</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Chillies (Capsicum annum var. accuminatum)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Chinese cabbage</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Chinese cabbage var. pekinensis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chinese cabbage var. chinensis</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pak Choi (Brassica chinensis var. chinensis)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>English cabbage (Brassica oleracea var. capitata)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>French beans (Phaseolus vulgaris)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Leek (Allium porrum)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Lettuce (Lactuca sativa)</td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Mustard cabbage (Brassica juncea var. foliosa)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poi choi (Brassica rubra)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Potato (Solanum tuberosum)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Radish (Raphanus sativus)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Red onions (Allium ascalonicum)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Sayur minyak (Brassica sp.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spring onion (Allium fistulosum)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Sweet peas (Pisum sativum)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Tomato (Lycopersicon esculentum)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Sources:

i. OT06, AG05; AG07, DO15; VB04 Pers. comm. 1990. Crops planted in 1965.
ii. FO01; KPD01; AG02; DO15; VB04 Pers. comm. 1990. Crops planted in 1982.
Tobacco, the traditional cash crop, was replaced by commercial vegetables. Tobacco, being a seasonal crop, could be grown only once a year. Vegetables, on the other hand, could be cultivated and harvested on a year-round basis except during drier months. More frequent harvests and sales of vegetables enabled the farmers to derive higher cash incomes on a more regular basis than they had from tobacco. Thus most Dusun farmers stopped cultivating tobacco for sale, although small amounts were produced for home consumption.

All farmers maintained subsistence production to save on food expenses so that they could use earnings from vegetable sales to meet their new needs. In 1970 Dusun farmers' incomes from vegetable sales ranged from $M50 to $M100 per month (DO14; DO15; DO17; DO21 1990: pers. comm.), which was higher than what they had received previously from sale of tobacco. But their life-styles had changed and expenses increased. Farmers started to invest money earned from vegetable sales in the education of their children, improvement of houses and in luxury items such as radios, furniture and motor vehicles. A few had also begun to invest in business enterprises.

The major changes that emerged between 1956 and 1970 were expansion of cultivation on previously forested land and a gradual development of two distinct systems of land use: traditional shifting cultivation systems devoted to the production of subsistence and cash crops, and a more sedentary system with some rotation, specialising in commercial vegetable production. In both systems dependency on modern inputs had begun. Soil erosion and leaching of nutrients
emerged as problems, particularly on plots cultivated under the more sedentary system, because of changed techniques of cultivation.

5.4 INTENSIFICATION OF LAND USE: 1970 TO 1982

The period between 1971 and 1982 saw even more rapid changes in land use in the Kundasang study area than in the previous 15 years. The two rural development institutions, the Farmers' Organisation (FO) and Korporasi Pembangunan Desa (KPD) established in the 1970s and improvements in physical infrastructure (Chapter 4) were the major forces behind these changes. The development institutions supplied the necessary farm inputs, and provided vigorous extension services. They also established demonstration plots and started joint-venture farming to train farmers in the techniques of intensive commercial vegetable cultivation on a more sedentary basis (Chapter 4).

In terms of physical infrastructure, new feeder roads were constructed within the study area. The Kundasang-Kouluan jeep track was upgraded to an all-weather road in 1972 and extended in 1978 to join the Tamparuli-Ranau trunk road at the Pinosouk end of the study area (Fig. 5.2). These roads helped to establish and maintain regular contacts between the extension officers and farmers in areas away from the trunk road, and to cart farm inputs and produce. The opening of the East-West highway in 1976 and its upgrading in 1982, and overall improvements in road systems in Sabah helped to establish better marketing links between Kundasang and other urban centres, resulting in further
increases in the farmers’ cash incomes (Campbell n.d: 73-79; FO01 1990: pers. comm.).

These improvements in physical infrastructure, support services and farmers’ cash incomes from commercial vegetable farming facilitated rapid transformations in land use between 1971 and 1982. Among the more significant changes were a decline in total area cultivated, an expansion in the area cultivated in commercial vegetables under a more sedentary grass-fallow rotation system, cessation of subsistence crop production, more intensive use of modern technology, an increase in varieties of vegetable cash crops planted, and changes in spatial distribution of the cultivated areas.

Because aerial photographs and land use maps of the study area for 1982 were not available, it was difficult to estimate the total area cultivated in the entire study area during this period. But according to informants (DO15; FO01; KPD02 1990: pers. comm.), approximately 200 farmers were farming in the area. The mean area cultivated per farmer in commercial vegetables per crop season was 0.5 hectares, which was cultivated on an average of about 2.5 crops per year. According to these estimates about 100 hectares were under cultivation throughout the year, and a total of 250 hectares were planted in commercial vegetables per year in the study area. This was a reduction of approximately 30 hectares over the 1970 acreage (Table 5.1).
This reduction was caused by the discontinuation of subsistence crop production and the more extensive shifting cultivation system of farming. By 1982 all Dusun in the study area stopped planting subsistence crops because of improvements in road conditions, labour shortage and increase in vegetable prices. As the existing feeder roads in the study area were upgraded and new ones were constructed in the 1970s a larger number of farmers who owned land close to these roads adopted the more intensive form of vegetable cultivation in rotation with grass fallow. Subsistence crop production under the traditional form of shifting cultivation with long-term fallows was continued only on plots located more than 400 to 500 metres away from the feeder roads. Farmers who owned only one plot in the study area and devoted it solely to the production of commercial vegetables, planted subsistence crops under shifting cultivation on land they owned outside the study area (DO17; FO01; KPD01 1990: pers. comm.). Thus by 1976-77, although commercial vegetable production under a more sedentary system had spread more widely in the study area, all farmers maintained subsistence food production under the traditional form of shifting cultivation either within or outside the study area.

From 1978 subsistence food production began to decline gradually due to a shortage of farm labour and rapidly increasing cash incomes from vegetable farming. From the early 1970s Dusun farmers began to experience labour shortages because larger numbers of Dusun children began to leave the area for higher education, and taking up off-farm employment. The labour shortage
problem became more serious after 1977 when Dusun labourers became unavailable (Chapter 7).

In the meantime, the opening of the East–West highway in 1976 expanded the market for Kundasang vegetables, enabling the Dusun farmers to earn over \$M330 (FO01 1990: pers. comm.; Raja and Gabongan 1978a: 5-6), and by 1980 some farmers earned as much as \$M1000 per month (FO01 1990: pers. comm.; Voon 1981: 57). To overcome labour constraints and take advantage of high cash returns from commercial vegetable farming, some Dusun farmers, especially those with fewer working age people in the household, stopped subsistence food production. They utilised all available labour for commercial vegetable production. According to Farmers' Organisation estimates (FO01 1990: pers. comm.), by 1979 only 40 per cent of the farmers maintained both cash and subsistence crop production. Most of these produced subsistence crops on land outside the study area (FO01; FO03; FO06 1990: pers. comm.). By 1981-82, when incomes from vegetable farming increased further, all farmers in the study area had abandoned subsistence crop production and had become specialised producers of commercial vegetables, cultivating their land in rotation with grass fallow. As a result, the area planted in commercial vegetables under more intensive grass fallow rotation increased by almost 150 per cent from 105 hectares in 1970 to about 250 hectares in 1982, but this increase was not large enough to make up for the reduction in cultivated area caused by the cessation of subsistence crop production.
By 1982 spatial distribution of cultivated land also changed. All land under commercial vegetable cultivation became concentrated close to the trunk road and other feeder roads because of greater access to marketing facilities. Land farther away was fallowed after subsistence food production was discontinued. Figure 5.3 is a thematic map showing the approximate distribution of land under different uses.

Figure 5.3. Approximate distribution of land under different categories of use in the Kundasang study area in 1982

Sources:

i. RF01; RF02; RF03; RF04; F001; F006; KPD01; KPD02 1990. Personal interviews.

It is based on information obtained from the sample land owners, and the staff of the FO and KPD (DO01-50; FO01; KPD01; KPD02 1990: pers. comm.). Although the map may not be accurate in terms of the actual area under cultivation, it does show the overall pattern of the spatial distribution of land under different uses.

Concentration of cultivation close to feeder roads had two degrading consequences: removal of forest cover, and expansion of cultivation on steep slopes. Destruction of forests proceeded at a rapid rate in the early 1980s (in areas marked A, B, and C on Fig. 5.4) when new feeder roads were constructed in these areas. Some very steep land, which was previously under forest or cultivated under a regime of shifting cultivation, was brought under permanent cultivation (Fig. 5.5: A, B, C). Both these practices led to accelerated soil erosion and land degradation.

To encourage diversification the FO introduced a range of new vegetable crops (DO15; DO17; RFD01; FO01 1990: pers. comm.; State of Sabah 1971:106). As a result, the varieties of vegetables cultivated in the study area increased from eight in the 1960s to 20 in 1976, all of which were maintained until 1982 (Table 5.2). However, English cabbage, Chinese cabbages, tomato and lettuce remained the most popular crops among Dusun farmers. The newly introduced crops such as celery, sweet peas and poi choi were not planted on a large scale because they required regular water supply and higher levels of labour.
inputs and technological and managerial skills, all of which were lacking in the study area at that time.

Figure 5.4. Distribution of forest in the Kundasang study area in 1970 and 1990 (A, B, C, D, E and F are the main areas of deforestation after 1970).

ii. Land use survey 1990.
Figure 5.5. Contour lines showing heights above sea level in different parts of the Kundasang study area (A, B, and C are areas with steep slopes brought under permanent cultivation after 1970).

Sources:


ii. Field observations.

iii. VH02; VH04 1990. Personal Interview.
With the adoption of a more intensive form of land use, with vegetable monoculture and expansion of cultivation on more marginal lands, accelerated soil erosion, loss of soil fertility and weed and insect pests became serious constraints to crop production. To maintain soil fertility and crop yields the FO and KPD advocated the use of larger quantities of chemical fertilisers such as NPK, urea, lime, Hi-Pod Calcium and Wuxal as well as chicken manure. Most farmers used chemical fertilisers because they became readily available at subsidised prices and on credit from the FO. Chicken manure, on the other hand, was not used widely due to shortage of supply. Although the FO bought chicken manure from poultry farms near Kota Kinabalu for supply to local farmers, stock was insufficient to provide a regular supply.

Weed and insect pest control also became dependent on chemical pesticides. Prior to 1970 farmers cut, dug and burned weeds from their fields at the start of land preparation. Only a few farmers occasionally sprayed with weedicides. By 1982 cutting and digging of weeds were rarely practised because of labour shortage. At the start of land preparation, tracts under fallow were sprayed with herbicides such as Grammaxone or Lasol. When the grass dried up it was burned. This was followed by complete tillage of the soil to destroy grass rhizomes and facilitate cultivation. On cropped land, weeds were removed manually, which became a more labour intensive and time consuming task than it had been under shifting cultivation (DO15; DO17; FO02; RFD01 1990: pers. comm.).
To control insect damage farmers continued to use insecticides, as they had prior to 1970, but the variety of insecticides used had increased with the introduction of Methamidophos, *Bacillus Thuringiensis* and Phenthoate (FO02 1990: pers. comm.). The use of insecticides also increased in quantity and frequency. According to estimates of the FO (FO02 1990: pers. comm.) and Raja and Gabongan (1978b:4-6) most farmers doubled the use the chemical pesticides, with some farmers using the cocktail method of applying indiscriminate mixtures of the chemicals. With the adoption of these technologies the farming system became heavily dependant on high-cost inorganic inputs.

To prevent accelerated soil erosion the development institutions emphasised soil conservation among Dusun farmers, and 80 per cent made some effort to control soil erosion. Soil conservation techniques included the use of bench terraces, contour drains and placing logs across steep slopes. Of the 20 per cent not adopting such practices, 10 per cent reported not cultivating steep slopes and the remaining 10 per cent did not adopt soil conservation measures because they did not see soil erosion as a major problem despite cultivating steep slopes (DO01-50 1990: pers. comm.).

Although a majority of the farmers did take some soil conservation measures, their efforts appear to have done little to control soil erosion. The consultancy firm of Raja and Gabongan (1978b:4-5) and soil conservation experts from West Malaysia who visited the area in 1980 found that the soil erosion became worse with the expansion of commercial vegetable cultivation, despite a
majority of the farmers constructing and maintaining bench terraces (Government of Malaysia 1981a:1-21). These findings indicate that the efforts of the Agriculture Department, development institutions and farmers to minimise soil erosion were unsuccessful, in part because some 10 per cent of the farmers who cultivated steep slopes were not aware of the extent of soil erosion on their land and so did not adopt any conservation measures. Also, there was a lack of technical skills among the field staff of various institutions who advised farmers to construct bench terraces on their land. Consequently, terraces constructed in the area were faulty in design. Most lacked the right amount of inward slope or failed to follow the contour, and therefore did little to prevent soil loss.

Thus the main land use changes in the study area between 1971 and 1982 were the cessation of shifting cultivation and subsistence food production. All farmed land within the study area was planted in commercial vegetables and cultivated more intensively in rotation with short-term grass fallow. In some areas this form of cultivation had also expanded onto previously forested steep lands following construction and improvements in nearby feeder roads. The cultivation of these steep slopes under a more intensive system had led to increased soil erosion. Although some soil conservation measures were adopted by a majority of the Dusun farmers, soil erosion, loss of nutrients and weed and insect infestation became constraints to crop production. Farmers began to depend increasingly on capital intensive technology such as hybrid seeds, chemical fertilisers and pesticides.
5.5 INTENSIFICATION AND LAND DEGRADATION: 1983 TO 1990

After 1983 the study area experienced very rapid and drastic changes in land use. The main driving force behind these changes was the provision of additional productive infrastructure, including irrigation and more feeder roads. The technical and managerial skills brought in by immigrant farmers, and availability of immigrant labour also had considerable influence on land use change. The feeder roads that were constructed and upgraded during the establishment of the irrigation project (Fig. 5.2) facilitated further expansion of vegetable cultivation in previously fallowed or forested areas within the study area. Irrigation made possible year-round cultivation of vegetables without the risk of crop failures.

The influx of a large number of immigrant non-Dusun farmers and farm labourers to the study area following the implementation of the irrigation project increased the total number of farmers. Some immigrant farmers came with more capital and higher levels of technical and managerial skills than those possessed by local Dusun. These farmers introduced new technology and expanded the cultivation of high-value crops. The immigrant workers also provided the labour force needed by both Dusun and non-Dusun farmers to expand the cultivated area and adopt a more intensive form of land use.

From 1983 to 1985, the FO and KPD further intensified their extension efforts to encourage commercial vegetable cultivation among Dusun farmers using government provided irrigation facilities and more sophisticated
technology. Consequently, transformation took place in the spatial distribution of cultivated land, cultivation practices, technologies used, crops planted and area cultivated. These changes occurred in two stages: from 1983 to 1986 and from 1987 to 1990. In each of these stages the transformation took different forms and resulted in different ecological consequences.

The distribution of cultivated land changed dramatically between 1983 and 1990. The upgrading and construction of feeder roads during 1982-83 and their subsequent neglect and deterioration after 1986 were the major contributing factors. Most of the original feeder roads within the study area were constructed in the 1970s and early 1980s (Fig. 5.2), with cultivation having extended along these roads (Fig. 5.3). During 1982-83 all the existing feeder roads were upgraded and new feeder roads X, Y and Z were constructed (Fig. 5.2). Cultivation extended along these roads. In the process a large proportion of the remaining forest cover was removed for vegetable cultivation along roads Y and Z (Fig. 5.4: D, E and F). This newly cleared land and all other cultivable lands close to other feeder roads were brought under permanent cultivation with irrigation by 1985-86.

By 1987, a major portion of road Z became impassable, and by 1990 most of the new land brought under cultivation along this road had been abandoned and reverted to grass and bush fallow. Similarly, about 50 per cent of the land that came under cultivation along road Y was also fallowed because of deterioration of the road. Consequently, by 1990 cultivation within the study area
became concentrated along all-weather feeder roads and main trunk roads (Fig. 5.6). This included some areas of the very steep land brought under cultivation in the late 1970s and early 1980s (Fig. 5.5 A, B and C).

Figure 5.6. Land under different categories of use in the Kundasang study area in 1990

Source: Land use survey conducted with the assistance of land use section of the Department of Agriculture 1990.
Cultivation practices in the study area underwent considerable transformation after irrigation became available. Continuous year-round cultivation of the same piece of land replaced the grass fallow rotation system within two years of the implementation of the irrigation project. Not only had irrigation eliminated the risk of crop failures during dry seasons, but also resulted in increased yields from continuously cultivated irrigated land. Given such advantages it was logical for the farmers to cultivate the land with irrigation facilities on a year-round basis.

In 1983-84, approximately 210 plots in the study area were under vegetable cultivation. Of these 111 were irrigated. On each of these plots irrigation was established on 0.4 hectares. The extension efforts of FO and KPD became concentrated on teaching techniques of permanent cultivation to farmers who had irrigation. Extension officers visited the farmers regularly and advised them on soil conservation, land preparation, timing of transplanting, and application of fertilisers, pesticides and water. In terms of cultivation practices farmers were advised to till the land completely during preplanting preparation, plant crops in rows, keep the crops free of weeds and insect pests, and keep irrigated land under continuous cultivation. After adopting these cultivation practices and following other recommendations of the extension officers the farmers experienced yield increases of up to 100 per cent (DO15; DO17; RFD02; VH02, FO01; KPD02 1990: pers. comm.).
Encouraged by higher yields and support from the FO and KPD, farmers with sprinkler irrigation expanded irrigation facilities and the area under the permanent system of cultivation. Farmers in the study area who had hitherto farmed without irrigation, and who were impressed by increases in yields achieved on irrigated plots, also adopted irrigation and cultivated their land on a permanent basis. From 1984 the installation of sprinkler irrigation and a permanent system of cultivation had spread rapidly both within and outside the study area (Chapter 4). By 1985-86 all cultivated plots in the study area had sprinkler irrigation installed (Fig. 5.7). A uniform system of cultivation was adopted throughout the study area whereby all cultivated plots were planted in commercial vegetables throughout the year using irrigation water.

After 1982, few new crops were introduced, with asparagus being the only new crop introduced between 1983 and 1990. A more significant change was a massive increase in the area cultivated in high-value crops such as broccoli, cauliflower, sweet peas, capsicum, poi choi, celery, sayur manis, carrots and lettuce (Table 5.2). These crops fetched high prices throughout the year and yielded higher profits to the farmers than other commonly grown crops (Table 5.3). Until 1982 only about 10 per cent of Dusun farmers grew these crops on a very small scale. From 1983 the availability of irrigation and the arrival of non-Dusun immigrant farmers with more capital and higher levels of technological and managerial skills saw a rapid expansion of the area under these crops.
By 1990 non-Dusun share-croppers and lessees were the main growers of these high-value crops, committing 53 and 75 per cent of their cultivated land respectively to these crops (Table 5.4).

Sources:

Table 5.3. Prices of vegetable cash crops (M$ per Kg) in 1976, 1983 and 1990 (na = not available).

<table>
<thead>
<tr>
<th>Crop</th>
<th>1965</th>
<th>1976</th>
<th>1990</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asparagus (Asparagus officinalis)</td>
<td>-</td>
<td>12.81</td>
<td>17.00</td>
</tr>
<tr>
<td>Beetroot (Beta vulgaris var vulgaris)</td>
<td>-</td>
<td>1.71</td>
<td>1.44</td>
</tr>
<tr>
<td>Broccoli (Brassica alboflabra var. italica)</td>
<td>2.83</td>
<td>3.72</td>
<td>3.68</td>
</tr>
<tr>
<td>Capsicum (Capsicum annum var. grossum)</td>
<td>1.78</td>
<td>3.28</td>
<td>3.82</td>
</tr>
<tr>
<td>Carrots (Daucus carota)</td>
<td>1.12</td>
<td>2.30</td>
<td>2.04</td>
</tr>
<tr>
<td>Cauliflower (Brassica oleracea var. botrytis)</td>
<td>1.88</td>
<td>4.18</td>
<td>3.72</td>
</tr>
<tr>
<td>Celery (Apium graveolens)</td>
<td>-</td>
<td>3.09</td>
<td>3.00</td>
</tr>
<tr>
<td>Chillies (Capsicum annum var. accuminatum)</td>
<td>-</td>
<td>2.54</td>
<td>1.09</td>
</tr>
<tr>
<td>Chinese cabbage</td>
<td>0.79</td>
<td>1.25</td>
<td>0.97</td>
</tr>
<tr>
<td>Chilli (Brassica oleracea var. pekinensis)</td>
<td>-</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Chinese cabbage Pak Choi (Brassica chinensis var. chinensis)</td>
<td>0.79</td>
<td>1.25</td>
<td>0.97</td>
</tr>
<tr>
<td>English cabbage (Brassica oleracea var. capitata)</td>
<td>0.49</td>
<td>0.95</td>
<td>0.55</td>
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<tr>
<td>French beans (Phaseolus vulgaris)</td>
<td>0.75</td>
<td>1.19</td>
<td>1.22</td>
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<td>Leek (Allium porrum)</td>
<td>-</td>
<td>na</td>
<td>na</td>
</tr>
<tr>
<td>Lettuce (Lactuca sativa)</td>
<td>1.42</td>
<td>1.59</td>
<td>2.20</td>
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<tr>
<td>Mustard cabbage Kai Choi (Brassica juncea var. foliosa)</td>
<td>0.81</td>
<td>1.35</td>
<td>1.63</td>
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<tr>
<td>Poi choi (Basella rubra)</td>
<td>-</td>
<td>3.17</td>
<td>3.30</td>
</tr>
<tr>
<td>Potato (Solanum tuberosum)</td>
<td>0.81</td>
<td>1.35</td>
<td>na</td>
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<tr>
<td>Radish (Raphanus sativus)</td>
<td>1.03</td>
<td>0.71</td>
<td>0.52</td>
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<td>Red onions (Allium ascalonicum)</td>
<td>-</td>
<td>1.18</td>
<td>1.00</td>
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<td>Sayur minyak (Brassica sp.)</td>
<td>-</td>
<td>2.19</td>
<td>2.58</td>
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<td>Spring onion (Allium fistulosum)</td>
<td>-</td>
<td>na</td>
<td>1.60</td>
</tr>
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<td>Sweet peas (Pisum sativum)</td>
<td>2.86</td>
<td>5.27</td>
<td>6.30</td>
</tr>
<tr>
<td>Tomato (Lycopersicon esculentum)</td>
<td>0.88</td>
<td>1.11</td>
<td>0.97</td>
</tr>
</tbody>
</table>

ii. KPD price survey records. Prices for 1983.
Table 5.4. Area planted in different commercial vegetable crops on 50 sample Dusuns' land within and outside the study area by the land owners and their relatives and tenants in 1990 (* = high-value crops).

<table>
<thead>
<tr>
<th>Crop</th>
<th>DUSUN (n=50)</th>
<th>NON-DUSUN (n=41)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Area farmers</td>
<td>Share-croppers</td>
</tr>
<tr>
<td></td>
<td>No. Area (Ha)</td>
<td>No. Area (Ha)</td>
</tr>
<tr>
<td></td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Asparagus*</td>
<td>3 1.4 3.2</td>
<td>0 0.0 0.0</td>
</tr>
<tr>
<td>Beetroot</td>
<td>6 0.6 1.4</td>
<td>0 0.0 0.0</td>
</tr>
<tr>
<td>Broccoli*</td>
<td>6 1.0 2.3</td>
<td>6 0.9 9.1</td>
</tr>
<tr>
<td>Capsicum*</td>
<td>4 0.7 1.6</td>
<td>4 0.4 4.0</td>
</tr>
<tr>
<td>Carrots*</td>
<td>13 1.4 3.2</td>
<td>6 0.6 6.1</td>
</tr>
<tr>
<td>Cauliflower*</td>
<td>18 3.6 8.1</td>
<td>17 2.2 22.2</td>
</tr>
<tr>
<td>Celery*</td>
<td>0 0.0 0.0</td>
<td>2 0.2 2.0</td>
</tr>
<tr>
<td>Chili</td>
<td>4 0.3 0.7</td>
<td>0 0.0 0.0</td>
</tr>
<tr>
<td>Chinese cabbages</td>
<td>10 1.0 2.3</td>
<td>2 0.1 1.0</td>
</tr>
<tr>
<td>English cabbage</td>
<td>43 18.1 40.8</td>
<td>8 0.7 7.1</td>
</tr>
<tr>
<td>French beans</td>
<td>8 0.9 2.0</td>
<td>2 0.2 2.0</td>
</tr>
<tr>
<td>Leek</td>
<td>25 2.5 5.6</td>
<td>8 0.6 6.1</td>
</tr>
<tr>
<td>Lettuce*</td>
<td>18 1.7 3.8</td>
<td>6 0.8 8.1</td>
</tr>
<tr>
<td>Mustard cabbage</td>
<td>9 1.2 2.7</td>
<td>6 0.5 5.1</td>
</tr>
<tr>
<td>Poi choi*</td>
<td>0 0.0 0.0</td>
<td>3 0.3 3.0</td>
</tr>
<tr>
<td>Potato</td>
<td>1 0.1 0.2</td>
<td>0 0.0 0.0</td>
</tr>
<tr>
<td>Radish</td>
<td>13 1.1 2.5</td>
<td>0 0.0 0.0</td>
</tr>
<tr>
<td>Red onions</td>
<td>3 0.1 0.2</td>
<td>0 0.0 0.0</td>
</tr>
<tr>
<td>Spring onion</td>
<td>20 2.0 4.5</td>
<td>6 0.4 4.0</td>
</tr>
<tr>
<td>Sweet peas*</td>
<td>9 1.0 2.3</td>
<td>5 0.7 7.1</td>
</tr>
<tr>
<td>Sayur manis*</td>
<td>0 0.0 0.0</td>
<td>0 0.0 0.0</td>
</tr>
<tr>
<td>Tomato</td>
<td>38 5.7 12.8</td>
<td>17 1.3 13.1</td>
</tr>
<tr>
<td>TOTAL</td>
<td>44.4 100.2</td>
<td>9.9 100.0</td>
</tr>
<tr>
<td>High-value crops</td>
<td>10.8 24.3</td>
<td>6.1 61.6</td>
</tr>
</tbody>
</table>

**Sources:**

i. Field measurements

ii. Interviews with samples land owners and relatives and tenants of land owners.
The Dusun farmers did not plant these crops on a large-scale despite higher profitability. Instead they committed about 75 per cent of their cultivated land to English cabbage, Chinese cabbages, tomato and other crops, so that overproduction and price fluctuations resulted. Only 25 per cent of their cultivated land was devoted to high-value crops (Table 5.4). Investigations showed that a majority of Dusun farmers could not meet the labour and other input requirements and lacked the technological and managerial skills required to grow these crops. Most high-value crops required very thorough land preparation and great care and attention in planting and cultivation. They also required the application of different types of fertilisers and pesticides following a specific schedule. To obtain high yields and good quality produce these crops required more sophisticated and capital intensive technology such as polythene sheds and drip irrigation.

A majority of Dusun farmers could not afford the costs of inputs and technology required to produce these crops profitably. Those who could afford lacked the managerial and technological skills. Consequently they produced only those high-value crops that were either established on their land by the KPD or did not involve very sophisticated technology, high levels of technological and managerial skills and high costs. At the time of study the only high-value crops planted by Dusun farmers were asparagus, carrots, lettuce, sweet peas, broccoli, capsicum and cauliflower. Of these, only asparagus, carrots, lettuce and cauliflower were cultivated on reasonably large areas. Asparagus was cultivated by only three farmers and the area cultivated averaged about 0.4 hectares per
farmer. This crop had been planted by the KPD under its joint venture scheme, with Dusun farmers simply maintaining and harvesting it. Cauliflower, carrots and lettuce were cultivated by almost 40 per cent of the Dusun farmers because these crops did not require as high a level of managerial and technical skills as other high-value crops.

The maintenance of crop yields under a system of more permanent cultivation and production of high-value crops necessitated considerable technological changes. These took two main forms: 1) intensification of the use of pre-existing technology, and 2) introduction of new technologies. The pre-existing technologies that were used more intensively were chemical fertiliser and pesticides. The types of chemical fertilisers used remained basically the same as those used between 1971 and 1982. However, their use increased by 50 to 100 per cent per unit area of cultivated land between 1982 and 1990. (DO15; FO02; KPD01 pers. comm: 1990).

The use of chicken manure also increased substantially. By 1990 a larger number of farmers owned vehicles and were able to transport their own chicken manure from distant poultry farms instead of depending on the Farmers' Organisation for their supplies. As a result the use of chicken manure became more widespread. In 1982 only about ten per cent of Dusun farmers used chicken manure. By 1990 almost 70 per cent of Dusun farmers, including owner-occupiers and relatives of land owners, used it. The remaining 30 per cent did not use chicken manure because they cultivated land, outside the study area,
that had high fertility and did not require too many inputs (DO15; DO28 1990: pers. comm.).

All non-Dusun farmers used chemical fertilisers and over 90 per cent also used chicken manure. The 10 per cent who did not use chicken manure were share-croppers farming outside the study area on Dusun-owned land that had been brought under cultivation more recently. This newly cultivated land was more fertile and did not require the use of chicken manure. However, all lessees and share-croppers farming within the study area depended heavily on chicken manure to maintain productivity on their land. Most of the lessees used six to eight tonnes per hectare of cultivated land per year. They claimed that they cultivated large areas on relatively less fertile land that had previously been cultivated over a long period of time by Dusun land owners. For these farmers the cost of maintaining productivity using only chemical fertilisers would have been prohibitive.

From 1983 farmers also became increasingly reliant on chemical pesticides for weed and insect control, with all farmers using larger quantities than before. By the mid-1980s a majority of farmers used a cocktail of Methamidophos, Bacillus thuringiensis and Phenthoate to kill insect pests (FO01; AG01 1990: pers comm.). Observations in 1990 showed that a mixture of atrazine, diuron and malathion was very commonly used by a majority of farmers.
Methods of weed control also became heavily dependant on chemicals. However, measures used by Dusun and non-Dusun farmers showed some variation. Dusun farmers generally sprayed weedicides such as Grammoxone, Lasol weedkiller and 'Clean Up 80' to kill weeds at the start of land preparation. Before planting, about 60 per cent blanket sprayed the land with Devrinol 2-E (a pre-emergent herbicide) to prevent early emergence of weeds. About a month after planting they again sprayed weedicides between cultivated beds, rows of crops and in drains. On beds of more delicate crops such as lettuce and carrots hand weeding was done. However, to avoid labour expenses involved in hand weeding the Dusun farmers covered some crops such as English cabbages and tomatoes with plastic bags or containers and sprayed weedicide around them. About a month before harvest most Dusun farmers stopped controlling weeds on their cropped land.

Timorese share-croppers and Bugis lessees, who controlled weeds both manually and with herbicides, used significantly less weedicide than Dusun farmers. Spraying weedicides at the start of land preparation was not practised, because they generally kept their land free of weeds while under previous crops. They also replanted the land immediately after harvesting, thus allowing no time for weed growth. Whereas weeds were removed manually by share-croppers from actual cultivated beds, weeds between vegetable beds and on the edges of planted areas were sprayed with weedicides.
Chinese, Timorese and Bangladeshi lessees neither used weedicide to kill weeds before land preparation nor blanket sprayed before planting because of absence of weeds on their land. These lessees weeded the cropped land carefully and planted immediately after harvesting, thus allowing no time for weeds to grow. The weeds from cultivated plots were removed manually. Most lessees, especially the Chinese, believed that weedicide hindered the growth of vegetables.

The most important yield-enhancing technological innovation between 1983 and 1990 was the polythene shed, introduced particularly to enhance the production of high-value crops. Polythene sheds protect more sensitive high-value crops such as poi choi, sayur minyak and celery from the direct impacts of hot sun and heavy rain during the early growing season. They also help prolong the bearing life of capsicum, tomato and sweet peas, and facilitate intercropping of these crops with short term crops such as Chinese cabbage and lettuce. Moreover, plastic sheds also helped reduce soil erosion and leaching of nutrients.

Despite these marked advantages, only Chinese and Timorese growers used polythene sheds, although some Dusun owned them. None of the Bugis used plastic sheds because they lacked capital to establish them. The Dusun did not use them because they lacked skills required to cultivate profitably in sheds. The Bangladeshi lessee did not build sheds on his land because he did not plant many of the crops that required them. Moreover, he did not want to risk
investment in plastic sheds for fear of damage by strong winds (LE09; LE10; DO15; DO34 1990: pers. comm.).

By 1990, 24 plots in the study area had polythene sheds. Of these 17 belonged to Chinese lessees, one to a Timorese lessee and six to Dusun land owners. Of the latter two were built by the land owners and four by lessees who had since left. To be profitable a shed had to be between 0.2 and 0.4 hectares in area, the estimated cost of which was M$6,000 to M$12,000, a cost far beyond the reach of most Dusun and Bugis farmers. Even though some Dusun land owners came into possession of ready made polythene sheds when leases expired, or built them on their land, they did not use them themselves because they lacked confidence and skills to cultivate the high cost, high profit crops cultivated in the shed. They took advantage of the sheds by arranging for share-croppers to use the sheds and thereby shared in the resultant higher profits.

While all farmers intensified their use of modern technology to enhance crop yields and control pests, soil conservation measures were neglected, particularly by Dusun land owners. Whereas in 1982 about 80 per cent of the sample land owners reported constructing and maintaining bench terraces or other soil conservation measures, field observations in 1990 showed that a majority of Dusun farmers totally neglected conservation measures. Fifty Dusun, including 39 land owners and 11 relatives of land owners and Dusun tenants, farmed on sample Dusun’s land. Forty-five of them cultivated land at least part of which was susceptible to erosion. Of these only seven constructed and maintained bench terraces and
contour drains in good repair. These seven included five relatives of land owners and two Dusun share-croppers who started cultivating the land more recently. The other 38, who cultivated some slopes ranging between 10 and 43 degrees, had terraces in a poor state of repair. These terraces were constructed in the early 1980s and had not been repaired for some years. Some terraces had even collapsed on sections of the plots.

The main reasons given for this neglect were high costs of construction and maintenance of terraces, the perceived ineffectiveness of the terraces in retaining soil and availability of other land to move on to when one plot became degraded. The farmers claimed that construction of new terraces cost them over M$500 per hectare and maintenance another M$120 per hectare per year. A majority of Dusun farmers felt these expenses were too high, given the falling profits from vegetable farming.

This situation had arisen after they began permanent cultivation under sprinkler irrigation. Farmers reported that they tried to build and maintain terraces after the implementation of the irrigation project but these collapsed repeatedly during irrigation and heavy rainfall. Frustrated with repeated damage, they stopped putting in further efforts to build new terraces or repair old ones. About 30 per cent of the land owners explained that they did not want to waste time and money in trying to conserve soil. Instead they planned to farm the land while it remained productive and then move on to other plots they owned elsewhere, leaving the degraded plot in fallow or leasing or share-cropping it with non-Dusun tenants.
However, all the non-Dusun farmers who cultivated slopes susceptible to erosion made concerted efforts to construct and maintain bench terraces in spite of repeated collapses. They did this because the conditions of tenancy required them to use appropriate cultivation practices including proper soil conservation. Moreover, it was in the tenants' interest to conserve soil as much as they could in order to get the maximum yields from the land during the tenancy. They also had no guarantee of other land to which they might move if severe erosion did occur.

There were also changes in area under cultivation and the actual location of cultivated land over the eight-year period from 1983 and 1990. As mentioned earlier, aerial photographs and land use maps for 1982 were not available, so the exact area under cultivation could not be calculated. In the following discussion use is made of estimates given by the sample land owners for cultivated areas in 1982 and 1986, along with measurements of the area cultivated in 1990.

The analysis showed that the area cultivated on sample Dusun land in the study area had increased by over 100 per cent from 1982 to 1990. This increase was a cumulative effect of changes that had taken place over the two developmental phases from 1983 to 1986 and from 1987 to 1990. The first phase was marked by a rapid increase in area cultivated by Dusun land owners, their relatives and non-Dusun tenants within the study area. In the second phase an opposite trend had emerged as the area cultivated by Dusun land owners within the study area had declined considerably, whereas the area cultivated by the relatives of land owners and non-Dusun tenants showed a steady increase.
In 1982, 50 sample land owners cultivated a total of 30.3 hectares of their land in commercial vegetables: 26.1 hectares within the study area and 4.2 hectares where feeder roads had been constructed outside the study area (Table 5.5). From 1983 a majority of Dusun land owners expanded the area cultivated within the study area to take advantage of the productive infrastructure provided by the government. Leasing and share-cropping with immigrant farmers had started and granting use-rights to land to relatives increased.

As a result of expansion in the area cultivated by Dusun land owners and an increase in farming by relatives of land owners and non-Dusun tenants, the number of farmers on the sample Dusuns’ land increased from 50 in 1982 to 73 in 1986. These included 45 owner-occupiers, three relatives of land owners, four lessees and 21 share-croppers. Five land owners stopped farming due to commitments to off-farm activities and leased and share-cropped some of their land. The total area under cultivation increased by 70 per cent from 30.3 hectares in 1982 to 52 hectares in 1986, with the major increase (18.9 hectares) occurring within the study area (Table 5.5).
Table 5.5. Area cultivated on 50 sample Dusuns' land within and outside the study area by the land owners and their relatives and tenants in 1982, 1986 and 1990.

<table>
<thead>
<tr>
<th>Location of cultivated land</th>
<th>Area of land under cultivation (Ha)</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dusun land owners</td>
<td>Dusun relatives</td>
<td>Non-Dusun tenants</td>
<td>Total area cultivated</td>
<td></td>
</tr>
<tr>
<td></td>
<td>n=50      n=45      n=39</td>
<td>n=0      n=3      n=11</td>
<td>n=0      n=25      n=41</td>
<td>n=50      n=73      n=91</td>
<td></td>
</tr>
<tr>
<td>Within the study area</td>
<td>26.1      32.0      16.3</td>
<td>0.0       3.0       9.3</td>
<td>0.0       10.0      16.6</td>
<td>26.1      45.0      42.2</td>
<td></td>
</tr>
<tr>
<td>Outside the study area</td>
<td>4.2       4.0       18.3</td>
<td>0.0       1.0       0.5</td>
<td>0.0       2.0       5.1</td>
<td>4.2       7.0       23.9</td>
<td></td>
</tr>
<tr>
<td>Total (Ha)</td>
<td>30.3      36.0      34.6</td>
<td>0.0       4.0       9.8</td>
<td>0.0       12.0      21.7</td>
<td>30.3      52.0      66.1</td>
<td></td>
</tr>
</tbody>
</table>

Sources:

i. Interviews with 50 sample land owners, for 1982 and 1986 data.

ii. Field measurements for 1990 data.
The period of high profits in the early 1980s was short lived. By 1985-1986 most farmers, and in particular the Dusun owner-occupiers started experiencing a considerable reduction in profits because of continuous increases in production coupled with a reduction in the market for Kundasang vegetables. By 1986 with the arrival of immigrants and the addition of new Dusun farmers, the number of vegetable farmers in the Kundasang District had increased by over 100 per cent. Moreover, the use of sprinkler irrigation also spread to other areas of the Kundasang District where irrigation water was available. Both factors led to a considerable increase in the production of vegetables. By this time the condition of the East-West Highway had begun to deteriorate due to lack of maintenance and the number of middlemen from towns on the East Coast decreased, thus reducing the market for Kundasang vegetables (FO01; KPD02; DO15; VH03; OT01 1990: pers. comm.).

Over-production occurred, particularly in crops commonly grown by Dusun farmers (English cabbage, Chinese cabbages, tomato, radish, lettuce). Because these crops could be grown without sophisticated technology and managerial skills, most Dusun land owners, their relatives and Bugis and Timorese share-croppers began to produce them in large quantities. The Chinese and Timorese lessees, on the other hand, concentrated on the cultivation of high-value crops and maintained high profitability.

Reductions in profits affected all producers of the more easily grown crops. However, the Dusun land owners were more severely affected than others
because of new financial commitments made on the basis of their past incomes. Moreover, their costs of production had also risen because of larger quantities of inputs required to maintain yields on land within the study area, most of which had lost fertility due to continuous cultivation and adoption of poor cultivation practices.

By 1986-87 declining profits and rising costs of production became major disincentives for Dusun land owners in commercial vegetable farming and maintenance of cultivation within the study area. Eleven of the sample land owners (including five who stopped farming between 1983 and 1986), most of whose household labour was occupied in off-farm employment or businesses, stopped farming and began to concentrate full-time on non-farm economic activities. The other 39, including 25 with off-farm economic activities and surplus household labour and 14 without off-farm economic activities, continued to farm. In order to reduce the cost of production most of these land owners started moving to land outside the study area that was considered more fertile than the land they cultivated inside. Some land owners also left the land inside the study area because of deterioration in the condition of feeder roads.

Consequently, by 1990, of the 39 sample land owners who cultivated some of their land, 14 maintained farming only within the study area, 12 farmed both within and outside the study area, and 13 had moved to farm outside. On the whole, 36 Dusun land owners, including 11 who stopped farming, vacated some of the land they were previously cultivating within the study area. Twenty-
six of these land owners either leased, share-cropped or granted to relatives use-
rights to the vacated land.

With increased leasing, share-cropping and granting of use-rights of land
to relatives (see Chapter 6) the total number of farmers on sample Dusuns’ land
increased from 73 in 1986 to 91 in 1990. The total area cultivated reached 66.1
hectares (Tables 5.5). With the changes in land tenure arrangements and increase
in area cultivated three important trends emerged. First, all the increase in
cultivated area took place outside the study area. Second, the area cultivated by
Dusun land owners decreased by half and that cultivated outside increased almost
fourfold. Finally, the area cultivated within the study area by sample Dusuns’
relatives and non-Dusun tenants doubled (Table 5.5).

The cumulative effect of all the changes over the two phases was an
increase in total area cultivated on sample Dusuns’ land by almost 120 per cent
from 30.3 hectares to 66.1 hectares (Tables 5.5 and 5.6). Increases occurred both
within and outside the study area. However, the major increases in cultivated area
took place outside the study area because Dusun land owners were moving to
farm the more fertile new land outside, which suggests that the effects of
environmental degradation and declining soil fertility were being felt.
Table 5.6. Changes in area cultivated effected by the land owners and their relatives and tenants between 1982 and 1990 on 50 sample Dusuns' land within and outside the study area.

<table>
<thead>
<tr>
<th>Venue of increase</th>
<th>All farmers</th>
<th>Dusun land owners</th>
<th>Dusun relatives and tenants</th>
<th>Non-Dusun tenants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall increase in area cultivated</td>
<td>35.8</td>
<td>4.3</td>
<td>9.8</td>
<td>21.7</td>
</tr>
<tr>
<td></td>
<td>118.1</td>
<td>14.2</td>
<td>32.3</td>
<td>71.6</td>
</tr>
<tr>
<td>Increase within the study area</td>
<td>16.1</td>
<td>-9.8</td>
<td>9.3</td>
<td>16.6</td>
</tr>
<tr>
<td></td>
<td>53.1</td>
<td>-32.3</td>
<td>30.7</td>
<td>54.7</td>
</tr>
<tr>
<td>Increase outside the study area</td>
<td>19.7</td>
<td>14.1</td>
<td>0.5</td>
<td>5.1</td>
</tr>
<tr>
<td></td>
<td>65.0</td>
<td>46.5</td>
<td>1.7</td>
<td>16.8</td>
</tr>
</tbody>
</table>

Sources:

i. Interviews with sample land owners for 1982 data.

ii. Field measurements for 1990 data.
5.6 IMPACT OF LAND USE CHANGES

The changes in land use initiated by the rural development programme have seriously degraded the land. New cultivation practices such as complete tillage, planting of single stands of crops in rows, clear weeding, use of sprinkler irrigation, cultivation on steep slopes and neglect of soil conservation measures led to rapid loss of soil nutrients, due to uptake by crops, leaching, oxidation and accelerated soil erosion. Moreover, weed and insect pests became major problems due to monocultural cultivation of vegetables on a sedentary basis.

At the time of study a majority of the farmers complained that soil had lost fertility rapidly since they started cultivating the land more intensively using irrigation. They also claimed that weed growth became more vigorous and insect infestations became more serious after the implementation of the irrigation project. Field observations showed that soil erosion had taken place in all areas where cultivation occurred on slopes. In particular, areas marked A, B and C on Figure 5.5 had suffered severe erosion. This was evident by the fact that on most plots in these areas only a thin layer of top soil remained. On plots that were cultivated at the time of study, farmers were planting crops on parent material and using large quantities of chicken manure and chemical fertilisers to maintain economic yields. Weed and insect pests were controlled by heavy application of chemical pesticides throughout the study area.

The heavy dependence on chemical inputs has had considerable ecological and socio-economic impacts. Pollution of soil and water was the main ecological problem observed. The farmers used a wide variety of pesticides to control weed
and insect pests, some of which (atrazine and diuron) are persistent. Frequent rain storms during the wet seasons and the use of irrigation produced ideal conditions for the pesticides to be washed into ground water reserves and rivers and streams through leaching and surface runoff. The effects of ground water contamination on human health were not observed because farm households did not utilise water from wells and nearby streams and rivers for domestic use. For domestic consumption they used irrigation water, which was collected in a dam located upstream from farming areas and was safe for domestic use.

The impacts of pesticide and fertiliser use on aquatic life were more evident. Pesticide contamination appeared to have destroyed most of the aquatic life that formed an important part of local diet in the past. The older residents reported that eels, fish and prawns, which had been in abundance and formed an important source of protein in local diets in the 1940s and 1950s, were rarely seen in the rivers and streams at the time of study. Older residents blamed the excessive use of poisonous pesticides and chemical fertilisers on nearby fields for this (AG01; FO01; KPD01; RFD01; RFD04; RFD05; VH04 1990: pers. comm.). Field observations showed that most of the streams within the study area were filled with weeds of various kinds. It was clear that the influx of nutrients in runoff was a contributor to greater weed growth in streams.

The spiralling costs of production and land tenure changes were the main socio-economic consequences of increasing use of pesticides and fertilisers. The increased application of pesticides and fertiliser had more than doubled the cost of production on land within the study area over the eight year period between 1983 and 1990 (DO14; DO17; FO02 1990: pers. comm.). To avoid the high cost of production many Dusun land owners moved to land outside the study area.
where infrastructure was less developed but soil fertility higher. Most of the degraded lands within the study area abandoned by these farmers were then cultivated by non-Dusun lessees and share-croppers. These tenants used more sustainable cultivation practices such as proper soil conservation measures, a combination of chemical fertiliser and chicken manure to increase soil fertility and both chemical and manual control of pests. By doing this they gradually improved the quality of degraded land within the study area. In fact, some of the degraded land that had been cultivated for three or four years by the Chinese lessees had recovered soil fertility and land owners were planning to take over the land on expiry of terms of tenancies.

5.7 CONCLUSION

Rural development in the study area has led to land use changes and environmental degradation as reported in literature (Chapter 2). There has been intensification of production on existing farmland and extension of cultivation on previously uncultivated marginal land. The new cultivation practices adopted by the farmers resulted in severe land degradation. To maintain production under such environmental conditions farmers were forced to adopt new yield-enhancing inputs, thus becoming locked into a system of production based on high-energy and capital-intensive technology. However, unlike other places, some practices adopted in the study area may be more sustainable, leading to recovery of degraded land. Socially, land degradation, overproduction and declining profits from the more commonly cultivated vegetable crops led to the transfer of a significant portion of Dusun land to non-Dusun farmers. This has had considerable effect on land tenure arrangements.
CHAPTER SIX
LAND TENURE CHANGES IN KUNDASANG

6.1 INTRODUCTION

The literature on land tenure points out that typically prior to colonialism and the introduction of commercial agriculture and rural development programmes, land rights were vested in local social groups. Use rights were granted to the members by leaders of the groups or group assent. Land held under this form of tenure could not generally be sold, leased or mortgaged to non-members. These unwritten rules enforced by group consensus ensured access to land for all members and prevented accumulation by a few individuals either from within the local community or from outside (Eastman 1990; Dike 1989; Goheen 1988; Bruce 1988; Fleuret 1988; Acquaye 1984; Crocombe 1971a; 1971b).

Colonial governments regarded such forms of communal land tenure as impediments to agricultural development and modernisation. In a number of instances, such as Fiji, colonial governments retained communal ownership in order to maintain social order. However, in many Southeast Asian and African countries they introduced the Western model of private ownership with individual titles codified and registered by the state, especially in parts of colonies where land was alienated and commercial agriculture introduced (Attwood 1990; Cramb and Wills 1990). Post-colonial independent governments, in their efforts to expand cash crop production using rural development as a strategy for
development planning, have continued to introduce such privatised land tenure models throughout developing countries. Both governments and development institutions tend to emphasise individual rather than communal ownership of land, thereby providing security of tenure to the farmers so that they can have favourable access to credit, better incentives to invest in agriculture, improve agricultural techniques and expand cash crop production (Attwood 1990; Haugerud 1989; Shipton 1988).

As profitable commercial agriculture becomes established in many areas, the demand for land increases, pushing up land prices and rents (Anan 1989; Shrestha 1988; Feder 1987). Subsequently several forms of tenure change take place, including land sales, leasing, share-cropping and granting of use-rights to relatives and friends (Thiele 1990; Swindell and Mammon 1990; Srivastava 1989; Slatter 1985). This happens on individually owned land and on customary land despite ‘rules’ that supposedly prevent it. These forms of tenure changes have both positive and negative consequences. On the positive side the diversity of tenure arrangements (in particular, leasing, share-cropping and granting use-rights to relatives) provides access to land to landless and near-landless people and enables them to make their livelihoods in rural areas. Moreover, these tenancy arrangements may assist production efficiency in the face of labour uncertainty, and enable land owners to hold on to land as income generating assets (Morrison 1980; Huang 1983; Slatter 1985; Shrivastava 1989).
On the negative side several authors claim that land tenure changes result in accumulation of land by the rich and dispossession and landlessness among the poor. Escalating land prices exclude the poor people from the land market (Anan 1988). Poor farmers who are forced to sell their land due to indebtedness, natural disasters or family misfortune are also rendered landless (Swindell and Mammon 1990; Chambers 1983; Swan 1983). High rentals and advance payments of rents exacted by the land owners for land much in demand force many poor tenants to relinquish the land they previously cultivated and become landless. Land lost by the poor is generally accumulated by rich and large-scale farmers (Slatter 1985; Husken 1979; Cheema 1985).

Some of the tendencies that the general model above contains have taken place in the study area since the implementation of the rural development project. Land tenure changes in the study area started when western land laws were introduced and land was alienated by the colonial government. The transition to the national legal system of land tenure, and subsequent changes leading to transfer of ownership and use-rights of indigenous land to non-indigenous outsiders, began from the base of the settlement pattern and customary land tenure of the indigenous people of Sabah.
6.2 SETTLEMENT PATTERN, CUSTOMARY LAND TENURE AND INTRODUCTION OF WESTERN LAND LAWS IN SABAH

Early literature based on anthropological research and travel, especially Alcock (1886), Rutter (1922), Harris (1956) and Leng (1965), emphasises that Sabah, with a land area of 76,405 square kilometres, has traditionally been an area with an abundance of land and a relatively small population.

These earlier works and more recent historical studies by Leong (1982) and Gudgeon (1981) indicate that coastal areas were sparsely populated by local inhabitants, mostly Dusun. Before the establishment of British North Borneo Chartered Company administration in the early 1880s they occupied only small pockets of land in coastal areas. Interior regions were also sparsely populated by Murut and Hill Dusun. The alienation of land for foreign settlers under the Chartered Company administration started in the 1880s, mainly on the East Coast (Leng 1965:70). After the rubber boom at the turn of the twentieth century large tracts of vacant land on the West Coast were also alienated by expatriates. In these coastal areas, land laws, promulgated by the British North Borneo Chartered Company, were enforced to give legal ownership to expatriates through the issue of title deeds, and to safeguard indigenous rights to their remaining lands. Accordingly, indigenous land owners in these areas were encouraged to acquire registered titles to their land (Tregonning 1965: 121).

Most of the more remote interior areas such as Ranau (including Kundasang), Tambunan, Tenom and Pensiangan remained sparsely populated and unaffected by expatriate invasion and the enforcement of the new land laws. In
these areas the indigenous peoples of Sabah continued to hold land under customary tenure, using two basic forms of customary individual tenure (Weinstock 1979: 17-18; Appell 1986: 120). The first and more prevalent form was based on a system of permanent tenure. The other was a tenure of limited duration.

Under the permanent tenure system, which Appell (1986) describes as a 'devolvable usufruct system', permanent rights over a particular tract of land are created and maintained by individuals in perpetuity by cutting the primary forest. No one else could use the land without the permission of the owner even after the land had reverted to secondary forest. The use-rights to the property, or absolute control of such a parcel of land, were inherited by the descendants of the person who originally cleared the land. The parcels of the original occupier could be inherited by his or her sons and daughters in varying amounts based on the judgement of how much that child had contributed to the clearing, acquisition and maintenance of the land. However, the principal heir was the child who remained in the household to take care of the parents when they could no longer physically cultivate the land. If the land owner did not have his or her own children, the land was inherited by his or her brothers. If the brothers were deceased, the land would be inherited by the brothers' sons. If the brothers had no sons, the property went to the sisters or sisters' children (Appell 1978: 149; 1969: 221; Williams 1965: 59-60). Sometimes land thus owned was lent to a neighbour to cultivate for an agricultural season.
The second basic form was a tenure of limited duration, which Appell (1986) calls a ‘circulatory usufruct system’. Under this system the person clearing the primary forest did not establish permanent use-rights. The use-rights to this parcel of land were generally retained for one or two years until all planted crops had been harvested. Once the agricultural plots reverted to secondary forest, any member of the village had the right to use it. The distribution of this land within the village territory was supervised annually by village headmen. This form of land tenure was an integral part of traditional subsistence agriculture. It guaranteed equal rights to all members of the community to obtain usufruct rights to communal land. The tenure system was flexible and could adapt to population change.

6.3 CUSTOMARY LAND TENURE AND THE INTRODUCTION OF WESTERN LAND LAWS IN KUNDASANG

6.3.1 Customary Land Tenure

Until the mid-1950s Kundasang remained relatively isolated from the main centres of Sabah due to the absence of roads. Unlike the coastal areas there was no land alienation by state or by private enterprise (Tregonning 1965; Leong 1982). As a result, national land laws were not enforced. The local Dusun maintained individual ownership of land around their villages under permanent tenure or devolvable usufruct rights as was the practice in other parts of Sabah where national land laws were not applied (Weinstock 1979: 17-19; Appell 1986: 119).
In the early 1950s, according to older residents and village headmen, the population of Kundasang District was small and land was considered to be plentiful. Whenever a household head wanted to start a new swidden (shifting agricultural plot) he was allocated a plot from unoccupied forested land by the village headman. The village headman would mark the boundary of the allocated land by placing river stones and planting *rolox* (*Codiaeum variegatum*), a type of fire resistant shrub with distinctive reddish brown or variegated leaves. Once the boundaries were marked and the land cleared and cultivated, the plot of land became the property of the household with rights of usufruct held in perpetuity. These tenure rights were based on unwritten rules enforced by group consensus whereby occupants could not sell, mortgage or grant use-rights to anyone from outside the village without prior permission of the village headman. The number of plots owned by individual households, according to informants, ranged from three to six depending on the subsistence needs and the household’s capacity to clear and cultivate the land (DO14; RFD01; RFD04; VH02; VH04 1990: pers. comm). Leng (1965:102), however, reports that some Dusun in Kundasang District owned as many as eight plots in the early 1960s.

In addition to swidden plots some household heads also claimed hunting grounds where they hunted wild animals and gathered wild plant foods such as leaves, ferns, nuts and fruit. Hunting grounds were generally located farther away from the village than swidden plots. Common boundary markers for hunting grounds included streams, rocks, tree stumps or foot trails. Once all the land close to the village was taken over by swiddens, the people then started clearing...
their hunting grounds for swiddens and acquired other hunting grounds farther away from the village. Most of these hunting grounds were sub-divided into smaller swidden plots by the time formal land titles were first granted in the area beginning in 1959 (VH04; RFD04 1990: pers. comm.).

6.3.2 Introduction of National Land Laws

The introduction of national land laws and the alienation of land in Kundasang started in 1955 when the government acquired 10 hectares of land to establish an agricultural research station to experiment with temperate vegetables and other highland crops (Colony of North Borneo 1956:11; VH04; RFD04 1990: pers. comm.). The next step taken by the government was a campaign in 1957 and 1958 to encourage Kundasang Dusun land owners to register titles to the land they occupied. At about the same time all land that was not occupied or claimed by the local Dusun under customary tenure was declared state land by the colonial government through enforcement of the revised version of the 1930 Land Ordinance (Colony of North Borneo 1948: 63-69, Sections 5, 7, 10). This law also stipulated that unoccupied state land could be alienated to anyone through application to the Lands Department.

Later, in 1962-63, the eastern slopes of Mt. Kinabalu and parts of Pinosouk Plateau above the elevation of 1500 to 1600 metres, where Dusun swiddens had not yet reached, were taken by the government as part of a National Park Reserve (The Royal Society North Borneo Expedition Report
1962:10; OT08 1990: pers. comm.). This limited the area available to the Dusun for the expansion of their swidden plots.

The campaign to register Dusun-held land was mounted by the District Administration Office, Ranau, on the instructions of the colonial administrators using village chiefs and a native Assistant District Officer (ADO). As explained by the ADO, the main aim of this campaign was to give the Dusun security of tenure by making their land ownership legal according to the laws of the country. Other aims of encouraging individual ownership of land were to give farmers control of land they worked so that they could have favourable access to credit using land title as collateral, and to provide farmers incentives to invest in farming and adopt sedentary methods of cultivation (Weinstock 1979: 110-123; LD01 1990: pers. comm.). In 1957 and 1958 the ADO went from village to village accompanied by village headmen to explain the importance of acquiring individual titles and to emphasise the implications of the revised 1930 Land Ordinance, which allowed alienation of land not claimed by local Dusun by outsiders (VH04; RF01 1990: pers. comm.).

Following this campaign, local Dusun began to apply for registered titles to all plots of land they claimed. They applied for separate titles to some plots under their own names and for others under their wives' and children's names. The village headmen encouraged them to do this to ensure that the local Dusun had enough land for their present needs and future needs of their children. The first few titles were issued in 1959. Thereafter, a large number of local Dusun
applied for and received titles to plots of land scattered over a wide area in Kundasang District. Among those who applied for titles to the land in the study area were the original residents of villages close to the study area (Fig. 4.1) and other Dusun who had moved, at an early time, into these villages from elsewhere within the Kundasang District (VH04; RFD01; RFD04 1990: pers. comm.).

The migrants to the original villages in or close to the study area were generally young men from more remote villages in the Kundasang District. Some had migrated to these villages after their marriage to local women. Others migrated in the late 1950s and early 1960s for employment with the Public Works Department in road construction works in progress at the time. The former group of migrants settled as members of their brides' households and were accepted as residents of the villages with rights to village land. The latter group of men initially stayed in the villages with friends or relatives and worked with PWD. After a while they sought permission from village headmen to settle permanently. If accepted as permanent residents of the village they could, with the approval of the village leaders, obtain plots of village land under devolvable usufruct system (Appell 1978: 166). When registration of titles started they applied for titles to the land they occupied, like other residents of the villages (VH04 1990: pers. comm.).

With the granting of registered titles, restrictions placed by the unwritten rules of customary tenure lapsed. Under national law owners could lease or sell land to other indigenous persons, whether from the same village or from outside
the area, without the village headman’s approval. They could also sell and lease to non-natives with the approval of the government (Weinstock 1979: 123-124; Colony of North Borneo 1948: Sections 64-69). Thus with the issue of registered titles, Dusun land owners acquired more freedom to change tenure arrangements. This fundamental change in land tenure came about not only as a result of state encouragement, but also because of significant Dusun acquiescence and initiative.

6.3.3 Acquisition of State Land

Following the promulgation of national land laws and the alienation of land by the state for both the Agricultural Research Station and Kinabalu National Park, local Dusun realised that land was no longer a free and unlimited resource. Moreover, the introduction of commercial vegetable farming rendered land an important asset for the generation of cash. The concept of private land ownership became important and accepted among the local Dusun. They made every effort to convert as much vacant state land, which lay outside the state reserve, to private property as they could. They cleared new plots from vacant state land in and around the study area, cultivated them and applied for registered title under their own names, or under the names of other household members. Once applications were accepted, a Land Application (LA) number was issued certifying that the land was legally theirs. A title would be issued in due course. People then moved on to clear other areas of unoccupied land and repeated the process until all vacant state land outside the state reserve in and near the study area was occupied and claimed. Thus by 1977 all vacant state land in the study area had been acquired by individuals. In the meantime, the value of land had
increased significantly in response to rising demand from outsiders. Some land had also been sold by local Dusun to outsiders.

In 1979 local Dusun began encroaching upon the National Park Reserve on the slopes of Mt Kinabalu adjacent to the study area boundary (Fig. 4.1). Instead of their being evicted from the park, political pressure was brought to bear on the State administration to excise a portion of the National Park Reserve land, including that which had been encroached upon, and declare it vacant state land. People from villages within and around the study area cleared one to two hectare plots on this land and applied for registered titles. At the time of the study, most of this land had not been cultivated, although titles had already been issued for some of it.

In the early 1980s, another 2221 hectares of National Park Reserve land on the Pinosouk Plateau was designated by the government for development (Chapter 4; Fig. 4.1). Four hundred and nineteen hectares of this was earmarked for a smallholder settlement scheme. When the project was shelved in 1985 (Chapter 4), this portion was also declared vacant state land. A total of 150 Dusun from in and around the project area acquired plots totalling approximately 200 hectares from this area.

In this manner local Dusun were able to acquire and accumulate large areas of state land virtually free of charge. Easy access to state land also enabled them to compensate for the land lost through sale, leasing, share-cropping, and
lending to relatives,’ all of which became common among the Kundasang Dusun during the 1970s and 1980s. The Dusun proved extremely adept at turning the land laws to their advantage. The process of title acquisition involved not just a desire to protect land from alienation by others but also to acquire a resource that was gaining economic value.

6.3.4 Creation of a Land Market

As commercial vegetable farming became more profitable in the early 1970s, and other physical developments took place in the late 1970s and early 1980s (Chapter 4), a new legal market in land was created. Some wealthy urban dwellers including merchants, traders, contractors, politicians and bureaucrats, and a few local farmers showed interest in buying land in Kundasang District. This was particularly so in the study area, where developments were taking place at a rapid pace. Demand for leasing and share-cropping by landless farmers from outside Kundasang District and Sabah also increased.

High prices and rentals presented the local farmers with new economic opportunities. Some saw an opportunity to make quick money and bring immediate improvements in their living conditions by selling some of their land. Others saw the prospect of diversifying their economic activities by investing revenue received from land sales in off-farm enterprises. Many also saw a chance to increase their cash incomes by leasing and share-cropping some of their land or granting use-rights to their relatives. Thus land sales, leasing and share-cropping with non-Dusun outsiders started gradually from the early 1970s and
gained momentum in the late 1970s and early 1980s. Granting use-rights to relatives, a customary practice among local Dusun, also became more common. These changes in tenure arrangements were facilitated by the additional individual rights acquired by the land owners after obtaining registered titles to their land.

6.4 THE LAND TENURE SITUATION AT THE TIME OF THE STUDY.

By 1990 a complex system of land tenure arrangements existed in the study area. Ownership and use-rights of a considerable portion of original Dusun land had been transferred to non-Dusun from outside the Kundasang District. Of the 750 hectares of land in the study area about 565 hectares were potentially useable for agriculture and the remaining 185 hectares were under public facilities, state reserve and rivers (Chapter 4). At the time of study all agricultural land (565 hectares) was surveyed, divided into 403 plots and owned by individuals or development institutions with registered titles or other documents of legal ownership according to national land law (Table 6.1). No land in the study area was held under customary tenure.
Table 6.1. Ownership of land in the study area in 1990 (Others include Part-Europeans, Indians, Pakistanis and Bangladeshis).

<table>
<thead>
<tr>
<th>Owner</th>
<th>Plots</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Local Dusun</td>
<td>322</td>
<td>79.9</td>
</tr>
<tr>
<td>Outside Dusun</td>
<td>12</td>
<td>3.0</td>
</tr>
<tr>
<td>Chinese</td>
<td>57</td>
<td>14.2</td>
</tr>
<tr>
<td>Others</td>
<td>7</td>
<td>1.7</td>
</tr>
<tr>
<td>Institutions (FO and KPD)</td>
<td>5</td>
<td>1.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>403</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Source: Kundasang Farmers’ Organisation survey of July 1990.

The individual owners of land in the study area included local Dusun, people from outside and development institutions (Table 6.1). About 20 per cent (81 plots comprising 115 hectares) of land formerly owned by Dusun had been purchased by outsiders: 76 plots by individuals and five by development institutions. Among the outsiders, urban-based Chinese entrepreneurs had bought the most land (Table 6.2, Fig. 6.1).

Table 6.2. Buyers of land in the Kundasang study area between 1970 and 1990 (Others include Part-European, Indians, Pakistanis and Bangladeshis).

<table>
<thead>
<tr>
<th>Buyer</th>
<th>Plots</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Local Dusun</td>
<td>13</td>
<td>13.8</td>
</tr>
<tr>
<td>Outside Dusun</td>
<td>12</td>
<td>12.8</td>
</tr>
<tr>
<td>Chinese</td>
<td>57</td>
<td>60.6</td>
</tr>
<tr>
<td>Others</td>
<td>7</td>
<td>7.5</td>
</tr>
<tr>
<td>Institutions (FO and KPD)</td>
<td>5</td>
<td>5.3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>94</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

Sources:  
iii. Lands Department (Ranau) 1990.
Of the 76 plots bought by outsiders 42 were cultivated. All except two were cultivated by non-Dusun immigrant lessees and share-croppers. Of the two exceptions one was cultivated by the buyer himself and the other by a relative of the buyer. The other 34 plots remained uncultivated (Table 6.3; Fig. 6.2).
Table 6.3. Owners and occupiers of cultivated and uncultivated plots in the Kundasang study area in 1990.

<table>
<thead>
<tr>
<th>Occupiers</th>
<th>Local Dusun</th>
<th>Individuals from Outside</th>
<th>Development Institutions</th>
<th>Total (Plot)</th>
<th>Total Area (Ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land owners</td>
<td>77</td>
<td>1</td>
<td>2</td>
<td>80</td>
<td>106.5</td>
</tr>
<tr>
<td>Relatives of land owners</td>
<td>34</td>
<td>1</td>
<td>0</td>
<td>35</td>
<td>39.4</td>
</tr>
<tr>
<td>Share-croppers</td>
<td>31</td>
<td>13</td>
<td>0</td>
<td>44</td>
<td>59.3</td>
</tr>
<tr>
<td>Lessees</td>
<td>36</td>
<td>27</td>
<td>0</td>
<td>63</td>
<td>85.8</td>
</tr>
<tr>
<td>Total Cultivated</td>
<td>178</td>
<td>42</td>
<td>2</td>
<td>222</td>
<td>291.0</td>
</tr>
<tr>
<td>Not Cultivated</td>
<td>144</td>
<td>34</td>
<td>3</td>
<td>181</td>
<td>274.2</td>
</tr>
<tr>
<td>Total</td>
<td>322</td>
<td>76</td>
<td>5</td>
<td>403</td>
<td>565.2</td>
</tr>
</tbody>
</table>


Of the land that remained under Dusun ownership approximately 21 per cent (67 plots comprising 93.8 hectares) was occupied by non-Dusun immigrant tenant farmers. As a result, about 37 per cent (208.8 hectares) of the 565 hectares of formerly Dusun owned land in the study area had come under the control of non-Dusun outsiders and development institutions. A further eight per cent (38 hectares) was cultivated by relatives of the Dusun land owners (Table 6.3; Fig. 6.2).
Figure 6.2 Occupiers of cultivated plots and location of uncultivated plots in the Kundasang study area in 1990.

Sources:

6.5  DYNAMICS OF THE EXISTING PATTERN OF LAND TENURE

The pattern of land tenure that existed at the time of study evolved as a result of land sales, leasing, share-cropping and granting use-rights to relatives over a relatively short period of time. In the following section the dynamics of this land tenure pattern are discussed.

6.5.1 Land Sales

The first legal land sale between a Dusun and a Chinese took place in 1970 when people from other parts of Sabah became aware of the economic potential of Kundasang land following the upgrading of the road from Ranau to Kota Kinabalu. Land sales gained momentum from the late 1970s when more outsiders became aware of the government’s planned irrigation project and other proposed developments in the area (FO01; KPD01; VH04; DO17 1990: pers. comm.).

Although land had been sold to outsiders for two decades, accurate information was hard to elicit from either sellers or buyers. Both parties wanted to keep the deals secret, primarily because the sales had not been registered with the Lands Department, in order to avoid paying land tax. Moreover, many sellers did not want others to know they had sold their land because the village committees, at least publicly, discouraged sales to outsiders. The figures presented here on land sales have been gathered from three sources: Lands Department records, interviews with 50 sample land owners, and from the Kundasang Farmers’ Organisation survey of all land holdings in the project area.
carried out in July 1990. It is unlikely that these figures are complete as there is undoubtedly an understatement of land sales to outsiders in all three sources.

The Lands Department office in Ranau kept all land records for Kundasang. At the start of field work I requested from the Lands Department Office in Ranau information on sales involving 155 plots in the study area that had received irrigation from the KPD by the end of 1989. According to the Lands Office, 25 of the plots had been sold. The first sale was registered in 1970, with most sales taking place between 1975 and 1989. Most of the buyers during the 1970 to 1979 period were either local Dusun farmers or Chinese who originated from urban areas in Sabah. After 1980, outsiders including urban-based Chinese, Dusun and others remained the main buyers of Kundasang land.

The second set of information was derived from my interviews with 50 sample land owners. Seventeen of the 50 land owners admitted selling a plot each during the 1970-1989 period. Only one of these plots was irrigated and this plot was one of the 25 recorded as sold by the Lands Department, Ranau. As with Lands Department records the information gathered from the sample land owners showed most sales took place between 1975 and 1989 (Table 6.4). Fourteen of the seventeen purchasers were people from outside the Kundasang district. Of the three plots sold to local Dusun only one was bought after 1980.

Of the 17 plots sold by the sample land owners only five were located within the study area. Four of these plots were bought by outsiders and one by a
local Dusun. Ten of the 12 plots outside the study area were situated on a hill close to the five-star Perkasa Hotel. This place was regarded as a high class residential area. All ten were bought by outsiders to build houses. The other two plots, which were located farther away from the main road and from Kundasang town, were bought by the Dusun and used for commercial vegetable cultivation.

Table 6.4. Year of sales and ethnicity of the buyers of land sold by the 17 sample land owners between 1970 and 1989.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Dusun</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>Outside Dusun</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Outside Chinese</td>
<td>1</td>
<td>2</td>
<td>4</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Other Outsiders</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>3</strong></td>
<td><strong>5</strong></td>
<td><strong>5</strong></td>
<td><strong>4</strong></td>
<td><strong>17</strong></td>
</tr>
<tr>
<td><strong>Percentage</strong></td>
<td><strong>18</strong></td>
<td><strong>29</strong></td>
<td><strong>29</strong></td>
<td><strong>24</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: Interviews with 17 sample land owners who sold the land.

Neither of the above sources provided a complete record of all plots sold. In July 1990 the Kundasang Farmers’ Organisation conducted a survey of land tenure and land use on all land in the irrigation project area. The staff of FO collected data on land sales, leasing, share-cropping and lending of land by interviewing all the local land owners in the project area and verifying the information with neighbours. The list of land sales compiled by the Farmers’ Organisation included all the irrigated plots recorded as sold by the Lands Department and also the five plots within the study area reported sold by the
sample land owners. The Farmers' Organisation survey was the most comprehensive of the three sources.

According to the FO survey 94 plots in the study area were sold. Of these 76 were bought by people who did not normally live in Kundasang, 13 by the local Dusun and five by the KPD and FO (Table 6.2). On the basis of Lands Department records, and information gathered from sample land owners, it is probable that most of the local Dusun who bought the 13 plots did so in the 1970s at the early stage of the development project. According to the sample land owners who sold land, only one local Dusun bought land in the 1980-1984 period. The buyer had lent money to the land owner under an agreement that if he (the land owner) failed to repay the loan in a specified time, the land owner would be obliged to sell the land at a pre-arranged price to the buyer. When the land owner could not repay the loan the Dusun who lent the money took over the land after paying an additional sum of money according to the original agreement (DO18; VH04 1990: pers. comm.).

Although some local Dusun could have bought land in the study area, relatively few did so because, first, they were not able to compete with the prices offered by urban-based buyers; second, they were able to acquire plots of land from the state reserve almost free of charge; and third, the wealthier households among the locals saw investment in business enterprises as potentially more profitable than acquisition of more land through purchase (DO14; DO17; VH04 1990: pers. comm.).
The seventy-six outside buyers included entrepreneurs, civil servants, politicians and other people in well-paid urban-based employment (Table 6.5). Interviewing these people proved extremely difficult. The major problem was to locate them because their addresses were not known. Among those who could be located, some were based far away in towns such as Labuan and Sandakan. Most of the entrepreneurs based in Kota Kinabalu were not prepared to be interviewed. Some made appointments but failed to keep them. Thus, the information presented here on reasons for buying land by outsiders is based on interviews with only six of the buyers comprising five entrepreneurs and a civil servant, and with the staff of FO and KPD who knew some of the buyers personally. The six land buyers interviewed also gave some information about other buyers known to them.

Table 6.5. Occupational background of people who purchased land in the Kundasang study area between 1970 and 1989.

<table>
<thead>
<tr>
<th>Occupation of buyers</th>
<th>No. of plots</th>
<th>Percentage of plots sold</th>
</tr>
</thead>
<tbody>
<tr>
<td>Entrepreneurs</td>
<td>63</td>
<td>67.0</td>
</tr>
<tr>
<td>Civil servants</td>
<td>4</td>
<td>4.3</td>
</tr>
<tr>
<td>Politicians</td>
<td>6</td>
<td>6.4</td>
</tr>
<tr>
<td>Other private sector</td>
<td>3</td>
<td>3.2</td>
</tr>
<tr>
<td>employees</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Development Institutions</td>
<td>5</td>
<td>5.3</td>
</tr>
<tr>
<td>Local Dusun farmers</td>
<td>13</td>
<td>13.8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>94</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

The outsiders who bought land in Kundasang did so with different motives depending on the time of purchases. A few of the earlier buyers, particularly the Chinese entrepreneurs, bought the land to diversify into temperate vegetable farming. However, they had no intention of farming the land themselves. After buying the land they gave it to share-croppers or relatives to cultivate. In contrast, the people who bought the land in the late 1970s and 1980s, after the state government announced its plans for development in Kundasang District (Chapter 4), did so to make money by utilising the land for non-agricultural purposes such as tourist accommodation and rental houses. Some also planned to build holiday homes and sub-divide the land into residential blocks and resell them later. When the government suspended its plan to carry out the planned developments, about 50 per cent of the buyers began to lease or share-crop the land while waiting for other investment prospects to emerge. The others left their land idle. The six purchasers interviewed were all leasing out their land. All of them indicated that they had initially bought the land for non-agricultural purposes.

Information on reasons for selling and how the proceeds from the sales were used was not collected from all Dusun sellers because many would not admit to selling their land. However, information was obtained from the 17 of the 50 sample land owners who had sold land. According to these sellers, increasing cash incomes or generation of liquid capital was the major incentive to sell their land. Prior to 1970 very few plots were sold and all transactions took place between the local Dusun. The prices paid barely exceeded M$1000 per hectare.
Often cash was not paid, but the land was exchanged for a buffalo or a cow for slaughter during weddings or feasts.

When outsiders started buying land in Kundasang in the 1970s the prices rose dramatically. The outsiders, most of whom originated from towns, offered between M$16,000 and M$ 64,000 per hectare (Table 6.6) depending on the location and terrain of the land. The land close to Perkasa Hotel, Kundasang town, the Tamaruli–Ranau trunk road and also land with good views and accessible by all-weather roads fetched the highest prices.

**Table 6.6. Prices received by 17 sample Dusun land owners who sold some of their land between 1970 and 1989.**

<table>
<thead>
<tr>
<th>Period of sale</th>
<th>Price Per hectare (M$'000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970-1974</td>
<td>10.0 - 20.3</td>
</tr>
<tr>
<td>1975-1979</td>
<td>12.3 - 37.5</td>
</tr>
<tr>
<td>1980-1984</td>
<td>15.5 - 57.9</td>
</tr>
<tr>
<td>1985-1989</td>
<td>16.5 - 64.0</td>
</tr>
</tbody>
</table>

Sources:  
1. Interviews with the sample land owners who sold land.  
2. LB01; LB02; LB03; LB04; LB05; LB06; FO01; FO03; KPD01; KPD04 1990. Personal Interviews.

Most Dusun sellers claimed that they could not have saved the amount received from the sales of a plot of land in their lifetimes working as vegetable farmers. With the revenue received they had been able to pay off debts and to improve their houses and facilities in the house. Part of the revenue was also invested in education of their children, purchase of vehicles and in businesses.
The manner in which the proceeds from land sales were used showed some variation between the 1970s and the 1980s (Table 6.7).

Table 6.7. Use of revenue received from land sales by 17 sample land owners who sold some of the land between 1970 and 1989.

<table>
<thead>
<tr>
<th>Period of sale</th>
<th>No. of owners who sold land</th>
<th>Use of revenue received from land sales</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>House and vehicle</td>
</tr>
<tr>
<td>1970-74</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>1975-79</td>
<td>5</td>
<td>3</td>
</tr>
<tr>
<td>1980-84</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>1985-89</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>17</td>
<td>8</td>
</tr>
</tbody>
</table>

Source: Interviews with sample land owners who sold land.

A majority of the land owners who sold land in the 1970s spent a substantial part of the money on improvement of housing and purchase of vehicles. At that time most farmers lived in houses with bamboo walls and thatched roofs. The Dusun who sold their land and some of the more successful farmers started replacing these traditional houses with houses with zinc roofs and timber walls on the model of the Agriculture Department's staff quarters.

Moreover, in the 1970s, when cultivation of commercial vegetables expanded onto land located farther away from the settlements and Tamparuli–Ranau trunk road (Chapter 5), ownership of vehicles became
necessary to facilitate cartage of farm inputs and produce. All sample land owners who sold land in the 1970s reported buying pick-up vans or jeeps. Most of them occasionally hired out these vehicles to transport passengers and cart other farmers' farm produce. In addition to investing in vehicles two of the land owners invested part of the proceeds from land sales in business enterprises. One became a middleman buying vegetables in Kundasang and wholesaling them in Kota Kinabalu. The other, who had established a grocery shop in 1964, invested part of the revenue from land sale to expand his shop. However, none of the sample land owners who sold land in the 1970s reported using their money immediately in the education of their children because they did not have children at higher education institutions at that time.

After 1980, although improvements in housing and facilities in the house took a significant portion of the revenue received from land sales, investment in education of children and business enterprises became increasingly important. Education of the children was always valued by the Dusun and most of the children who qualified for post-primary education were sent out to other towns in Sabah in the 1970s when the farmers’ incomes from vegetable farming increased. By the early 1980s educational facilities had improved in Kundasang with the establishment of a junior secondary school, and more children qualified for higher education. Most Dusun bore the expenses of their children’s education from their farm and off-farm incomes. Dusun who had sold land used part of the revenue to educate their children (Table 6.7).
According to sample land owners, investment in business enterprises also increased significantly in the 1980s because of the emergence of new opportunities and a decline in profits from commercial vegetable farming. During the early 1980s the population of Kundasang District increased with the arrival of immigrant farmers, farm workers and employees in the tourist industry (Chapter 4). Demand for services increased and provided opportunities to the local Dusun to participate in businesses such as grocery shops, restaurants and transport. Dusun farmers’ profitability from vegetable farming also began to decline in the mid-1980s, forcing some Dusun land owners to opt for non-farm economic activities. Dusun who had saved surplus incomes from farming or land sales began to invest in business. Some of those who did not have savings sold some of their land in the mid-1980s to invest in business.

The claims of sample Dusun with respect to the investment of revenue derived from land sales were reflected in the types of houses and business enterprises they owned and the levels of education and occupations of their children. Of the six sample land owners who claimed to have invested part of the revenue received from the sale of their land in businesses, three were operating grocery shops and restaurants in Kundasang town. Of the remaining three, one owned a mini-bus and the other operated a farm input store. The last was a middleman buying and wholesaling vegetables.

Of the three who claimed to have invested part of the revenue derived from land sales in the education of their children, two had daughters who were
school teachers, and the other had two of his children at a university in West Malaysia. In addition, all sellers of land owned well furnished houses built to modern designs. In fact, some of the houses owned by sellers of land were among the best in the settlements within or close to the study area. Judging from business enterprises and assets owned and education level of their children, it was clear that land sales had helped these Dusun to improve their standards of living and diversify their economic activities.

6.5.2 Leasing

According to older land owners, village heads and officials of FO, leasing of land to outsiders started in the late 1960s. The first lessees, neither of whom was on the plots at the time of study, were two Chinese market gardeners from around Papar, a small town on the West Coast about 50 kilometres from Kota Kinabalu (Fig. 1.1). By 1978 the number of lessees in Kundasang district had increased to eight, all of whom were Chinese. According to the Farmers’ Organisation estimates, they leased 10 to 12 plots with an estimated area of 15 hectares. Only three of these plots lay inside the study area and the rest outside in areas where new feeder roads were constructed in the 1970s (DO15; DO17; VH04; FO03 1990: pers. comm.).

Leasing out land by both local Dusun and outside land buyers increased significantly after the implementation of the irrigation project in 1983, for three reasons. First, the project attracted a large number of immigrant farmers including the Chinese, Bangladeshi, Timorese and Bugis who wanted to lease the
land. Second, the land rents increased significantly with rising demands for land by immigrant farmers, providing the land owners an opportunity to derive additional incomes from leasing some of their land while they farmed the rest of their land or occupied themselves with off-farm economic activities. Finally, the government’s decision to shelve the overall development plan of the area prompted some of the urban-based land buyers who bought the land for non-agricultural purposes to lease it out while waiting for further developments to take place. Consequently, 63 plots (28 per cent of the cultivated land) in the study area owned by both local Dusun and non-Dusun outsiders were being leased to immigrant farmers in 1990 (Table 6.3).

All land was leased for terms ranging from three to five years. In all cases written agreements were made between the lessees and the lessors. In the case of Timorese and Bugis lessees, agreement papers were written by school teachers or other educated people in the area and witnessed by the village headman or written and witnessed by the Assistant District Officer at Ranau. The Bangladeshi and Chinese lessees used agreements drawn up by solicitors.

The rent paid ranged from M$154 to M$274 per hectare per month depending on the location and quality of the leased land. As a general procedure the lessee was given a rent-free period of three months to prepare the land and establish his crops. After the first three months the lessee was required to pay his fixed rent at the beginning of each month whether he harvested any crops or not. In principle the lessee was also required to follow proper farming practices
including soil conservation. If the lessee decided to leave before his tenancy expired, he had to notify the land owner three months in advance or pay three months’ rent. If the land owner decided to terminate the leasing arrangement he had to give the lessee three months notice and allow him to harvest all his crops. On the expiry of a lease the lessee was required to leave all improvements on the land for the owner, including farm houses, polythene sheds and irrigation systems.

At the time of the study, there were 26 lessees in the study area, all of whom were immigrants from other parts of Sabah, West Malaysia and overseas. These included 16 Chinese, three Timorese, six Bugis (from Sulawesi) and one Bangladeshi (from Bangladesh). They leased 63 plots of land in the study area and about 15 plots outside. There were no local Dusun lessees because all owned sufficient land.

Information could not be gathered on all the 26 lessees in the study area because of a reluctance to be interviewed on the part of most Chinese lessees (and their employees) on land owned by Dusun but not included in my sample (Chapter 1). Therefore, information was gathered from five Chinese, two Bugis and two Timorese and the sole Bangladeshi lessee in the study area. The five Chinese all leased land from Dusun land owners included in the sample. One Bugis lessee leased land owned by a sample land owner and the other leased from a Dusun not included in the sample. Similarly, one Timorese lessee was on a sample Dusun’s land and the other on another non-sample Dusun’s land.
The two Bugis lessees interviewed came to the study area in 1985. Both had previously worked elsewhere in Sabah; one had been a truck driver with a logging company near Sandakan and the other worked as a carpenter in the neighbouring town of Ranau. They heard about profitable farming opportunities from friends already working in the study area. After saving some money (about M$1500) they came to the study area and began farming, leasing one plot each.

One of the two Timorese lessees interviewed arrived in 1982, the other in 1983. Both had heard about the economic opportunities in Kundasang from friends who worked there in the late 1970s and had then returned home. These friends even lent the lessees money for their air and boat fares and told them the procedures involved in obtaining work permits. They came from Flores Island to Kota Kinabalu, obtained work permits and then came to Kundasang. The first to arrive worked for a Chinese lessee as a labourer, and later as a share-cropper. He became a lessee in January 1985, leasing one plot. At the time of study he was leasing three plots, two in the study area and one outside. He also owned two mini-buses in a partnership with another Timorese. The other Timorese lessee had worked as a labourer, and then as a share-cropper with a Chinese lessee before becoming a lessee himself in 1987. He was leasing only one plot of land at the time of study but was planning to lease another.

The main reasons given by the Timorese lessees for working as farm labourers and share-croppers before becoming lessees were to save money required to start as lessees, and to gain sufficient experience in commercial
temperate vegetable farming and farm management. None of the Bugis and Timorese lessees had had previous experience in temperate vegetable cultivation prior to coming to the study area. In terms of preferred land types all the Bugis and Timorese said they preferred to lease land close to all-weather roads and Kundasang town if possible. Moreover, they preferred land on which they could start cultivation immediately without a large initial capital investment.

The sole Bangladeshi lessee came to Kundasang in 1983 to work for the KPD on a three-year contract. While working for the KPD he married a local Dusun woman. When his contract with the KPD expired he stayed back and started farming, leasing one plot initially. He increased the number of plots gradually. At the time of study he was leasing three plots, one in the study area and two outside. He was also buying and selling vegetables as a middleman in partnership with a Pakistani.

Of the five Chinese lessees, three were from West Malaysia and the other two from different parts of Sabah. None of them had had experience in commercial vegetable farming before coming to Kundasang. They picked up the techniques from other Chinese lessees who had been commercial vegetable farmers in the Cameron Highlands in West Malaysia before coming to Kundasang. These earlier Chinese lessees were always ready to help and advise. All the Chinese lessees had some savings before they started farming and if short of funds they were helped by other Chinese who had begun farming earlier. They all started by leasing one plot and increased their plots to three and four as they
saved more money for further investment. The mean number of plots leased by individual Chinese lessees at the time of study was 3.6 with a total area of about 6.4 hectares. The Chinese preferred to lease plots that were close to all-weather roads, not too steep and with sufficient water for irrigation. Within a few years of starting to farm as lessees, most Chinese diversified into other non-farm economic activities. At the time of study three of the lessees also owned businesses: two operated grocery and farm input shops, and one owned a restaurant.

The lessors included both local Dusun and non-residents of Kundasang who had bought the land there. Detailed information about all lessors could not be gathered because of the difficulty in locating outside lessors. The information presented here was gathered from the six outside land buyers I managed to interview (discussed above) and the ten lessors in my sample of 50 land owners. The outside lessors were entrepreneurs, civil servants, politicians and other urban-based workers. They had neither time nor labour to cultivate the land themselves. Leasing the land provided some income from it.

Within the local Dusun community, leasing was common among the land owners who had off-farm employment or business interests (Table 6.8). Nine of the ten sample lessors were involved in off-farm employment or business, only one having no off-farm economic activities. Of the nine land owners with off-farm economic activities four did not cultivate any of their land themselves and the other five cultivated some land themselves and leased out some. The most
common reasons given by all the Dusun lessors for leasing their land included a shortage of household labour, high rentals derived from leasing, declining profits from vegetable farming and the hope of benefiting from the improvements left behind by the lessees.

Table 6.8. Age of land owners who had granted use-rights to relatives and the residential status of the relatives.

<table>
<thead>
<tr>
<th>Age of land owners</th>
<th>Residential status of relatives</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Living with land owner</td>
<td>Living separately</td>
</tr>
<tr>
<td>30-34</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>45-49</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>50-54</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>55-59</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>60-64</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Over 65</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>5</strong></td>
<td><strong>4</strong></td>
</tr>
</tbody>
</table>

Sources:

i. Interviews with the sample Dusun land owners who had granted use-rights to their land to relatives.

ii. Interviews with relatives who were granted the use-rights.

The four non-farming lessors included a school teacher, a politician, a driver and a businessman. They leased their land mainly because of shortage of household labour and low profits from farming (Chapter 7). Most of the household labour of these lessors was occupied off-farm. Moreover, the declining profits from farming had discouraged them from cultivating their land using hired
labour or share-croppers. They preferred to lease out their land because leasing allowed them to derive regular incomes and devote time that would have been spent in the supervision of farm work to leisure or business.

Shortage of household labour, loss of soil fertility on land in the study area and declining profits due to price fluctuations were given as common reasons for leasing the land by the remaining six lessors who cultivated some of their land themselves. All six claimed that they maintained cultivation on some of their land, mainly land outside the study area that had been brought under cultivation more recently. They had leased out the land in the study area that they had been cultivating for a long period of time because it had lost fertility and required more inputs to maintain production. Moreover, shortage of labour and fluctuating prices of vegetables had made cultivation of these plots uneconomic (Chapter 5).

One of the sample lessors who leased out a plot in the study area and cultivated two plots outside said that he was getting M$450 per month rental from the leased land. By leasing the land he received a regular income from the land without incurring any labour and input costs. He claimed that the rent he received was higher than the income he formerly derived from farming the land. Using the household and hired labour previously utilised on the leased land, he cultivated two plots outside the study area. These two plots were more fertile and gave the land owner much higher returns than he was able to derive from the plot he had leased out.
The hope of benefiting from the improvements (in terms of physical infrastructure and soil fertility) that would be left behind by the lessees was given as an important reason for leasing the land by all lessors. They claimed that while leasing the land, the lessees, especially the Chinese and Timorese, constructed on-farm feeder roads, polythene sheds, farm houses and also installed irrigation facilities. These improvements sometimes amounted to about M$20,000. The lessees also used large quantities of organic and inorganic fertilisers to improve and maintain productivity on land that had become infertile after years of continuous cultivation prior to leasing. On the expiry of leases, the land owners hoped to acquire these improvements, farm the land themselves or use share-croppers and make higher profits.

6.5.3 Share-cropping

Literature shows that share-cropping is usually done by landless tenants. However, in some cases land owners with insufficient land also work on other people’s land under share-cropping arrangements. The share-croppers may cultivate on a portion of a plot cultivated by land owners or cultivate on separate plots. Share-cropping contracts operate on a variety of conditions. In some cases landlords and share-croppers share equally all costs of production including labour and farm inputs. In others the landlords simply provide land and farm inputs while the share-croppers provide labour. In most cases the landlords’ share of crops ranges between 50 and 70 per cent of the total harvest (Huang 1983; Slatter 1985; Shrivastava 1989).
In the study area, share-cropped plots were those over which tenants had direct agreements with the landlords to farm on a share basis. The plots were worked solely by share-croppers and neither the land owner nor his family cultivated any part of them. Some plots were leased and then contracted by the lessees to share-croppers to work. These plots were not included in the share-cropping category in this study but were classified as leased plots.

Share-cropping was the first form of the land tenure change adopted by local Dusun after the introduction of commercial vegetable farming in Kundasang. A few land owners tried single crop share-cropping with Dusun workers from the interior of Ranau and other villages within the Kundasang District in the early 1960s. However, this arrangement proved unsatisfactory because the share-croppers frequently left before the crop matured, taking a small compensation for their work. Share-cropping with immigrant Timorese workers was also tried by a few Dusun land owners in the late 1970s, when Timorese first started arriving in the area. This arrangement also did not work out because the Timorese were not willing to take the risk of crop failures during the dry seasons (DO14; VH01; VH04 1990: pers. comm.).

Share-cropping with immigrant farmers became widespread after the implementation of the irrigation project in 1983 because more share-croppers became available in the influx of Timorese and Bugis and because the risk of crop failures due to drought was eliminated. The household labour of the local farmers proved insufficient to meet the labour requirements of the more intensive
form of cultivation adopted after irrigation became available. By share-cropping their land, Dusun land owners were able to increase further the area of land under cultivation while freeing some of their family labour for off-farm occupations. At the time of study, 44 plots, which constituted 20 per cent of the cultivated land in the study area owned by both local Dusun and outside land owners, were share-cropped (Table 6.3)

At the time of the study approximately 240 share-croppers worked in the Kundasang study area. Of these approximately 130 worked for the local Dusun and outside land owners, and the rest for immigrant lessees. All except two of these share-croppers were Timorese and Bugis. The two exceptions were local Dusun. Because of the large number of share-croppers and reluctance on the part of share-croppers working for Chinese lessees to be interviewed, data could not be obtained on all share-croppers. The data presented here were gathered from 15 share-croppers. These included 12 of the 33 share-croppers on 12 share-cropped plots owned by 11 of the 50 sample land owners and three who worked on land owned by urban-based landlords who bought land in the study area. Of the share-croppers interviewed, one was Dusun, three were Bugis and 11 were Timorese.

Unlike the lessees, the share-croppers cultivated the land without any formal written agreements. Conditions for share-cropping were agreed upon verbally between the share-croppers and the land owners. The period of share-cropping was not fixed, giving both parties liberty to terminate the arrangement at any time. However, certain procedures were followed when terminating share-
cropping arrangements. If the share-cropper decided to leave, he had to notify the land owner one month in advance to allow the land owner time to find a replacement. On the other hand, if the land owner decided to discontinue the arrangement, he had to allow time to the share-cropper to harvest all crops he had planted on the land.

The share of proceeds from sale of vegetable crops received by the share-croppers varied considerably from one land owner or lessee to another and between crops planted in polythene sheds and those in open fields (Chapter 5). All local Dusun and outside land owners who share-cropped their land provided all inputs including seeds, fertilisers, pesticides and irrigation. A few also provided polythene sheds. The share-croppers provided labour. The proceeds were shared in the following manner. For the crops grown in polythene sheds the share-croppers received 35 to 40 per cent and for the crops grown in open fields they received 50 per cent of the gross proceeds.

The lessees who contracted share-croppers to work their land also paid for all expenses including inputs and land rents. However, they paid a smaller share of gross proceeds to the share-croppers. All lessees paid the share-croppers 35 per cent of the gross proceeds for crops planted in open fields and 25 per cent for crops planted in polythene. Despite receiving a lower proportion of the gross proceeds, most share-croppers preferred to work for Chinese lessees because the share-croppers who worked for Chinese lessees claimed that the actual amount they received per year was generally higher than that received by the share-
croppers who worked for Dusun land owners, owing to higher yields achieved under the more efficient Chinese management. Higher returns also accrued to the lessees and their share-croppers from the cultivation of high-value crops (Chapter 5).

A second advantage of working with the Chinese lessees was the training the share-croppers received in the use of modern technology, cultivation of high-valued crops and better farm management. After acquiring the managerial and technological skills used by the lessees, the share-croppers hoped to become successful farmers as lessees in the future. In fact, all the Timorese lessees in the study area received their training under the Chinese lessees. As a result the crops planted by these Timorese and their farm management and labour organisation were very similar to those of the Chinese lessees.

Share-cropping on others’ land was uncommon among the local Dusun. There were only two local Dusun share-croppers in the whole of the study area. Both were young married men who had moved out of their parental homes because of disagreements with their parents. They had their own land, which was still under forest as they lacked capital to develop it. Meanwhile, they share-cropped a plot owned by a Dusun entrepreneur, saving money to clear and farm their own land at a later stage. Both lived in a farm house built by the land owner on the plot they share-cropped.
The majority of Timorese and Bugis were young men between 20 and 35 years of age. About 20 per cent were married but only a few had come with their wives and young children. Most had been working in the study area for two to three years. The number of share-croppers on individual plots ranged from one to five depending on the area of cultivable land on the plot. On average individual share-croppers cultivated about 0.2 hectares. They lived in groups in farm houses built by the land owners, did their cooking together and shared household expenses. In cases where a married share-cropper shared accommodation with single men his wife did the housework for everyone and received payment for her work.

The land owners in the study area who allowed their land to be share-cropped included 13 outsiders and 31 local Dusun. The 13 outsiders were entrepreneurs and civil servants based in different parts of Sabah. According to information gathered from the share-croppers who worked on their land, the outside land owners visited their land at irregular intervals ranging from once every two or three months to once a year depending on where they were based and when they could get time. Most came only to check records of farm expenses and vegetable sales and to collect their share of proceeds.

Within the local Dusun community, share-cropping was common among land owners with off-farm economic activities. Of the 11 sample land owners who share-cropped 12 plots, eight were involved in off-farm employment and business. Only three were fully dependent on farming for their livelihoods. Of the
eight with non-farm economic activities five did not farm any of their land themselves and the other three farmed some of their land in addition to share-cropping. As with the lessors, the most common reasons given by the land owners who share-cropped their land was shortage of household labour.

The five non-farming land owners included four entrepreneurs and a hotel manager married to a school teacher. All household labour available to these land owners was either employed off-farm or occupied in family businesses (Chapter 7). Consequently, they were short of household labour to work on the land and to supervise hired labourers, who needed a much higher level of supervision than the share-croppers. They visited their land once or twice in a fortnight to supply inputs and collect produce from the share-croppers for marketing. All these land owners claimed that share-cropping offered them the best option for earning income from their land while they were occupied full-time in other economic activities. It also allowed them to hold on to their land, earn from it, and speculate on its value increasing in the future.

The other three land owners with off-farm economic activities who share-cropped some of their land included two entrepreneurs and a farmer with three adult children working off-farm. They claimed that more than 50 per cent of the adult members of their households were occupied off-farm. As a result they could not cultivate all of their land themselves. Moreover, they did not wish to invest too much in hired labour and spend time supervising it. Consequently, they share-cropped some of the land. The three land owners without off-farm
economic activities who share-cropped their land had only two adults in their households. They cultivated one plot each with the help of hired labour and share-cropped another one or two plots.

Apart from shortage of household labour, all land owners who share-cropped their land said that high cost of production on land within the study area, opportunity to increase production without incurring additional expenses in labour and sharing the risk of loss with the share-croppers were other major reasons for share-cropping. Like the Dusun lessees, all owners of share-cropped land claimed that the land within the study area had become less fertile as a result of continuous cultivation and required large amounts of chemical fertilisers and higher labour inputs to maintain production. To provide the inputs and labour, according to the land owners, was to risk financial loss, especially during the glut season. Therefore, they preferred to share-crop the land because this did not require any cash payments for labour and the share-croppers worked hard to produce crops without supervision. In the event of low prices, losses were shared by the share-croppers. The land owners themselves preferred to farm the land outside the study area, which they considered more fertile.

6.5.4 Granting Use-Rights to Relatives.

Granting relatives use-rights to land was customary among Kundasang Dusun, as it was among the Dusun and Rungus of other parts of Sabah (Weinstock 1979: 17; Appell 1969: 48; 1978: 163). This practice has become more common and the conditions under which use-rights are granted have also
been modified since the implementation of the irrigation project in 1983. In the study area 35 plots were cultivated by relatives of land owners. These relatives worked under two arrangements. The first was a continuation of customary practices used before the establishment of the irrigation project. Under this arrangement land owners granted use-rights to some poor relatives to improve their social and economic well-being. The relatives stayed separately from the land owners’ households, cultivated the land to which they had been granted use-rights and kept all the proceeds.

Under the second arrangement, which started after 1983, the relatives lived with the land owners as members of their households and cultivated the land. The land owners helped in the cultivation of land at times but their contribution to farm work was not significant because most of them were too old to work on land. The proceeds from the land and household expenses were shared by both the relatives and the land owners.

The relatives who were generally given use-rights to the land were married brothers, sisters, daughters and grandsons (sons’ sons) of the owners. The sons were not usually granted use-rights because they were given ownership of some of the fathers’ land when they decided to separate from parental households after marriage, a practice similar to that of Rungus Dusun (Appell 1978: 149).
Nine of the sample land owners had granted use-rights over some of their land to relatives, four under the first form of arrangement and five under the second. The four in the first category were a daughter, a sister and two brothers. The two brothers were local Dusun who owned some land in Kundasang District but whose plots were located away from the roads and were still under forest. The daughter and sister were married to men from outside the Kundasang District who owned no land of their own in the district. The other five relatives who lived with land owners included a grandson and four married daughters. The grandson was a local who owned some land of his own, which was still under forest. All the daughters were married to men from outside Kundasang District who owned no local land.

The four land owners who granted use-rights over some their land to their relatives under the first arrangement included a young, a middle-aged and two elderly people (Table 6.8). All claimed that they were trying to help their relatives, who were either landless or owned plots within the Kundasang District that were inaccessible by road.

Although all nine land owners had granted use-rights to relatives for the same basic reasons, their long-term plans regarding the future occupation and ownership of land differed significantly between the young, middle-aged and the older land owners. The older land owners planned to give ownership of the land to the relatives if they proved to be successful farmers. The younger and the middle-aged land owners, on the other hand, planned to take the land back in the
future when the relatives could afford to clear their own land or purchase some land of their own.

All five land owners who had granted use-right to relatives under the second arrangement were older people (Table 6.8). One worked off-farm full-time and had no sons of his own to work on the land. The other four were too old to farm the land themselves. All their other adult children had either moved out of their households after marriage to farm their own land or lived in the household and worked off-farm. These land owners had asked their close relatives (four married daughters and their husbands and a grandson) to live with them and cultivate their land. The relatives were also responsible for taking care of the ageing land owners and their spouses until their death. In return the relatives had been promised the ultimate ownership of the land they were cultivating.

The granting of ultimate ownership of land to the user and the person who took care of the land owner who could no longer actively cultivate the land was a continuation of customary practice among the indigenous people of Sabah (Appell 1978:149). This practice showed that despite registration of land under national land laws some customary ways continued where they fitted needs such as providing for those without land or caring for aged persons.
6.6 CONCLUSION

Very rapid transformations in land tenure took place in the study area in a relatively short period of time. Within 35 years of the introduction of national land laws, land tenure has been transformed from a customary, unwritten system to a national codified and registered system. Moreover, the ownership and use-rights of about 45 per cent of all land in the study area has passed to buyers, tenants and relatives of land owners who originated from outside the Kundasang District.

Despite the transfer of ownership and use-rights of much of Dusun land in the study area to non-Dusun outsiders and to relatives of land owners, there was little accumulation of land among the rich local or outside buyers. There was some evidence of accumulation among the lessees. However, this was not a major problem because all leases were of short-term duration of three to five years. There was also no evidence of dispossession and displacement of the original owners. At the time of study all sample land owners possessed two or more plots of land, mostly outside the study area (Table 6.9). This was so mainly because both the customary and modern land laws allowed the local Dusun to acquire large quantities of land at low cost.
Table 6.9. Land of 50 sample Dusun under the control of land owners themselves and their relatives and tenants in 1990.

<table>
<thead>
<tr>
<th>Owners and occupiers</th>
<th>Land owned by 50 sample land owners in 1990</th>
<th>Land cultivated by relatives and tenants</th>
<th>Land under owners' control in 1990</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of plots</td>
<td>Area (Ha)</td>
<td>Percentage of total land area</td>
</tr>
<tr>
<td>Location of land</td>
<td>Within the study area</td>
<td>Outside the study area</td>
<td>owned</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>Total</td>
<td></td>
</tr>
<tr>
<td>No. of plots</td>
<td>73.0</td>
<td>131.0</td>
<td>204.0</td>
</tr>
<tr>
<td>Area (Ha)</td>
<td>98.2</td>
<td>177.2</td>
<td>275.4</td>
</tr>
<tr>
<td>Percentage of total land area owned</td>
<td>35.7</td>
<td>64.3</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Source: Interviews with 50 sample Dusun land owners.

On the whole the adoption of these changes in land tenure arrangements brought a number of benefits to the Dusun land owners, their tenants and relatives. Many Dusun land owners have been able to increase their farm production and cash incomes and improve their standards of living. Several elderly land owners who were not able to farm themselves were able to keep their land under production by granting use-rights to their landless relatives. A large number of landless relatives of land owners and non-Dusun tenants were able to gain access to land and improve their incomes and living conditions. Moreover, the adoption of these tenure arrangements enabled a large proportion of Dusun land owners to diversify into non-farm economic activities resulting in major changes in labour allocation and organisation.
CHAPTER SEVEN
ECONOMIC DIVERSIFICATION AND LABOUR ORGANISATION

7.1 INTRODUCTION

Generally, in subsistence-oriented societies the household labour remains the primary labour and consumption unit. Economic activities and allocation of labour are aimed at meeting the household’s subsistence and socio-cultural needs. Most agricultural work is done with household labour. Cooperative work groups, made up of close friends and neighbours, however, also help their members on a reciprocal help basis with heavy agricultural tasks such as land preparation and harvesting of crops. Cooperative work groups also undertake non-agricultural work such as house building and repairing and hunting (McNetting et al. 1989; Carmen and deJanvry 1979; Obara 1988). How do such forms of labour organisation change in the transformation from subsistence to commercial agriculture?

After the implementation of rural development programmes labour organisation usually undergoes drastic transformations. The factors that influence changes include increased amounts of farm work, diversification of economic activities and changes in attitudes of farmers and their children towards farm work. The introduction of new crops, cultivation practices, and imposition of official schedules of farm operations demand increased labour inputs on a regular basis, thus increasing the amount of farm work for household labour (Banzon-Bautista 1989; Obara 1988). Customary inter-household cooperative labour
becomes difficult to organise and inefficient in terms of coping with increasingly complex and time-constrained farm work. As a result such customary, non-paid labour is commonly replaced with hired workers (Gudeman 1978; Baharuddin 1979; Saul 1983; Grossman 1984; Anan 1989).

It has often been suggested that as development progresses, distinct groups of rich and poor farmers and landless labourers emerge in the rural areas (Fegan 1989; Anan 1989). Rich farmers generally operate large farms, diversify into non-farm business enterprises and educate their children for white collar jobs. They organise and allocate available labour on the basis of relative returns from farming and off-farm activities, an arrangement that generally leads to a reduction in the participation of the wealthier household labour in farm work. The better educated adult children work in salaried jobs and others are occupied in family businesses. The wives of farmers and younger children stay home. Farm work is increasingly done by hired labour under the supervision of the rich farmers (Fegan 1989; Anan 1989; DeVries 1990; Castillo et al. 1986).

It is often the case on the other hand, notably where land is scarce, that poor farmers own little or no land but have surplus labour. Inadequate farm incomes force some household members, especially children, to hire themselves out as a survival strategy to strengthen the family’s security and income. Such children are often not well educated and work as farm labourers or off-farm as unskilled labourers (Morrison 1980; Lenin 1982; White and Wiradi 1989; Gidarakou 1990). Landless labourers are mainly young married men who have
separated from their parental households without receiving a share of their parents’ land. Landless labourers also include those who have lost their land through forced sales or repossession by landlords (Chapter 2). These people work as labourers on rich farmers’ land for their livelihoods (Hart 1989; Byres 1982; Lenin 1982; Mackenzie 1989; Slatter 1985). Later on, when rich farmers begin to adopt labour-saving techniques such as farm machinery and chemical pesticides, poor farm labourers are commonly displaced and are forced to migrate to urban areas in search of employment (Rigg 1988; deJanvry et al. 1989; Hart 1989; Fegan 1989).

In areas where there is more land, conversely, the literature often points out that the attitudes of young people and farmers’ aspirations for their children commonly result in rural–urban migration and neglect of farms. After the implementation of rural development programmes, many farmers are able to educate their children, who then attach greater value to their social independence and mobility, and prefer to work in urban areas. A majority of rural parents do not want their children to follow in their footsteps and remain in the agricultural sector, and encourage them to pursue white-collar jobs (deVries 1990; Wong 1989; Ahmad 1988; Gasson 1988). Such attitudes and aspirations have led to an exodus of rural youth to the urban areas, thus creating a shortage of agricultural labour, and the abandonment of agricultural land (Ching 1984; Zulkifly 1982).

This chapter examines how rural development has affected labour organisation in the Kundasang study area. In doing so the chapter considers what
employment and other economic opportunities became available in the area at different stages of development, how households allocated their labour resources to take advantage of these opportunities, what were the attitudes of Kundasang Dusun towards farm work in terms of economic status and generational issues, and whether differentiation of labour occurred.

Like other chapters, this chapter is organised chronologically with major themes being brought out in the context of each development phase. The first part looks at Dusun labour organisation before the introduction of commercial agriculture. This is followed by a discussion of labour organisation between 1955 and 1970, the early stages of the rural development project. Then transformations in labour organisations between 1971 and 1982 are described. The final section examines changes in labour organisation between 1983 and 1990 when new groups of people came into the study area to take up farm employment and farming.

7.2 PRE-1956 ECONOMIC ACTIVITIES AND LABOUR ORGANISATION OF KUNDASANG DUSUN

Until 1955 Kundasang Dusun were subsistence farmers. Their agricultural activities and labour organisation were based on principles that met their subsistence and socio-cultural needs (Chapters 4 and 5). In agriculture the main tasks included clearing forest, burning trash, dibbling holes for sowing seeds, planting cuttings, weeding, harvesting, threshing, winnowing and drying padi, and picking, slicing and drying tobacco leaves. Two forms of labour were used: household labour and cooperative work groups.
At this time, most Dusun households had nuclear families. It was customary among the young Kundasang Dusun to separate from parental households shortly after marriage. Married daughters usually settled in their husbands' villages. For the married sons, parents established separate households by building a house and furnishing it with necessary household items, and allocating a piece of land planted in crops. This procedure was followed for all children except the youngest sons and children who remained in the parental households after marriage to take care of the parents in their old age. Thus, a typical household's labour force of Kundasang Dusun consisted of all adult members including the household head, the spouse and unmarried adult children. In some cases household labour also included elderly parents who resided in the household.

Cooperative work groups were made up of adult males from eight to ten households of close friends and kin living in the same settlement. These groups worked on individual members' fields on a reciprocal and rotational basis for two or three days at a time, performing heavier tasks such as forest clearing, and harvesting and threshing hill padi. Construction and repair of houses were also undertaken by the work groups. Wherever the cooperative groups worked, the land owner provided lunch to all members, and on the final day, entertained the group with tapai (home brewed rice wine) and an evening meal. In some cases the members of cooperative work groups also shared food from their gardens and hunted wild animals together. The rest of the farm work was divided between the men and women of the household. Burning debris and dibbling holes for planting
Crops were men's work. Harvesting of crops other than hill padi was done by both men and women. Sowing seeds, weeding and post-harvest treatment of crops were the responsibility of women although men occasionally helped with some of these tasks (VH04; DO15 1990: pers. comm.).

Thus prior to 1955 Kundasang Dusun had a subsistence-based agriculture. Hired labour and transactions in cash among the local Dusun did not exist. Although this system of self-help, reciprocity, and cooperation allowed little accumulation of surplus, it helped to forge and maintain important social bonds among neighbours. People generally remained, as Gudeman (1978:34) has argued, subordinated to the aim of self-sufficiency.

7.3 INTRODUCTION OF CASH ECONOMY: 1956 TO 1970

After 1956 Dusun participation in the cash economy commenced with the introduction of commercial agriculture, and the subsequent emergence of wage employment and business opportunities within Kundasang (Chapter 4), changes that necessitated transformation in labour organisation.

In 1956 commercial vegetable farming was introduced. It was boosted particularly after 1960 with the construction and upgrading of the Tamparuli–Ranau trunk road. Simultaneously off-farm employment opportunities also became available within or close to the study area with the Agriculture Department, Mamut Copper Mines and the Public Works Department (PWD). Some 30 to 40 Dusun from the Kundasang District found both casual and regular
employment (Chapter 4). A few of the better-off Dusun land owners who could afford to purchase vehicles became middlemen, buying vegetables locally and selling them to retailers at the Kota Kinabalu Municipal Market. With increasing cash incomes the demand for store-bought goods rose locally and some Dusun land owners started small retail stores in their villages. With these changes the cash economy began to take root among Dusun subsistence farmers.

The exact number of Dusun in the study area who worked off-farm or started businesses between 1956 and 1970 is not known but this information is available for the 50 sample land owners for 1970. In 1970, only 31 of the sample land owners had started commercial farming. Of these, five had diversified into off-farm economic activities (Table 7.1). Two worked off-farm with the PWD and the Agriculture Department. The other three ran businesses: one operated a grocery shop and two sold vegetables as middlemen. Of the other 19 who did not farm in 1970, three, including a politician and two school teachers, lived and worked elsewhere. Four others resided with their parents and worked on their farms. The remaining twelve were too young to farm (DO01-DO50 1990: pers. comm.).

Despite the adoption of more labour-intensive farming practices and diversification into off-farm economic activities, the composition of Dusun household labour did not change. A majority of the households continued to be nuclear families or were the case prior to 1956. As a result, some land owners began to find that the labour resources and organisation used prior to 1955 were not sufficient to cope with increased farm work. Inadequacy of pre-1956 forms of...
Table 7.1. Economic activities of 31 of the 50 sample land owners who were farming in 1970.

<table>
<thead>
<tr>
<th>Economic Activities</th>
<th>Number of land owners</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farming only</td>
<td>26</td>
<td>84</td>
</tr>
<tr>
<td>Farming and off-farm employment</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Farming and business</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>31</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

*Source: Interviews with 50 sample land owners.*

With the adoption of commercial vegetable farming and more intensive forms of cultivation the amount of farm work increased considerably. In addition to work involved in the cultivation of subsistence crops, vegetable production required the construction and maintenance of bench terraces, the application of pesticides and fertilisers, and more frequent planting, weeding, cultivation and harvesting, particularly on the plots devoted solely to cultivation of commercial vegetables in rotation with grass fallow (Chapter 5).

Despite the adoption of more labour-intensive farming practices and diversification into off-farm economic activities, the composition of Dusun household labour did not change. A majority of the households maintained nuclear families as was the case prior to 1956. As a result, some land owners began to find that the labour resources and organisation used prior to 1955 were not sufficient to cope with increased farm work. Inadequacy of pre-1956 forms of
labour utilization was felt particularly by land owners with smaller numbers of working-age people and those who had family members in off-farm employment or business.

Coincidentally, from 1962-63 hired labourers became available in the study area. These comprised two groups of Dusun who originated from two separate areas and worked under different conditions. The first group comprised wage labourers, who came from three villages within the Kundasang District (Mehemboyan, Kinandusan and Simpangan) located up to ten kilometres from the study area. Except during the planting and harvesting seasons for hill padi, groups of between ten and fifteen men and women from these villages came regularly to the study area and other nearby areas where commercial vegetable production was practised. They worked on a daily basis for different farmers for two or three weeks at a time before returning home. After a time some of these laborers learned the techniques and were hired to do all types of work involved in vegetable cultivation, including land preparation, transplanting, weeding and the application of fertilisers and insecticides.

The second group consisted of contract labourers. They came from a village in the interior of Ranau (Malinsau) located approximately thirty kilometres away from the study area. They came every three or four months in groups of fifteen to twenty and worked for up to three weeks at a time before returning to their village. They were issued contracts by farmers in the study area.
to carry out work such as clearing land, digging drains and weeding vegetable crops.

With the availability of hired labour, labour organisation among the local Dusun began to undergo changes, particularly in the cases of households involved in off-farm activities and where younger land owners had insufficient household labour. Of the 31 land owners who were farming at the time only 13 had adult children or parents resident in their households. The other 18, including the five with off-farm activities, had only two adults in their households, the land owner and his wife.

Land owners whose households included adult children or elderly parents who did not seek off-farm employment or own businesses used the same forms of labour as they had prior to 1956 with slight modifications in organisation. They continued to do all the farm work with cooperative and household labour (Table 7.2). The only change adopted was in the frequency of the use of cooperative labour. Previously, cooperative labour was generally used only twice a year for agricultural work: during land clearance and for harvesting hill padi. In the 1960s, cooperative labour was used four to five times a year: twice for hill padi production as was the practice before, and another two to three times a year, for a day at a time, to help with work related to commercial vegetable production, particularly land preparation, planting and weeding.
Table 7.2. Economic activities and forms of farm labour used by 31 of the 50 sample land owners who were farming in 1970.

| Economic activities of land owners | Forms of labour used on farms                      |              |              |
|-----------------------------------|---------------------------------------------------|--------------|
|                                   | Household and cooperative labour | Household, cooperative and hired labour | Total |
| Farming only                      | 13                                  | 13            | 26            |
| Off-farm employment or business   | 0                                   | 5             | 5             |
| **Total**                         | **13**                              | **18**        | **31**        |

Source: Interviews with 50 sample land owners.

Younger couples without other adults in the households also completed all farm work associated with subsistence crop production using household and cooperative labour. However, for some tasks related to commercial vegetable production which could not be completed by the cooperative and household labour, such as land preparation, cultivation, weeding and construction of bench terraces, outside labour was hired either on a contract or daily basis depending on labour availability at the time.

The land owners with off-farm employment or businesses used cooperative labour only for the production of hill padi. During the planting and harvesting seasons of hill padi, these land owners took time off from their businesses or employment in order to work with cooperative work groups to utilise their services. This was necessary because the Dusun who usually worked as hired labourers for land owners in the study area worked on their own padi fields at these times and were unavailable.
For commercial vegetable production these land owners depended on household and hired labour. This change became necessary because adult males from these households were occupied off-farm and could not participate in reciprocal group work on a regular basis and thus could not utilise the services of cooperative labour. These land owners sometimes hired contract labourers from the interior of Ranau for land preparation and weeding but depended on household labour and on Dusun from nearby villages for work such as spraying insecticides, cultivating and weeding vegetable plots.

Thus in the period between 1956 and 1970 a transition from a subsistence to a cash economy had started, with all Dusun households adopting cash cropping and some beginning to participate in business and off-farm employment. However, subsistence crop production and use of traditional forms of cooperative labour were maintained. Although cash cropping and participation in non-farm economic activities necessitated the use of hired workers and modifications to organisation of cooperative labour, high levels of commercialisation of labour had not taken place. Cooperative and household labour remained the dominant forms of farm labour.

7.4 THE RISE OF OFF-FARM ECONOMIC ACTIVITIES: 1971-1982

The period from 1971 to 1982 saw a rapid change in the economic activities of Kundasang Dusun due to the intensification of government efforts to develop commercial agriculture, improvements in marketing networks, development of the tourist industry and commencement of physical development
(Chapter 4). These developments led to an expansion in the area under commercial vegetables, intensification of land use and further opening up of employment and business opportunities for local Dusun.

Improvements in the road system and marketing network led to a rapid expansion of vegetable cultivation in areas farther away from the main roads both within the study area and elsewhere in the Kundasang District. Efforts of the Farmers’ Organisation and Korporasi Pembangunan Desa to modernise agriculture resulted in adoption of a more intensive form of land use (Chapter 5). The tourist industry, Farmers’ Organisation, Korporasi Pembangunan Desa and other physical developments undertaken by the Sabah Government, all within commuting distance of the study area, offered various forms of employment opportunities to the locals (Chapter 4), particularly the better-educated young Dusun. Business opportunities also increased, and Dusun land owners operating businesses, mainly as middlemen, also increased in number.

The demand for hired farm labour increased, at the same time as the availability of Dusun wage labour within Kundasang District began to decrease because of the spread of commercial vegetable farming in villages that had previously supplied farm labour. Employment opportunities created by the KPD in its joint-venture farming added to the shortage of farm labour between 1977 and 1978 (Chapters 4 and 5) (DO17; DO15; RFD01; VH04 1990: pers. comm.).
However, the labour shortage problem was solved in 1979-80 with the timely arrival of immigrant labourers from Timor in Indonesia. The first six Timorese labourers were brought into the study area in 1976 by a Chinese lessee who had formerly farmed in Papar, a market gardening area near Kota Kinabalu. These Timorese later informed their friends who were working either in other parts of Sabah or at home in Timor about employment opportunities available in Kundasang. Friends and relatives began arriving in search of employment, increasing the number of Timorese labourers in both the study area and the Kundasang District. These immigrant labourers were generally hard working and reliable and needed little supervision.

After the arrival of immigrant Timorese labour, the number of adult Dusun children taking up off-farm employment and those leaving for higher education increased substantially. Dusun participation in business also increased. By 1982, 54 per cent of the sample land owners had diversified into off-farm economic activities compared with 16 per cent in 1970. Thirty per cent owned businesses and 24 per cent had members of the household employed off-farm (Table 7.3). Furthermore, almost 40 per cent of the households in the study area had adult children attending high schools or institutions of higher education in other towns of Sabah, West Malaysia and even overseas (DO01 - DO50 1990: pers. comm.).
Table 7.3. Economic activities of the 50 sample land owners in 1982.

<table>
<thead>
<tr>
<th>Economic Activities</th>
<th>No. of Households</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farming only</td>
<td>23</td>
<td>46</td>
</tr>
<tr>
<td>Farming and off-farm employment</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Farming and business</td>
<td>14</td>
<td>28</td>
</tr>
<tr>
<td>Farming, off-farm employment and business</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>50</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Source: Interviews with 50 sample land owners.

The exodus of Dusun into off-farm economic activities and in pursuit of higher education resulted in a considerable reduction in the proportion of the land owners’ household labour involved in farming. In 1970, an estimated 90 per cent of all adults in the sample land owners’ households were occupied full-time in farming with only 10 per cent working off-farm or at school (DO14; DO15; DO16; RFD01; VH04 1990: pers. comm.). By 1982 only 67 per cent remained in farming (Table 7.4). Twenty-one per cent were occupied off-farm, 10 per cent in off-farm employment and 11 per cent in family businesses. Another 12 per cent, made up of adult children, were at schools and other educational institutions (DO01-DO50 1990: pers. comm.).
The conditions of employment and wages of the hired labourers also changed as the demand for farm labour increased and Timorese labour began to replace local Dusun labour. Until 1975 all Dusun hired labourers were employed on a casual basis because they were not available for regular employment. Because the Timorese sought full time employment, by 1982 about 50 per cent of the Timorese hired labourers were employed on a regular basis by the Dusun land owners who had allocated all their household labour to family businesses or off-farm employment. The remaining 50 per cent of the Timorese and all the Dusun wage labourers were employed on a casual basis by Dusun land owners who periodically needed to supplement their household labour to do the farm work. They were hired for periods ranging from one to three weeks at a time.

Table 7.4. Economic activities and occupation of household labour of 50 sample land owners in 1982.

<table>
<thead>
<tr>
<th>Occupation of household labour</th>
<th>Economic activities of households</th>
<th>Farming only (23 households)</th>
<th>Farming and off-farm economic activities (27 households)</th>
<th>Total (50 households)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M  F  Total</td>
<td>M  F  Total</td>
<td>M  F  Total</td>
<td>%</td>
</tr>
<tr>
<td>Farming</td>
<td>38 35 73</td>
<td>19 27 46</td>
<td>57 62 119</td>
<td>66.8</td>
</tr>
<tr>
<td>Off-farm employment</td>
<td>0 0 0</td>
<td>14 3 17</td>
<td>14 3 17</td>
<td>9.5</td>
</tr>
<tr>
<td>Family business</td>
<td>0 0 0</td>
<td>12 7 19</td>
<td>12 7 19</td>
<td>10.7</td>
</tr>
<tr>
<td>Schooling</td>
<td>5 5 10</td>
<td>8 4 12</td>
<td>13 9 22</td>
<td>12.4</td>
</tr>
<tr>
<td>Domestic work only</td>
<td>0 0 0</td>
<td>0 1 1</td>
<td>0 1 1</td>
<td>0.6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>43 40 83</strong></td>
<td><strong>53 42 95</strong></td>
<td><strong>96 82 178</strong></td>
<td><strong>100.00</strong></td>
</tr>
</tbody>
</table>

Source: Interviews with 50 sample land owners.
In the early '1980s the Timorese labourers demanded higher wages, resulting in the wages of all male labourers being increased from M$5.00 to M$6.00 per day and the wages of female labourers from M$4.00 to M$5.00 per day. Dusun contract workers from the interior of Ranau, who were employed under the same conditions as they were in 1970, also asked for higher pay. Whereas in 1970 they were satisfied with an average income of M$2.00 per day, in 1982 they would not take a contract unless they were guaranteed an average of M$4.00 to M$5.00 per person per day.

With the availability of Timorese labour the use of cooperative labour declined and its organisation underwent modifications. Until 1970 all land owners had used the services of the cooperative work groups at least for the cultivation of subsistence crops. In 1982, when production of subsistence crops ceased (Chapter 5), about 30 per cent of the land owners comprising those who had off-farm economic activities no longer used cooperative labour because of a shortage of household males to reciprocate the work done by cooperative work groups (Table 7.5). They depended on Timorese labour to do the bulk of the work.
Table 7.5. Forms of labour used to do farm work by 50 sample land owners with different types of economic activities in 1982 (a= households with no household males working on farms; b = households with no household labour working on farms.)

<table>
<thead>
<tr>
<th>Forms of labour used in farming</th>
<th>Farming only (23 households)</th>
<th>Farming and off-farm economic activities (27 households)</th>
<th>Total (50 households)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Household, contract, cooperative and casual hired labour</td>
<td>15</td>
<td>7</td>
<td>22</td>
<td>44</td>
</tr>
<tr>
<td>Household, contract, and cooperative labour</td>
<td>8</td>
<td>4</td>
<td>12</td>
<td>24</td>
</tr>
<tr>
<td>Household and casual hired labour</td>
<td>0</td>
<td>9a</td>
<td>9</td>
<td>18</td>
</tr>
<tr>
<td>Regular hired labour only</td>
<td>0</td>
<td>7b</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>27</td>
<td>50</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Interviews with 50 sample land owners.

Land owners who maintained the use of cooperative labour until 1982 modified its organisation to suit the needs of commercial agriculture. Modifications included frequency of use, the size of work groups and hospitality extended by host land owners to group members. Since commercial vegetable production required more labour inputs on a regular basis, cooperative work groups were used more frequently, as often as every four to six weeks instead of once every two or three months as was done previously. The work groups worked for a day at a time on each group member’s land, helping with tasks such as digging drains, clearing and tilling the land, constructing and maintaining terraces and weeding.

The size of the work group was reduced from 8 to 10 households in 1970 to four or five in 1982. The reduction in size facilitated organisation of the work
groups at shorter intervals. Hospitality shown towards the work groups by the host land owners apparently declined, with provision of lunch, and dinner and *tapai* after the day's work becoming less common. This was done to save expenses because of increased frequency of the rotations.

Changes were also adopted in the overall organisation of labour, particularly among land owners who had diversified into off-farm economic activities. The 27 land owners involved in off-farm economic activities had almost 40 per cent (38 out of 95) of the household labour, mostly males, occupied off-farm and another 17 per cent still at school (Table 7.4). These land owners relied more on hired labour to do the farm work than on household and cooperative labour. Only 11 of these land owners who had some adult males involved in farming continued to use cooperative labour (Table 7.5). Of these only four managed to complete all the farm work with household and cooperative labour. The other seven supplemented these forms of labour with casual wage labourers.

The remaining 16 households, nine with all males and seven with all household labour working off-farm, stopped the use of cooperative labour (Table 7.5). The nine with all males occupied off-farm relied on female household labour and outside labour hired on a casual basis to do the farm work. The other seven land owners who had all their household labour (male and female) employed off-farm included two school teachers, a hotel manager with school teacher wife, a politician and three middlemen whose wives either worked off-
farm or were market vendors. They relied on Timorese labour hired on a regular basis to do farm work and look after their land.

Relatively few changes in organisation of labour were adopted by the 23 landowners who did not diversify into off-farm economic activities. They utilised the services of cooperative work groups on a regular basis to help with some of the heavier work, as they had in the early 1970s. They also employed contract labour from the interior of Ranau two or three times a year to do land preparation and weeding. The bulk of the other farm work such as planting, applying fertilisers and pesticides, cultivation and harvesting was done by household labour. They also occasionally hired daily paid workers on a casual basis to help with farm work not accomplished by the cooperative work groups, contract labour or household labour.

On the whole, the period between 1971 and 1982, was marked by specialisation in commercial agriculture and diversification into non-farm income generating activities. The economic value of labour began to be recognised, leading to landowners allocating their labour resources to more rewarding enterprises. Landowners involved in family businesses and off-farm employment allocated household labour to these activities because they were regarded as more profitable and less demanding in terms of physical effort. Among these landowners the use of hired labour to do farm work increased while cooperative labour declined. Those who used cooperative labour modified its organisation and
supplemented it with hired labour to cut down on expenses and to ensure efficiency in production.

7.5 DIFFERENTIATION OF LABOUR: 1983-1990

The period from 1983 to 1990 was a time of very rapid transformations in economic activities and labour organisation. The result was an emergence of a diversified and differentiated pattern of labour organisation and the formation of distinct groups of land owners, farmers and labourers.

7.5.1 Factors Responsible for Transformations in Labour Organisation

The main factors responsible for the transformations in labour organisation were a change in the demographic structure of Dusun households, changes in the attitudes of Dusun (leading to a decline in the supply of locally available farm labour), the cessation of the use of cooperative labour, a new wave of immigrant labourers and farmers to the study area, and the emergence of further economic opportunities requiring reallocation of household labour.

7.5.1.1 Changing Structure of Dusun Households

By 1983-84 the structure of Dusun households changed with an apparent switch from nuclear to more extended families. Until 1970 most Dusun land owners maintained nuclear families as was customary prior to 1956. From the early 1970s extended families started becoming more common, with married sons and daughters living in their parents' households. This change was adopted for two reasons. First, the resultant larger pool of household labour enabled land
owners to take advantage of a wider range of economic opportunities in the study area, thus enabling them to accumulate surplus. Second, because the land values had increased, land owners became hesitant to part with their land by giving it away to their sons immediately after marriage for fear that the sons would sell the land. Land owners wanted their sons to become more mature and responsible before being granted ownership of part of their land (DO14; DO17; VH01; VH02; VH04 1990: Pers.comm.). The married sons, did not mind the arrangement provided they were assured ownership of their share of land at a later stage. The land owners, all of whose adult children were either occupied off-farm or lived separately, asked some of their close relatives to live with them and help farm their land for mutual benefit (Chapter 5 and 6).

7.5.1.2 Changes in Attitude and Decline in Dusun Farm Labour

The demand for farm labour rose dramatically with the expansion in the area cultivated and the intensification of land use after irrigation became available in 1983 (Chapter 5). Yet, at the same time, local Dusun labour available for farm work, including both land owners’ household labour and Dusun hired labour within the Kundasang District, continued to decrease as the education of adult children was further emphasised and the attitude towards farming of both younger and older generations of Dusun changed. A majority of children who had left home earlier for higher education had not returned to farming, the better educated having found well paid jobs. Those who had not, refused to farm and preferring lower paid off-farm jobs such as waiters, housekeepers, barmen, drivers, clerks and labourers. (Table 7.6).
Table 7.6. Economic activities and occupation of household labour of 50 sample land owners in 1990.

<table>
<thead>
<tr>
<th>Occupation of household labour</th>
<th>Farming only (14 households)</th>
<th>Farming and off-farm economic activities (25 households)</th>
<th>Off-farm employment and/or business (11 household)</th>
<th>Total (50 households)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td>Farming</td>
<td>17</td>
<td>15</td>
<td>31</td>
<td>29</td>
</tr>
<tr>
<td>Off-farm employment</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>Business</td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Domestic duties</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>Schooling</td>
<td>6</td>
<td>4</td>
<td>12</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>23</td>
<td>19</td>
<td>72</td>
<td>71</td>
</tr>
</tbody>
</table>

Source: Interviews with 50 sample land owners.

At the same time some of the older generation of Dusun who had accumulated savings began to invest in businesses such as grocery shops, restaurants, trucks and mini-buses and move household labour out of farming. This trend became more common after 1985 when profits from vegetable farming began to decline. Such enterprises engaged a larger proportion of household labour than did vegetable wholesaling, which was the most common form of business among the Dusun land owners until 1982. Moreover, with expansions of commercial vegetable farming in more distant settlements in the Kundasang District, Dusun who had formerly worked for land owners in the study area became farmers on their own land, thus further reducing the supply of locally available Dusun labour.
7.5.1.3 Cessation of the Use of Cooperative Labour

The use of cooperative labour also stopped soon after the implementation of the irrigation project because increased labour requirements on a more regular basis on individual farms, together with the reduction in household labour available for farm work, made it difficult for many Dusun land owners to release adult male labour for cooperative work. Moreover, as the land owners' cash incomes increased and immigrant labourers became increasingly available, many land owners preferred to hire non-Dusun labourers and free themselves of the burdens of reciprocity associated with cooperative work groups.

7.5.1.4 A New Wave of Immigrant Labourers and Farmers

A new influx of immigrant Timorese, Bugis, Chinese, Bangladeshis and others entered the study area and the Kundasang District shortly after the implementation of the irrigation project (Chapter 4). While the majority of the Timorese, Bugis and some contract workers from the interior of Ranau came in search of employment as farm labourers, a few Timorese and Bugis and all the Chinese, Bangladeshis and others came to farm as lessees or share-croppers. These immigrants filled the gaps in the labour supply created by the discontinuation of cooperative labour, the unavailability of Dusun hired labour and the movement of the land owners' household labour into non-farm economic activities and schooling.

After the arrival of this large pool of immigrant labour and farmers, the composition of hired labour, their conditions of employment and remuneration
changed. Immigrant lessees offered higher wages to the labourers, resulting in increases in the wages of all labourers. The Dusun from the interior of Ranau continued to work on contracts as they had in 1982 but demanded higher rates of pay. Whereas in the early 1980s they received an average of M$4.00 to M$5.00 per day per person, in 1990 they demanded between M$7.00 and M$10.00. The Timorese and Bugis were hired as day labourers on a regular or casual basis, with men receiving between M$10.00 and M$11.00 a day and women M$8.00.

7.5.1.5 Emergence of New Economic Opportunities and Re-allocation of Labour

In addition to providing much needed farm labour these immigrants also created a demand for leasing and share-cropping Dusun land (Chapter 6). Both, the demand for land and availability of farm labour presented the Dusun land owners with a wider range of options to increase their cash incomes. Apart from farming larger areas using immigrant labour and freeing household labour to work off-farm or run businesses, they could now lease or share-crop their land and further expand their participation in business or off-farm employment, the opportunities for which continued to expand.

Dusun land owners in the study area responded to these options in a variety of ways depending on relative returns and availability of household labour. In the early stages of the implementation of the irrigation project between 1983 and 1985, when profits from vegetable farming were high, 45 of the 50 sample land owners opted to increase their cash incomes from farming utilising immigrant labour. Only five of the sample land owners with off-farm economic
activities stopped farming, because they lacked time to supervise the hired labour. These land owners either leased or share-cropped their land with outsiders.

From 1985, when the profits from commercial vegetable farming began to decline (Chapter 5) Dusun land owners with sufficient labour and capital began to redirect more of these resources towards off-farm economic activities, leaving farming to immigrant labourers and farmers. They began to invest more in business enterprises such as grocery shops, restaurants, and mini-buses and trucks. In the meantime, land owners who already owned businesses other than marketing of vegetables expanded their range of activities. For example, the grocery shop owners operated restaurants on the same premises. The children of many more land owners completed their education and started working off-farm. Consequently, by 1990, only 14 land owners who lacked capital and/or labour resources to diversify their economic base depended solely on farming for their livelihoods.

Increased diversification into off-farm economic activities by Dusun land owners had five major outcomes. First, the proportion of land owners with off-farm economic activities increased from 54 per cent in 1982 to 72 per cent in 1990 (Table 7.7). Second, the proportion of land owners involved in all the three possible forms of economic activities including farming, off-farm employment and business rose from two per cent in 1982 to 12 per cent in 1990 (Table 7.7). Third, 22 per cent of land owners stopped farming and concentrated full-time on business or off-farm employment. Fourth, the proportion of land owners'
household labour occupied off-farm increased from 20 per cent in 1982 (Table 7.4) to 35 per cent in 1990 (Table 7.6). Finally, economic diversification and adoption of various forms of land tenure arrangements led to the emergence of different categories of land owners and farmers in the study area, including Dusun owner-occupiers and non-farming land owners, and non-Dusun immigrant tenant farmers. These groups organised labour in different ways depending on the availability of household labour and financial resources, which resulted in a highly differentiated pattern of labour organisation.

Table 7.7. Economic activities of 50 sample land owners in 1982, 1985 and 1990

<table>
<thead>
<tr>
<th>Economic Activities</th>
<th>1982</th>
<th>1985</th>
<th>1990</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Farming only</td>
<td>23</td>
<td>46</td>
<td>25</td>
</tr>
<tr>
<td>Farming and business</td>
<td>14</td>
<td>28</td>
<td>5</td>
</tr>
<tr>
<td>Farming, business &amp; off-farm employment</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>Farming and off-farm employment</td>
<td>12</td>
<td>24</td>
<td>12</td>
</tr>
<tr>
<td>Business only</td>
<td>0</td>
<td>0</td>
<td>2</td>
</tr>
<tr>
<td>Off-farm employment only</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100</td>
<td>50</td>
</tr>
</tbody>
</table>

Source: Interviews with 50 sample land owners.

7.5.2 Labour Organisation Among Dusun Land Owners

In 1990 labour organisation among the different groups of Dusun land owners became differentiated in terms of participation of land owners' household labour in actual farm work and the rate of employment of hired labour.
Household labour of non-farming land owners contributed little in terms of farm related work. All farm work on their land was done by immigrant farmers and paid labourers. Among owner-occupiers with off-farm economic activities some members of the households participated in farming. However, their role was generally limited to supervision of hired labor, supply of inputs and marketing produce. Owner-occupiers who did not diversify into off-farm employment or business used household labour for the bulk of farm work, with only limited use of hired labour. Differences in labour organisation existed between those owner-occupiers with and without off-farm economic activities.

7.5.2.1 Owner-occupiers Without Off-farm Economic Activities

After the discontinuation of cooperative labour around 1983, this group of owner-occupiers depended on household and hired labour to do all farm work. The extent to which hired labour was used depended on the age of land owners and the stage in the family life, which determined the availability of household labour, number of dependants, and the need to earn surplus cash incomes. Dependants included young children under 15, adult children over 15 who were at school and elderly people over 65 years of age who were unable to work on farms. For this reason, the land owners without off-farm activities are grouped according to their ages (Table 7.8).

Younger land owners between 30 and 39 years of age had only two adults each in their households: the land owners and their wives. All these households had four to six children aged between one and thirteen. Despite large numbers of
dependants, expenses of these households were generally low because none of the children were at high schools. Moreover, the land owners did not have housing and other loans to repay. Both the low household expenses and declining profits from vegetable farming acted as disincentives to these land owners to invest more heavily in labour and farm inputs and plant large areas under vegetable cash crops. Most cultivated an average of 0.7 hectares per household. The land owners and their wives did most of the farm work with the help of one outside labourer employed on a regular basis. During land preparation and weeding these land owners hired one or two additional casual labourers to help with the extra work. With incomes derived from the land they were able to meet the household and farm expenses. Savings were generally small.

Table 7.8. Mean number of different forms of labour utilised in farming, number of dependants, and area cultivated by 14 sample households without off-farm economic activities in 1990.

<table>
<thead>
<tr>
<th>Type of labour used, number of dependants and area cultivated</th>
<th>Age group of land owners</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30-39 (3 land owners)</td>
</tr>
<tr>
<td></td>
<td>40-49 (5 land owners)</td>
</tr>
<tr>
<td></td>
<td>50-59 (5 land owners)</td>
</tr>
<tr>
<td></td>
<td>over 60 (1 land owner)</td>
</tr>
<tr>
<td>Household labour</td>
<td>2</td>
</tr>
<tr>
<td>Regular hired labour</td>
<td>1.0</td>
</tr>
<tr>
<td>Casual hired labour</td>
<td>1.6</td>
</tr>
<tr>
<td>Number of dependants per household</td>
<td>5.0</td>
</tr>
<tr>
<td>Area cultivated per household (Ha)</td>
<td>0.7</td>
</tr>
</tbody>
</table>

Source: Interviews with 14 sample land owners without off-farm economic activities.

The general pattern of labour organisation adopted, and the justification for doing so, among land owners in the 30-39 year age group, is illustrated by
the case study of land owner DO19. This land owner was 31 years old and his wife was 30. They were married in 1979 and had five children aged between one and ten. In 1980 the land owner separated from his parental household. His father gave him the plot of land he was cultivating at the time of the study. The father also built him a two-bedroom wood and iron house in a residential area near Kundasang Town. Subsequently, this land owner acquired another two plots of state land.

Between 1983 and 1985, when vegetable prices were high, he and his wife cultivated approximately one hectare of commercial vegetables, employing two Timorese labourers on a regular basis. This enabled him to make good profits. From the revenue derived from farming he bought a pick-up van, improved and extended his house and kept some surplus in his saving account. After 1985, when vegetable prices began to decline, he reduced the area under vegetables to 0.8 hectare and employed one Timorese labourer on a regular basis instead of two. During land preparation, planting and weeding he hired another Timorese or a group of Dusun contract labourers to do additional work.

Because of fluctuating prices of vegetables and the absence of alternative sources of income he did not want to risk financial losses by investing more resources in farming. He claimed that the income he received from farming was sufficient to meet all household and farm expenses. Small surpluses were also saved when prices were good. He planned to increase the area under cultivation and hire labour if his household expenses increased in the future.
The five land owners between 40 and 49 years of age had large numbers of dependants and high household expenses. Most had four to six dependants of whom half were older children at high schools. Moreover, these land owners had either extended or renovated their old houses or built new ones to cater for their grown up children, using bank loans which they were repaying. In order to meet these expenses, they cultivated large areas of vegetables.

Since most of their older children were at high school they had only themselves and their wives to work on the farms. In order to maintain cultivation on large areas these couples employed two or three farm labourers on a regular basis and about the same number of casual labourers during land preparation, planting and weeding times. The land owners and their wives worked full-time on the farms with the hired labourers to save labour costs and increase their farm profits.

The need for surplus cash incomes and labour organisation of land owners in the 40 to 49 year age group is illustrated by the case study of a 46-year old sample land owner, DO13, who had five children of whom two were at a primary school and three were at boarding high schools in Kota Kinabalu. Annual expenses for the high school children were approximately M$7000. In addition to this he had built a two-storey house in 1984 with a bank loan, which he was repaying at a rate of M$500 per month.
To meet these expenses he had 2.7 hectares of commercial vegetables on three different plots. His wife cultivated one plot with two regular and two casual Timorese labourers while the land owner himself cultivated two plots located close to each other, using four Timorese labourers hired on regular and two on casual basis. Both the land owner and his wife worked full-time with the labourers. He claimed that he had no choice but to take the risk of financial losses in order to meet his financial commitments. Yet at the time of the study, this had not happened.

The five land owners between 50 and 59 years of age had come to a stage when most of their children had left school. Some had married and moved out of the parental households. Some who had left school were still living with the land owners and had not been able to find off-farm employment. They were available for farm work. The dependants in most of these households were very young grandchildren and a small number of older children who were still at school. All land owners in this group had finished paying their housing and other loans. Therefore, their overall expenses and need to save were low. Price fluctuations of commercial vegetables, absence of non-farm incomes to invest in farming and a lack of interest in farming among the adult children also acted as disincentives for these farmers to devote greater effort and resources to vegetable farming. As a result most these land owners maintained cultivation on only about one hectare of land. This enabled them to meet their household expenses and pay for their older children's education. Since they had three to four adults available for farm
work they did most of the farm work with household labour and hired outside labour only on contract or casual bases for land preparation and weeding.

Only a few land owners without off-farm economic activities were in the over-60 age group. One was surveyed. All his own children lived away from home, farming their own land. Because this land owner could not farm his land himself, he asked one of his single grandsons to live with him, farm his land and look after him and his wife. In return he willed the land to the grandson. The grandson cultivated the land with the help of a Timorese labourer hired on a regular basis. He also hired a labourer on casual basis when needed.

7.5.2.2 Owner-occupiers With Off-farm Economic Activities

Owner-occupiers with off-farm economic activities were generally older people. Of the 25 sample owner-occupiers in this category 80 per cent were over 50 years of age, and 10 per cent each in the 30 to 39 and 40 to 49 year age groups. All had extended families with either adult children or elderly parents and adult brothers and sisters, living as part of their households. All households had more than three working age people (Table 7.9). Despite similarities in terms of availability of household labour, these land owners fell into two categories on the basis of their reasons for farming. Until 1985 all maintained commercial vegetable farming as an important source of income and savings. After 1985 when profits from vegetable farming began to fall, some invested additional resources to maintain farming as an important form of economic activity to occupy surplus household labour and to derive additional income. Others merely
maintained lower levels of farming to supplement their off-farm incomes. Among the 25 sample land owners 16 fell in the former category and nine in the latter. These categories of land owners differed considerably in the way they organised in terms of outside labour used and the contribution of household labour to farm work.

**Table 7.9.** Purpose of farming, number of persons per household and use of different forms of labour in farming and off-farm occupations by 25 sample land owners with off-farm economic activities in 1990 (Figures represent the mean number of persons per household).

<table>
<thead>
<tr>
<th>Availability of household labour and use of different forms of labour in various economic activities per household</th>
<th>Purpose of farming</th>
<th>Number of dependants per household</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Supplement off-farm incomes</td>
<td>Accumulation of surplus</td>
</tr>
<tr>
<td>Household labour available</td>
<td>3.5</td>
<td>4.8</td>
</tr>
<tr>
<td>Household labour occupied off-farm</td>
<td>1.4</td>
<td>2.4</td>
</tr>
<tr>
<td>Household labour occupied in farming</td>
<td>2.1</td>
<td>2.4</td>
</tr>
<tr>
<td>Regular hired labour in farming</td>
<td>1.0</td>
<td>3.0</td>
</tr>
<tr>
<td>Casual hired labour in farming</td>
<td>1.5</td>
<td>2.4</td>
</tr>
<tr>
<td>Number of dependants per household</td>
<td>2.0</td>
<td>2.8</td>
</tr>
</tbody>
</table>

**Source:** Interviews with 25 sample land owners with off-farm economic activities.

The nine land owners who farmed only to supplement their off-farm incomes were elderly people who had spent large portions of their incomes on the improvement of their houses, purchase of vehicles and education and marriage of their children. As a result, they owned good houses, vehicles and other facilities in the house, but could not save enough to invest in businesses. Most of the adult children had moved out of their households after marriage.
Thus the households comprised the land owner, his wife, one or two adult children and a few grandchildren. Only a few of these adult children were still at school. Therefore, the average number of dependants in their households was small compared with other land owners with off-farm activities (Table 7.9).

The adult children who had left school did not want to work on farms although a majority were not qualified for well paid jobs. Instead, they took up low paid off-farm jobs. The land owners and their wives did most of the farm work. Due to shortage of household labour and lack of financial resources to invest in hired labour and farm inputs these land owners could not cultivate large areas. They cultivated an average of about 0.5 of a hectare in commercial vegetables using a Timorese labourer hired on a regular basis. Occasionally they hired one or two casual labourers to help with work not completed by the household and regular hired labourer.

The incomes earned from the farms and contributions received from children who worked off-farm were used to meet household expenses and save small surpluses. Two of the land owners who had adult children at school also leased out a plot each. The rents earned helped them pay for their children’s education. In general, this form of labour organisation and farming did not appear to be sustainable in the long run. A majority of land owners found it difficult to cope with farm work, because of old age, and planned to lease or share-crop their land to immigrant farmers and move out of farming. The two land owners who had already leased a plot were both waiting for adult children to leave school and
start working. Then they planned to move out of farming, leasing out the land they were still cultivating.

A typical example of this form of labour organisation was that of a sixty-year-old sample land owner DO02. The land owner and his wife had six children: three sons and three daughters. He spent a considerable proportion of his income on education of his children but only two of his daughters did well at school and started working in well paid salaried jobs. One became a nurse and the other a school teacher. Both married and left home within a year of starting work. Of the remaining four children, the daughter and the two elder sons also married and left home. The youngest son left school about eight years ago but refused to work on the farm. About a year after leaving school he obtained a driving licence and started working as a driver for Kinabalu National Park. He married a waitress who worked for the Perkasa Hotel. At the time of study they had two children aged five and three.

According to the land owner the wages earned by his son and daughter-in-law were not high. The elderly couple farmed to contribute to household expenses and save some surplus for future needs. They worked on the land with the help of a Timorese labourer hired on a regular basis. Occasionally, when necessary, one or two additional labourers were hired for a few days. Both the land owner and his wife complained that they found it difficult to cope with farm work because of old age, but they lacked financial resources to hire more labourers. They planned to retire in the near future after leasing the land out.
The 16 land owners who maintained farming as an important source of income were among the more well-off people in the study area with two or more sources of non-farm incomes. Six owned businesses such as grocery shops, restaurants, mini-buses and trucks, in addition to having adult children employed in well-paid jobs as teachers, nurses, medical assistants, agricultural officers and land surveyors. Of the remaining ten, two owned businesses and eight had two or three adult children or other members of the households working off-farm.

Availability of household labour and incomes from off-farm sources enabled these land owners to maintain farming as an important source of income. All derived substantial incomes from off-farm sources which enabled them to invest part of their farm incomes back into farming to buy inputs and hire labourers. Their off-farm incomes also provided insurance against losses that might be incurred from farming due to fluctuating vegetable prices. In addition, they had surplus household labour willing to work on farms and/or supervise hired labour. These included the land owners themselves, their wives and some adult children who had left school some time back and decided to take up farming, or relatives of land owners who originated from outside Kundasang District. Among the 16 sample land owners, all except three participated in farming activities, particularly in supervision of hired labour, supplying farm inputs and marketing produce.

Of the three who could not participate in farming activities, one land owner and his wife were too old even to supervise labourers. The other two were
employed off-farm and their wives were occupied in family businesses. Their farms were worked by relatives (daughters and sons-in-law). The land owners paid for farm inputs and hired labourers. The relatives worked with hired labourers on the farms.

In the remaining 13 households a majority of the better educated children worked off-farm. The children who did not do well at school were occupied in family businesses. The daughters and daughters-in-law looked after shops and restaurants and the sons drove mini-buses and trucks. A few daughters in these households were also occupied in domestic duties while waiting to be employed off-farm. These households also had sons who had left school a few years ago and decided to take up farming.

Most of these land owners farmed large areas on two or three plots and invested heavily in hired labour and farm inputs. A bulk of farm work was done by hired labourers. The land owners' wives and sons supervised the labourers on different plots. The land owners supplied inputs, marketed the produce and occasionally helped with the supervision of labourers.

Sample land owner DO17 was a typical example of an owner-occupier with off-farm economic activities who farmed to derive substantial additional income. He was sixty years old and had four adult children, three daughters and a son, all of whom had left school. The three daughters worked off-farm. One was a field assistant with Agriculture Department in Kundasang and the other
two worked as house-keepers with Kinabalu National Park. The son left school about seven years ago and started farming. This land owner had three plots under cultivation. One of these plots was cultivated by share-croppers and the other two by hired labourers. The two plots worked by hired labourers were looked after by his son and wife. Both the son and wife supervised the hired labourers but did not work on the farm. The land owner brought farm inputs, marketed produce from all plots and supervised share-croppers on one of the plots. From the income derived from the share-cropped plot and contributions from his daughters’ wages he met all household expenses. He was able to accumulate substantial savings from incomes from the other two plots.

7.5.2.3 Non-farming Land Owners

Eleven of the land owners stopped farming altogether between 1983 and 1990. A majority lacked sufficient household labour to supervise hired labour. Some who could supervise felt that returns from farming were insufficient to warrant extra expenses and labour time. They had nearly all their household labour employed off-farm or occupied in family business (Table 7.10). A few who were not occupied elsewhere did domestic work. Nine of the land owners either leased or share-cropped their land. The remaining two left their land idle while waiting to lease or share-crop it.
Table 7.10. Economic activities of 11 non-farming sample land owners and occupation of their household labour in 1990.

<table>
<thead>
<tr>
<th>Economic activity</th>
<th>Total number of adults in the households and their occupation</th>
<th>Economic activity</th>
<th>Total (11 households)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of adults in</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>the households and their</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total no. of adults in</td>
<td>22</td>
<td>14</td>
<td>36</td>
</tr>
<tr>
<td>the households</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No. occupied off-farm</td>
<td>16</td>
<td>10</td>
<td>26</td>
</tr>
<tr>
<td>No. in household duties</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>No. at school</td>
<td>6</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>22</td>
<td>14</td>
<td>36</td>
</tr>
</tbody>
</table>

Source: Interviews with 11 non-farming sample land owners.

The land owners who leased their land left all farming responsibilities to the lessees. However, those who share-cropped their land made some of their labour time available on a weekly basis to supervise farm activities. They visited their land at least once a week to supply farm inputs and collect produce for marketing. They also made decisions regarding what crops should be planted and when and where to plant them.

In general with economic diversification and changes in labour organisation between 1982 and 1990, three trends became clear. First, there was an increasing dependence on hired labour to do the farm work in all groups of owner-occupiers. Second, there was a tendency among the Dusun to move out of farming. The younger educated Dusun preferred off-farm employment to farming even if they did not qualify for well-paid jobs. The older generation Dusun with surplus savings also invested in businesses and allocated their household labour
to these enterprises. Finally, differentiation began to emerge between different groups of land owners in terms of participation of household labour in actual farm work. The household labour of land owners without off-farm incomes and with low levels of off-farm incomes worked on the farms with hired labourers. Among the land owners with high levels of off-farm incomes the participation of household labour in farming was limited to supervision of hired labourers, supply of inputs and marketing of produce.

7.5.3 Labour Organisation Among Immigrant Farmers

The organisation of labour among the immigrant farmers was also highly differentiated. At one extreme were the Chinese, Timorese and Bangladeshi lessees, who were among the most well-off farmers in the study area. All their farm work was done by immigrant share-croppers and labourers, while they themselves assumed managerial roles. On the other extreme were the Bugis lessees and Timorese and Bugis share-croppers who could not afford hired labour. They did most of the farm work using household labour and cooperative work groups.

7.5.3.1 Lessees

A majority of the Chinese, Timorese and Bugis lessees were under 45 years of age. Most of their young children were still at school either in towns of Sabah or in their own countries. Household labour consisted of the lessees themselves and their wives. All the lessees except the Bugis leased three to four plots both within and outside the study area and cultivated areas ranging from
two and a half to seven hectares (Chapters 5 and 6). The Bugis lessees were poor farmers who leased only one plot each and cultivated approximately one hectare per lessee.

Some of the more well-off Chinese, Timorese and Bangladeshi lessees had also diversified into non-farm enterprises. In the sample of 10 lessees, five, including three Chinese, a Timorese and a Bangladeshi, owned businesses. Of the three Chinese, one operated a restaurant and the other two grocery and farm input shops. The Timorese lessee owned two mini-buses and the Bangladeshi was involved in marketing vegetables as a middleman. As a result there existed two categories of lessees in the study area: lessees with and without off-farm enterprises. These lessees used different forms of labour organisation.

The organisation of labour among the lessees without off-farm enterprises varied according to their financial status and the amount of land cultivated. A majority of Bugis lessees, who suffered financial constraints and leased only one plot each, cultivated less than a hectare of land. They did most of the farm work with household and cooperative labour. The organisation of cooperative labour by Bugis farmers was similar to that used by the Dusun land owners prior to 1983. Five to ten Bugis lessees organised themselves in work groups. When a member of the group needed assistance the others came and worked for half a day to a day at a time in tasks such as land preparation, building and repairing terraces and weeding. By utilising the services of cooperative work groups the Bugis lessees were able to save on labour costs. The lessees and their wives did all
other work such as transplanting, applying fertiliser and spraying pesticides. Only when they were not able to gather the members of the cooperative work groups and needed some work done urgently did they hire Timorese or Bugis labourers for two or three days.

Most of the Chinese and Timorese lessees who had not diversified into off-farm activities leased two to four plots and cultivated up to seven hectares of land. The lessees and their wives did not do any farm work. They usually employed six to eight share-croppers and two to three labourers on each of their leased plots. The lessees' wives stayed home while lessees assumed managerial roles on the farms. The lessees also purchased and distributed farm inputs and marketed farm produce. Early in the morning they visited each of their leased plots, collected the vegetables for sale and took orders for farm inputs required by the share-croppers. During the latter part of the morning they sold vegetables and bought farm inputs. The afternoons and evenings were devoted to delivering the inputs that were in short supply, paying the share-croppers their share of proceeds and discussing and planning farm work for the following day.

Despite minimum supervision the employees of the lessees worked hard. This was because the lessees trained and selected their workers carefully to ensure they had an efficient work force. Initially, they employed their workers as labourers and trained them in the techniques of vegetable farming as apprentices by making them work under the supervision and guidance of the more experienced workers. While the labourers underwent training the lessees observed
their capacity to follow instructions and work with minimal supervision for three to four months. When satisfied with their performance the lessees employed them as share-croppers on a more permanent basis. If the performance of the workers as share-croppers proved unsatisfactory they were either demoted to the position of labourers or dismissed. Moreover, it was in the interest of the share-croppers to do their best because their incomes depended on the amount and quality of crops produced.

The organisation of labour among lessees with businesses was very similar to that of the Chinese and Timorese lessees without business enterprises. The lessees themselves were involved full-time in the management of farming activities. The other enterprises were looked after either by their wives or business partners depending on the nature of business. Restaurants, and grocery and farm input shops were managed by the Chinese lessees' wives, who hired Timorese female workers, especially the wives of Timorese share-croppers, to do most of the work. The Timorese who owned the transport business and the Bangladeshi involved in wholesaling vegetables as a middleman had partners to run the businesses.

By using share-croppers the lessees were able to cultivate large areas without spending much cash in the form of wages, and minimised their supervision time. With training, careful selection and strict management the lessees were able to achieve high productivity from their workers. The Bugis
lessees were also able to reduce their labour costs by utilising the household and cooperative labour to do most of their farm work.

7.5.3.2 Share-croppers

Share-croppers, most of whom were not financially well-off, could not afford hired labourers. Since most of them were either single, or had left their wives back home, their household labour generally consisted only of themselves. The small number of married share-croppers who were accompanied by their wives generally shared accommodation with other men who were single. Their wives did the housework for all the men who lived in the same house. Some of these wives also worked for the Chinese lessees in their shops or restaurants.

The farm work done by the share-croppers varied according to the residential status of the land owners whose land they share-cropped. Those who share-cropped on land owned by absentee land owners (land buyers resident in other towns) had more work to do than those who farmed local Dusun land. In addition to doing all the farm work they bought farm inputs and sold farm produce. Those who share-cropped with the local Dusun land owners simply did the farm work. Purchasing inputs and selling of produce was done by the land owners themselves.

Despite variations in tasks performed, the organisation of labour among the share-croppers was quite uniform. Due to their inability to employ hired labourers they did all the farm work themselves, with the help of the fellow
countrymen who were also share-croppers. They helped each other in two ways. Most of the share-cropped plots were worked by two or more share-croppers, who cultivated separate parts of the same plot. Share-croppers on the same plots helped each other regularly in all kinds of farm work. In addition, some ten to 20 share-croppers from three or four separate plots organised themselves in cooperative work groups and helped each other in the same manner as the Bugis lessees did. With this form of labour organisation the share-croppers managed to keep their labour costs low and profits reasonably high, as well as maintaining social cohesion among the group.

In general the pattern of labour organisation among immigrant farmers showed greater differentiation than existed among Dusun land owners. Household labour of rich lessees did no farm work. Their roles were confined to supervision and management. Some of the poor lessees and share-croppers did most of the farm work using family and traditional forms of cooperative labour organisation. However, this was not a permanent feature among the poor lessees and share-croppers. As savings accumulated they also started farming as the rich lessees did.
7.6 CONCLUSION

Between 1955 and 1990 the economic activities and labour organisation of the Kundasang Dusun underwent dramatic transformations. During this period almost all Dusun land owners shifted their emphasis from subsistence farming to specialised commercial production of temperate vegetables. A majority also diversified into off-farm employment and business enterprises. In the process, the Kundasang Dusun have successfully adopted more complex labour relations, allocating their labour resources to the most economically rewarding enterprises. Most have become employers of large numbers of immigrant labourers and share-croppers to do farm work. Many have also become lessors. As farm work was increasingly done by immigrant farmers and labourers, a large proportion of Dusun household labour became employees in the private and public sectors and operators of their own businesses. In many instances Kundasang Dusun have done this to deliberately move out of farming. Thus rural development in Kundasang has been a means to an end (often non-agricultural) and not an end in itself.

Labour differentiation arose in the Kundasang study area as a response to the increasing availability of low-cost immigrant labour. Dynamic, but distinct groups of non-farming land owners, owner-occupiers, lessees, share-croppers and labourers emerged. The immigrants also adopted complex labour relations over time. The various divisions of labour organisation seemed to be working in a such way that every one benefited, with little or no displacement or proletarianisation of original Dusun land owners and the farm labourers.
Of free choice, Dusun became increasingly engaged in off-farm employment and/or business. Although progress among different groups was not even all seemed to have gained. A majority of Dusun land owners experienced considerable improvements in their social and economic status. All lessees, and in particular the Chinese, Timorese and Bangladeshis, seemed to have accumulated considerable surplus and diversified their economic base. The Timorese and Bugis labourers, who were at the bottom of the Kundasang social ladder, were also better-off compared to what they would have been in Timor and Sulawesi. Thus the Kundasang rural development experience seems to have provided gains for all, through choice, not force. With appropriate provisions to guard against future land alienation and environmental degradation, it might turn out that Kundasang has been successful in providing a variety of hopefully sustainable 'development paths' for both Dusun and non-Dusun alike.

8.1 IMPACT OF THE KUNDASANG PROJECT

The Sabah state government implemented two main rural development projects in Kundasang: 1) an agricultural project to improve the living conditions of farmers by encouraging them to adopt more intensive and efficient farming methods, primarily for temperate vegetable farming, using modern technology such as improved planting materials and chemical fertilizers and pesticides. Under this strategy, basic productive infrastructure such as roads, irrigation and agricultural support services including seed, techquy, research and extension, were made available to Dusun farmers. These facilities and services were provided to the farmers in their own physical, social and economic environment in an effort to...
CHAPTER EIGHT
THE TRANSFORMATION OF KUNDASANG AND ITS IMPLICATIONS FOR MALAYSIA

In the preceding chapters rural changes in the Kundasang study area have been discussed as they relate to land use, land tenure and labour organisation. The resultant social, economic and environmental consequences indicate that although land degradation has occurred, and diversified groups of land owners, tenants and labourers have emerged, the project as a whole has been successful in transforming agriculture, and improving farmers’ incomes and standards of living. The question remains whether or not the Kundasang case provides lessons for Malaysia generally.

8.1 IMPACT OF THE KUNDASANG PROJECT

The Sabah state government implemented in-situ rural development project in Kundasang had two basic aims: 1) to substitute for imports of temperate vegetables into Sabah; 2) to improve the living conditions of Dusun shifting cultivators by encouraging them to adopt more intensive forms of land use, primarily for temperate vegetable farming, using modern technology such as improved planting materials and chemical fertilisers and pesticides. Under this strategy basic productive infrastructure such as roads, irrigation and agricultural support services including credit, cash grants, research and extension were made available to Dusun farmers. These facilities and services were provided to the farmers in their own physical, social and economic environment in an effort to
minimise disruption of their traditional way of life. There was also land reform in terms of allowing for individual ownership of land with registered titles.

The strategy proved highly successful. Kundasang Dusun adopted modern technology and new crops, intensified land use and became more responsive to market forces. A majority also modified land tenure and diversified their economic bases to increase cash incomes. As a result, Kundasang became a large-scale producer of commercial vegetables, accruing both national and local benefits. At the national level, Sabah became almost self-sufficient in temperate vegetables, thus improving the balance of trade.

Locally, Dusun farmers experienced marked improvements in cash incomes and standards of living, as evidenced by the increased availability of social facilities, levels of education of children, improved housing and the presence of new material possessions. Improved social facilities included the establishment of a police post, a health clinic, mosques, churches, primary and secondary schools and the Kundasang shopping centre (Chapter 4). In terms of level of education, until the late 1960s about 50 per cent of local Dusun children dropped out of the school system before completing six years of primary schooling. Of the 50 per cent who did complete primary education only about 10 per cent proceeded to secondary schools (DO13; DO14; DO17; VH04 1990: pers. comm.). With the establishment of new primary schools and a junior secondary school in the study area, the level of education of Dusun improved considerably. At the time of study all Dusun children from the study area received at least six
years of primary education, 95 per cent went up to year ten in secondary schools, and between 70 and 80 per cent proceeded to the higher secondary and about 40 per cent to tertiary institutions (DO01-50; VH01-04 1990: pers. comm.).

Improvements in material possessions took place in terms of housing, facilities in the house and ownership of luxury items. In the mid-1960s all Dusun in Kundasang lived in houses with thatched roofs and bamboo walls and floors. At the time of study all houses within and close to the study area were built to modern designs with timber, iron and concrete. Whereas prior to the implementation of the project the Kundasang Dusun’s material possessions generally included only cooking utensils, clothes and a few simple tools (DO13; DO17; VH04 1990: pers. comm.), most of their new homes were furnished with modern fittings and furniture.

In terms of facilities, all 50 sample Dusun houses were connected to a piped water supply and 47 had electricity either supplied by Sabah Electricity Board or from their own power plants. Twenty-one households had telephones. Eighty per cent of the houses had either electric or gas stoves and over 60 per cent had refrigerators (electric or kerosene). All households had television sets (power or battery operated) and 18 also had videos. A total of 88 vehicles, including private cars, pick-up vans, mini-buses, trucks, jeeps and Land Cruisers were owned by 48 of the sample land owners. Such data indicate improvements in the material standards of living of the target population and provide strong vindication of the Kundasang Project.
The geography of the area also underwent drastic change, with major transformations in vegetation, agriculture, population and settlement patterns. The most significant change in vegetation of the area was replacement of forest with crops and other forms of vegetation. Forest cover was removed from about 85 per cent of the area. Most of this land was first converted to shifting cultivation plots and later into settlements and permanent fields cultivated in commercial vegetables. At the time of the study more than half of the cleared land had reverted to grass and scrub fallow after farmers stopped cultivating it because of loss of soil fertility and poor road conditions. The rest was under commercial vegetables, settlements and roads. Agriculture has changed from mixed subsistence-cash crop production to specialised commercial vegetable farming. The traditional crops such as hill padi, cassava and tobacco were replaced by vegetable cash crops. With the arrival of non-Dusun immigrants and increase in Dusun population, the population of the area increased considerably and became ethnically mixed. The settlement pattern changed with the establishment of new kampongs and homesteads on individual farms. In the 1950s all Dusun lived in three Kampongs (Fig. 4.1). At the time of the study about 80 per cent of the Dusun lived in eight kampongs located within or close to the study area (Fig. 4.1). The remaining 20 per cent of the Dusun and a majority of the non-Dusun immigrants lived in houses built on individual farms away from kampongs.

Major factors that seem to have contributed to the success of the Kundasang Project were government provision of productive infrastructure and support services including roads, irrigation, credit and extension services. It is
also apparent that certain special characteristics of Kundasang including the natural environment and availability of land, labour and off-farm economic opportunities, complemented government efforts and contributed significantly to the success of the project. Furthermore, the Dusun participants proved particularly adept at responding to the changes and making significant alterations to their way of life and organisation of land and labour resources.

As discussed in Chapter 4, the Kundasang project had a distinct advantage in terms of environmental conditions. Due to its location at a high altitude, Kundasang experiences low temperatures throughout the year, with small seasonal variations. The Tanjong Lipat and Kalipit soils found throughout the study area were of high to moderate fertility, which allowed sustainable crop production given proper soil conservation measures and addition of fertiliser. These environmental conditions made the area highly suitable for cultivation of a wide range of temperate vegetables on a year-round basis. The problem of moisture stress experienced during drier months was overcome by the provision of irrigation facilities.

In terms of land reform, the introduction of national laws, granting of land use-rights in perpetuity under the customary tenure, and encouragement to acquire titles all facilitated ownership by individual Dusun of several plots of land in a variety of locations. This contributed to the success of the project in four ways. First, it enabled Dusun land owners to expand cultivation of
commercial vegetables over a large area when feeder roads were built. Second, it enabled Dusun to sustain high levels of production by moving on to more fertile plots when previously cultivated land lost fertility (Chapter 5). Third, it allowed Kundasang Dusun to sell, lease, share-crop or grant use-rights to land to relatives. These tenure rearrangements, in addition to providing Dusun land owners increased cash incomes, also provided landless people access to land and an opportunity to improve their economic status. Finally, ownership of multiple plots of land allowed for the adoption of several forms of tenure rearrangements, including limited sales to outsiders, while, at the same time preventing proletarianisation and landlessness among the Dusun.

The availability of immigrant farm labour played a crucial role in making the Kundasang project a success. Temperate vegetable farming is labour-intensive. In the Kundasang study area, farmers’ inability to mechanise farm operations due to steep slopes and rough terrain further accentuated the need for farm labour. Dusun labour proved insufficient to cope with increased farm labour demands when the area under commercial vegetables was expanded in the late 1970s (Chapter 7). The arrival of immigrant Timorese and Bugis played a major role in the maintenance and expansion of commercial vegetable production by the Dusun and non-Dusun farmers, many of whom took advantage of increasing business opportunities and off-farm employment.

Off-farm economic opportunities in the form of employment and small businesses became available from the early stages of the project and continued to
expand as development progressed, enabling a large proportion of Dusun to diversify their economic base. Those land owners who diversified their economic base invested part of their off-farm incomes in farm inputs, hiring farm labour and installing irrigation facilities. Off-farm incomes also helped many Dusun to accumulate savings which were invested in education of children, improvement of housing and purchase of luxury items. More recently, the off-farm employment opportunities absorbed a large proportion of Dusun school leavers who were not willing to work on farms, enabling them to be productively employed and contribute towards household incomes of land owners.

Finally the role of the Dusun themselves should be noted. They were not simply passive recipients of government investment but were significant participants in responding to and shaping the development of the project. Critically, they were able to maintain and adapt many of the old ways as long as it suited them (for example, communal reciprocal labour or hill padi cultivation). But they also proved prepared to abandon these when the modern alternatives gave better results. Furthermore, though the local Dusun did not control the whole decision-making process in the project, they were quick to take advantage of opportunities — both planned and unintended by the government — that became open to them. A prime illustration of this was the way many quickly cleared forest land in order to lay claim to land titles. In short, the Dusun quickly developed the skills and, for many, the business acumen, to manage land and labour resources effectively to meet their own development goals.
8.2 LESSONS FROM KUNDASANG

The Kundasang development experience teaches us four important lessons. The first lesson is that in-situ development projects can be very effective means of transforming shifting cultivators into sedentary commercial farmers, despite the fact that shifting cultivators generally find it difficult to adjust to completely settled agriculture in a new environment (King 1988; Abeyrama and Weber 1983). In-situ development projects may allow gradual adaptation to changes in economic activities and work schedules of farmers, and do not require farmers to move from one physical, social and economic setting to a new one. Innovations introduced sequentially over time allow farmers to integrate new crops and technologies into their existing farming system on their own terms. Farmers can adopt the innovations if they perceive benefits compared to the existing system of farming, and gradually adjust to a new structural, social and economic climate. Because in-situ developments require fewer adjustments, made at a slower rate, shifting cultivators seem better able to cope with innovations. Moreover, in the absence of official control over economic activities, farmers generally have a wider range of choices in terms of land use, land tenure arrangements and labour organisation. They can continue the production of subsistence crops while expanding into commercial crops. Moreover, they are able to rearrange tenure and reorganise labour to cope with the demands of cash cropping and more intensive land use, and to take advantage of new economic opportunities.

Second, the Kundasang experience teaches us that basic infrastructure, agricultural support services, and land and labour availability are four essential
components of a successful rural development project. Basic infrastructure usually includes roads and irrigation facilities. Roads assist in the spread of agricultural innovations, market information and consumer goods to previously isolated rural areas. They also provide access to market outlets for agricultural products and make people responsive to market forces. Irrigation overcomes constraints imposed by lack of or uneven distribution of rainfall, thus reducing the risk of crop failures and allowing year-round production of crops. Also important are agricultural support services such as research and extension, credit and cash grants, which facilitate adoption of technological innovations and new cash crops. Land availability and greater security of land tenure enables farmers to adopt cash crops while maintaining subsistence crops during the initial stages of development. At a later stage, land availability allows for expansion of cash crops over a larger area. Increased labour availability facilitates the adoption of more intensive forms of land use as development progresses.

The third lesson is that in-situ projects are cheaper to implement than ex-situ land development and resettlement schemes because they do not involve large-scale land development and the associated establishment of farms and houses. Consequently, they neither impose heavy investment burdens on governments nor burden the farmers with heavy debts. Relatively smaller investment is required for the provision of basic infrastructure and agricultural support services, which reach a larger number of farmers than capital intensive services provided in localised land development and settlement schemes. Moreover, a subsistence production system that provides a relative level of
economic and nutrition security, which can underpin more speculative agricultural developments, usually pre-exists.

The fourth and final lesson is that the neglect of proper cultivation practices and adoption of land tenure changes to increase cash return in the short run can lead to land degradation and render original land owners landless. The development institutions lack powers to control land use practices and land tenure changes. In order to maximise production and achieve short-term benefits many farmers adopt improper land use practices, such as expanding cultivation onto marginal lands or not taking appropriate soil conservation measures, thus causing soil erosion and land degradation. Moreover, many land owners sell, lease or share-crop their land to increase their profits and cash incomes. These practices, although bringing immediate economic gains, can in the long run lead to agricultural unsustainability and proletarianisation, poverty and landlessness among the original land owners.

8.2 SUSTAINABILITY OF THE KUNDASANG PROJECT

Can the Kundasang Project continue to be successful? The answer is a qualified 'yes'. In its 35 years of existence the project has shown steady progress towards modernisation and intensification of agriculture, resulting in improvements in incomes and overall standards of living of the main target Kundasang population. Three unplanned, but predictable processes that emerged as the development progressed and, that need to be addressed if sustainability is
to be achieved are land degradation, land sales and displacement of Dusun from their former economic activities.

During the two decades between 1970 and 1990 farmers in the study area neglected soil conservation measures, despite official efforts. This resulted in accelerated soil erosion and land degradation. When a given plot was rendered too infertile to yield sufficient returns, instead of implementing soil conservation farmers moved onto new plots either within or outside the study area (Chapters 5 and 6). Although this system of shifting cultivation from a degraded to a more fertile plot has worked well until now, it will almost certainly not be sustainable in the future. Increasing transfer of use-rights and ownership of Dusun land to non-Dusun immigrants and relatives of land owners will soon create scarcity of suitable land, forcing the farmers to cultivate the degraded land. Unless conservation measures are taken a vicious circle of further land degradation and decline in yields could result. This would present serious constraints to long term sustainability of the Kundasang Project. Thus, land degradation needs to be slowed down and stopped through education of farmers and through enforceable legislation.

Land sales have increased steadily since a market for Kundasang land was created in 1970, leading to loss of some Dusun land to outsiders. Despite this loss, widespread dispossession and proletarianisation of original Dusun land owners has not taken place because most Dusun own multiple plots of land. But this situation is unlikely to continue in future because all available land in
Kundasang District has now been allocated to individuals (Chapter 6). The Dusun who sell the land now will be unable to replace it by acquiring more plots directly from state land. This indicates that increasingly widespread landlessness and proletarianisation of Dusun could occur unless land sales to outsiders are stopped. However, other forms of land tenure changes (particularly, leasing, share-cropping and granting use-rights to land to relatives) are a way of preventing such dispossession and should be maintained. They enable Dusun land owners to maintain ownership of their land, while at the same time generating incomes, despite shortages of household labour to cultivate the land themselves. These tenure arrangements also provide important dynamic mechanisms whereby landless people can acquire access to land and make a living in the agricultural sector.

The non-Dusun immigrants have played an important role in making the Kundasang Project a success by providing labour, and introducing technological and managerial skills that have often been superior to those possessed by the local Dusun. They have also brought in capital. Over the last decade, the immigrants’ roles have changed considerably from simple labourers to tenant farmers and business operators. Consequently, at the time of study non-Dusun farmers occupied almost 50 per cent of the cultivated land within the study area. The tendency among the younger Dusun to work off-farm suggests that, perhaps, after the older generation of Dusun have retired from farming, farming will be dominated more by immigrants, even if Dusun maintain land ownership.
A monopoly of immigrants in the business sector by non-Dusun also appears likely. Although immigrants started investing in business more recently, their numbers have increased rapidly. With better business acumen and higher levels of managerial skills the immigrant businessmen, particularly Chinese, have accumulated capital, expanded their business operations and seem likely to dominate the business sector in the future. So, in sum, immigrants may displace local Dusun from both the farming and business sectors and they may control the entire local economy. If this happens there could be ethnic tensions, and possibly open confrontation between the Dusun and non-Dusun.

8.4 IMPLICATIONS FOR SABAH AND MALAYSIA

Can the Kundasang experience be reproduced elsewhere in Sabah and Malaysia? The answer here is again probably ‘yes’. The Kundasang experience has proved that in-situ development projects can be less disruptive to the way of life of small-scale subsistence farmers and can offer a wide range of economic choices to farmers. The infrastructural facilities provided under in-situ projects can be less expensive and benefit a larger number of rural people.

Land development and settlement schemes, on the other hand, are generally culturally and socially more disruptive, requiring farmers to undergo a process of imposed changes in an unfamiliar structural, economic and social setting (King 1988; Abeyrama and Weber 1983; MacAndrews 1977). Too many and too rapid changes in economic activities, work schedules and way of life of
settlers are required. The lack of a pre-existing subsistence system places further economic and practical burdens on resettlement scheme participants and managers. Consequently, many participants in ex-situ agricultural schemes, for example shifting cultivators of Sabah and Sarawak, are not able to adjust to the life in such schemes (King 1988; Zainal and Hoh 1987).

As suggested above, ex-situ settlement schemes are also expensive to implement. Whereas the Kundasang in-situ project cost between $M8,000 and $M9,000 per Dusun household involved in the project (KPDOl; FO01 1990: pers. comm.) most of the resettlement schemes in West Malaysia cost between M$26,400 and M$53,000 per settler family (Courtenay 1988:252; Jomo and Shari 1981:243). Despite heavy capital outlay, the resettlement schemes seem to have benefited only a small proportion of the rural population (Jomo and Shari 1981).

Although some settlement schemes in West Malaysia have shown considerable success, most in East Malaysia showed slow progress in terms of improving the standards of living of settlers. Some schemes have even failed to enable settlers to meet their everyday expenses and pay back loans (King 1988; Zainal and Hoh 1987).

These comparisons indicate that in-situ projects may be more appropriate strategies for rural development than capital-intensive ex-situ land development programmes. In-situ development projects are particularly suitable for shifting cultivators for whom a rapid transition to completely settled cultivation in a new environment with complete dependence on cash crop is generally difficult. These
findings seem to indicate the federal and state governments perhaps need to stress in-situ development projects in Sabah, Sarawak and states of West Malaysia where farmers have access to ample land (though such a situation may become increasingly rare). By adopting in-situ development, governments may promote a less disruptive model of development.

Although the Kundasang in-situ development project seems to be workable model, there are undoubtedly limits to the extent to which it can be reproduced. The land frontier is fast disappearing, especially in West Malaysia. Therefore, there is a need to look at different forms of in-situ strategies. These strategies may involve intensification of better land with high value crops.

Moreover, Kundasang is a special case with temperate climatic conditions with a small ‘niche’ product, temperate vegetables. Its reproduction in other areas of development may be hindered by unsuitable climatic and soil conditions. Moreover, if other areas in Malaysia with similar environmental conditions were brought into production of some of the vegetables grown in Kundasang the problems of oversupply and low prices currently suffered by Kundasang farmers would be made worse. There is, thus a need to develop other high value and low volume ‘niche’ products, but not many other examples exist.
CHAPTER NINE

RETROSPECT

What is the significance of the Kundasang case study beyond Sabah and Malaysia? The economic, social and environmental impacts of rural development in the Third World and Malaysia were reviewed in Chapters 2 and 3. These are revisited in this chapter and comparisons made with the findings of the Kundasang study by identifying points of agreement or disagreement with the literature. Then the implications of Kundasang study are discussed. Finally, the issues that need further research are highlighted.

It is difficult to generalise about the Kundasang case study, because there are many aspects that appear unique, which may not be replicated elsewhere. These include:

1). The development of a product (temperate vegetables) that provided a lucrative return but which was based on the particular environmental conditions (largely related to the high altitude) of Kundasang. Although prone to erosion, and requiring nutrient supplements, irrigation and soil conservation, the soils of the region have also proved able to support intensive horticulture.

2). The availability of significant areas of surplus land surrounding the project to which local Dusun had access. In a sense, easy access to land created a
frontier mentality where local people could claim additional land while leasing, share-cropping or selling other plots.

3. The availability of cheap immigrant labour primarily from Indonesia, has meant that there has been a constant supply of people willing to undertake the more onerous and less rewarding tasks involved in intensive horticulture. This has not only prevented a local labour shortage (and consequent rise in wages and decline in profitability of the project) but it has also facilitated the diversification of Dusun labour into business operations and the education of young adults.

These factors have been critical in mitigating some of the negative processes of change, found elsewhere, such as accelerated soil erosion and fertility loss, landlessness and subsumption of local enterprises to newer and larger-scale capitalist forms of agriculture.

However, bearing these special conditions in mind, it is still possible to draw some valuable comparisons and insights from the Kundasang experience.

9.1 MAJOR ISSUES RAISED IN THE RURAL DEVELOPMENT LITERATURE

The literature points out both positive and negative outcomes of rural development in the Third World. Positive impacts include availability of social services, increased agricultural productivity and the diversification of economic opportunities for the rural population. A common approach to rural development
has been the provision of a ‘package deal’ with social infrastructure as an important component. As a result, social facilities of various kinds are established in previously isolated rural areas as part of the implementation of development programmes (Cheema 1985; Goldberg 1984; Reynolds 1975; Myint 1975). Rural areas may also experience significant increases in agricultural production resulting in increases in agricultural exports and reduction of food imports (Richards 1985; Hardjono 1983). There is much evidence that farmers affected by rural development programmes can receive higher incomes and improve their living conditions (Swan 1983; Ali 1983; Long 1968). Opportunities also arise for farmers to diversify into off-farm businesses and employment, change land tenure arrangements and allocate labour to more profitable activities (Fegan 1989; Simpson 1987; Castillo et al. 1986; Abdel-Fadil 1975).

The most common negative impacts of rural development include concentration of benefits on the rich, land expropriation and increasing landlessness among the poor, rural unemployment and land degradation. Studies by Mehmet (1986), Hart (1989) and Said (1989) in Malaysia and elsewhere by Anan (1989), Husken (1979), Lipton (1982) provide evidence that the rich, landed and larger farmers are the major beneficiaries of rural development programmes because of their superior access to productive resources and political connections. Government policies and development institutions also favour the rich by concentrating extension services, credit, seeds, fertiliser, tools, machinery and other inputs on them, thus widening the social and economic gaps between the rich and poor.
The literature also points out that expropriation and landlessness of the poor are common outcomes of the transformations in land tenure that accompany rural development programmes. Swindell and Mammon (1990), Srivastava (1989), Jomo (1986), Baharuddin (1979) show that with the provision of productive infrastructure and the introduction of cash crops, land prices and rents escalate. To take advantage of the high prices and rents land owners sell, lease and share-crop their land, a process that commonly excludes the rural poor from the land market, expropriates land from poor tenants, and postpones intergenerational land transfers. All of these result in increasing landlessness among the poor and concentration of land among the rich (Dike 1989; Downs and Reyna 1988). This occurs particularly where there were significant inequalities in land ownerships prior to rural development initiatives, and where land is scarce.

Studies on rural labour utilisation show that the use of labour-intensive techniques in the early stages of rural development programmes increases the demand for labour, creating employment for a large number of rural poor (Hart 1989; Banzon-Bautista 1989; Jayasuriya and Shand 1983). Later on, as development progresses, seasonal labour shortages, resulting in rising agricultural wages, official schedules of planting and harvesting activities and increasing labour costs necessitate adoption of labour-saving devices such as mechanisation of land preparation, planting and harvesting operations and chemical weed control. In the process a large number of rural poor lose employment and
livelihoods in the agricultural sector (Fegan 1989; White and Wiradi 1989; Husken 1979; Stoler 1988).

Much literature also emphasises that land use practices adopted after the introduction of commercial agriculture under rural development programmes often result in serious environmental degradation. The desire among farmers to accumulate profits coupled with increasing population pressure (due both to natural growth and immigration), usually lead to more intensive use of existing agricultural lands and extension of cultivation onto more marginal lands (Thiele 1990; Blaikie and Brookfield 1987b; Brookfield 1984). Both of these processes lead to shortened fallow periods, monocultures of soil-exhausting crops and complete tillage on steep slopes, all of which contribute to accelerated land degradation in the forms of soil erosion, oxidation and leaching (Lewis 1992; Torres-Zorrilla and Rausser 1990; Thiele 1990; Blaikie and Brookfield 1987a; 1987b).

9.2 ISSUES FROM KUNDASANG

The Kundasang case study offers insights into many of these issues. In general the Kundasang findings support the views of the positive benefits of rural development pointed out in literature, in terms of availability of social services, increased agricultural production and availability of greater opportunities for rural people. Since the implementation of the rural development project in Kundasang, the road network linking Kundasang with other parts of Sabah has improved considerably. Piped water, electricity and telephone services also became
available. Educational, medical, religious, cultural and social services have also shown vast improvement since 1970 (Chapter 4). In the agricultural sector, the area under cultivation and the quantity and varieties of commercial vegetables expanded rapidly, particularly after the implementation of the irrigation project in 1983 and the arrival of immigrant farmers.

With improvements in cash incomes and the level of education, opportunities also arose for Dusun to participate in various forms of off-farm business enterprises and work within the tourism and mining industries within commuting distance of the study area. All of these contributed to improved incomes and living conditions of the local Dusun.

On the negative side, evidence from Kundasang supports the concern over land degradation raised in literature. Since government intensified its efforts to increase commercial vegetable production, especially between 1983 and 1985 when commercial vegetable farming became highly profitable, Kundasang Dusun exploited land for short-term benefits without due consideration for the long-term sustainability of yields. Forests were cleared and cultivation expanded on steep slopes without appropriate soil conservation measures. Efforts of the Agriculture Department and other development institutions to encourage soil conservation had little impact. The result was a rapid degradation of a significant area of land in the study area through accelerated soil erosion and declining soil fertility.
Yet the Kundasang findings diverge considerably from the conclusions of existing literature on the following issues: 1) concentration of benefits of development among the rich; 2) increasing landlessness among the poor; 3) increasing rural unemployment, and 4) over-emphasis on agriculture.

Whereas numerous studies (for example Anan 1989; Husken 1979; Feder 1987; Hinderink and Sterkenberg 1987; Byres 1982) indicate that the benefits of development are concentrated on a small number of richer and larger farmers, evidence from Kundasang does not support this. While the Kundasang study shows differentiation in area cultivated, types of crops planted and material possessions among the farmers, there is little evidence to suggest that these differences were a result simply of the commercialisation of agriculture — of government-sponsored ‘rural development.’ The project itself did not directly concentrate benefits on a specific group of farmers with superior access to productive resources or political connections. In the case of Kundasang, almost all Dusun have been able to improve their standard of living. The differentiation that does exist is mainly a result of differences in the stage in life cycle of households, differences in technological and managerial skills and the ability of the farmers to utilise the services and incentives provided under the rural development programme. Alternative sources of income and accumulation of off-farm income were also important determinants of inequality. Thus the Kundasang findings show that differentiation in a community may exist despite benefits of development being made available to all.
The second point of disagreement relates to the claims of literature that expropriation and landlessness of the rural poor generally follow the implementation of rural development programmes as suggested by Anan (1988), Swindell and Mammon (1990), Slatter (1985), Hart (1989), and Shrestha (1988). Findings in the study area show that despite the sale, leasing and share-cropping of a considerable amount of land, none of the original land owners have become landless. All Dusun still maintain ownership of multiple plots because most either owned several plots of land at the start of the project, or were able to obtain and register more land after the project began.

Claims made by Third World researchers (especially by Jayasuriya and Shand 1983; Hart 1989; Stoler 1988; Banzon-Bautista 1989) that a rise in on-farm employment opportunities at the early stages of rural development programmes is followed by massive unemployment at later stages, are not supported by the Kundasang findings. The Kundasang case showed that demands for farm labour continued to increase as the development project matured because labour intensive methods of farming were maintained and the number of local Dusun available for farm work either as hired or household labour declined (Chapter 7). In the absence of local Dusun labour, large numbers of immigrant labourers were employed.

Most developing world literature seems to put agriculture at the centre of rural development and tends to measure its success in terms of increased agricultural output. The findings from Kundasang study show that although
agriculture is an important contributor to the success of rural development, it is not the only aspect to be emphasised. One of the main findings from Kundasang is the role of agriculture in both regional and household conceptions of development. From a regional perspective, agriculture has obviously been central to the transformation of the Kundasang District, but it has not been the only factor. Other factors such as development of transport and marketing infrastructure and the creation of off-farm economic opportunities for the local Dusun were also important. Off-farm economic opportunities were created through education and training of rural manpower. These were the major considerations among development institutions at Kundasang and the local Dusun themselves. As a result a more dynamic brand of rural development emerged in Kundasang.

It is important also to look at the role of agriculture in household development strategies. It is clear from an examination of the history of Dusun involvement in the project that the success of temperate vegetable farming has provided a key path to increased incomes, services and lifestyle choices. It has raised the value of their land, given them cash to purchase new commodities and services, and it has opened their access to an outside world of new opportunities and constraints. Yet their commitment to agriculture has been less than complete, especially when the choices of the newer generation of adults are examined. Intensive horticulture involves hard physical labour, it is vulnerable to the vagaries of climate and the market, and there appear to be others who are prepared to undertake the hard work in return for partial access to land. With
these things in mind, local Dusun have been quick to perceive both the constraints involved in the new agricultural enterprise and the related opportunities it has opened up. In many cases, they have developed strategies that have involved keeping a stake in, and an income from, the project (primarily through retaining land ownership but leasing out or share-cropping their land) but at the same time seeking more lucrative and attractive opportunities elsewhere. This has lessened their risks and their dependence on the project, even though they might have been able to earn higher cash incomes had they committed themselves entirely to the project.

It is interesting to note that such partial commitment also seems to be a strategy employed by other participants, such as the Chinese (who mostly have business or agricultural pursuits elsewhere) or immigrant Indonesians, who mostly retain their households and, presumably, their base for subsistence agriculture, at home.

With only partial commitment to the project, many Dusun have been able to devote time and resources to developing business activities, which are perceived as yielding better returns for labour (and perhaps as having higher status), or investing in their children’s education (something that would result not in farming as a career but, say, a white collar occupation). They also spread their risks in the early stages by keeping access to old-style subsistence agriculture on other plots of land outside the project, or more recently by developing new land, some of which has been leased or share-cropped with others. Off-farm
employment in government, local services or at the nearby mine have also diversified household incomes and provided relatively stable supplementary incomes to supplement farming.

Thus, it is reasonable to conclude that farming, although successful and lucrative, is not seen as a long-term desired development ‘end’ in itself for Dusun households. They see it as offering a range of opportunities, which they have skilfully exploited, but their desired futures (or, more precisely, the desired futures for their children) in many cases lie not in the soil but in an office or business. Perhaps rural development should therefore be seen as something that widens choices for people and gives them extra resources but does not commit them to a rural lifestyle or necessarily to a rural conception of ‘development’.

9.3 IMPLICATIONS OF KUNDASANG FOR THE DEVELOPING WORLD

There is an obvious difficulty in extrapolating lessons from the analysis of a small and untypical development project such as Kundasang to rural development, in general, in the developing world. But it can also be argued that what has happened in Kundasang in terms of land use, land tenure, increased economic opportunities and organisation of labour, are processes that are more general, and might be replicated in some other areas of the developing world. The findings of Kundasang also have important implications for the developing world in relation to the need to address issues related to land degradation, social and economic differentiation, landlessness and rural unemployment.
With respect to land degradation, it is clear from the Kundasang experience that although rural development programmes with an emphasis on commercial agriculture bring numerous social and economic benefits, the desire among farmers to maximise short-term cash incomes can often result in inappropriate land use practices that cause severe damage to land in terms of the removal of forest cover, accelerated soil erosion and loss of soil fertility. Land degradation caused by such practices constitutes a major constraint to sustainable development of agriculture and the maintenance of benefits initially derived from the development projects. To prevent the emergence of such environmental problems the education of farmers and monitoring of land use practices should form important components of rural development programmes. Concerted efforts are needed on the part of development institutions to encourage farmers to adopt proper land use practices, and to put in place appropriate legislation and enforcement to discourage unsustainable land use practices.

The Kundasang study and several others (Shrivastava 1989; Morrison 1980; Swindell and Mammon 1990) have shown that, after the implementation of rural development programmes, land sales, leasing and share-cropping increase rapidly. Leasing and share-cropping are adopted by land owners to overcome labour shortage problems and earn cash incomes while maintaining ownership of their land. Land sales, on the other hand, bring short-term benefits to the land owners by giving them access to cash to pay off debts, educate their children or acquire material goods. In the long-run, however, uncontrolled land sales may result in landlessness and displacement of the original land owners, irrespective
of how much land was initially owned. Displacement and proletarianisation of original land owners may lead to social disintegration with devastating effects on the sustainability of benefits derived from development programmes. In Kundasang, however, this has so far, not happened. The Dusun have successfully and flexibly utilised a range of land tenure practices to both profit from the land and retain their ownership of it.

The Kundasang study has also shown that social and economic differentiation within a community may occur despite the relatively equitable distribution of the benefits of development. Despite this, continued effort must be made to maximise equitable distribution assistance so as to minimise social and economic differentiation.

The Kundasang case shows that loss of rural employment is not always a concomitant of rural development programmes. The study shows that employment opportunities for the rural labour force depend on two factors: availability of off-farm economic opportunities and labour, and the ability of the farmers to adopt labour-saving techniques. If off-farm employment or business opportunities are available within or close to the area of development, the better-off land owners would generally allocate their household labour to these activities and hire outside labour to do farm work. Moreover, when farmers are not able to adopt labour-saving techniques because of either inability to afford them or unsuitable terrain, they may have little choice but to depend on hired labour.
Therefore, to reduce problems of rural unemployment, successful development programmes need to be accompanied by an increase in off-farm employment.

Finally in reflecting on the Kundasang experience, it is possible to see how ‘development’, when it has been largely successful as in this case, can be defined at different levels. It is tempting to concentrate on material aspects and on matters of physical output and cash incomes. On such criteria, the scheme is judged a success by the government agencies involved: it has boosted output, promoted self-sufficiency, and provided an example of the rapid transformation of a previously subsistence and self-sufficient group into a prosperous rural community tied to the widening regional and global market. Looking at the material standards of living of the local Dusun who now have motor vehicles, modern consumer goods and apparently relatively modern lifestyles, without apparently excessive indebtedness or loss of land, similar conclusions can be reached at the household level.

Yet is this the most important aspect of ‘development’ for Dusun? Material prosperity may be the objective of their activities but the changes that the project has brought involve more than mere income. Critically, development has created opportunity and flexibility for the Dusun. Their options have been opened. They can stay on their hill swidden plots (as long as these are outside the project area) if they wish, though few do. They can engage fully in intensive vegetable growing on the project or nearby. They can become ‘land managers’, hiring labour or leasing out or share-cropping their land, thus keeping some say
in farming without doing all the hard labour. They can dabble in business. They can seek new futures for their children. Development, then, is as much about opportunity, the ability to pursue different lifestyle paths, including the ability to retain at least some elements of the old, as it is about cash incomes. Furthermore, development is dynamic, as opportunities and constraints change over time. As long as people retain the flexibility to change and adapt, they have the chance for continuing development, albeit in many different guises.

9.4 AREAS OF FURTHER RESEARCH

This study adopted a slightly different approach from that of most approaches to studying rural development and, as a result, has provided some new perspectives on the topic (though these are not entirely unique). The approach had four elements, some of which have identified areas of further research.

First, the study looked at a project that was generally seen as successful. Many previous studies have tended to focus on ‘development disasters’ — projects that do not work. Some examples of such studies are that of Emrich (1973), Abeyrama and Weber (1983) in West Malaysia, King (1988) in Sarawak and Reining (1982) in Zande. In this way a lot can be learned from mistakes, but the Kundasang study shows that much can also be learned from things that go relatively well. In fact it is often harder to find positive lessons than merely critique projects that go wrong.
Second, it is important to look beyond a project, to appreciate the wider linkages between a project and what people do. So in Kundasang I looked at landholding and off-farm employment both inside and outside of the project area in order to explain why the project proceeded as it did. Further work in Kundasang could, for example, examine the wider economy of the Timorese or the Chinese with respect to how they are using Kundasang as part of wider strategies in other places. Rural development, then, needs to be seen not just as project-oriented and restricted to a given area but as a dynamic and interlinked series of processes whereby the people involved (not just the products marketed) span regional and international boundaries. The geography of rural development cannot be neatly circumscribed by the boundaries of a project.

Third, projects have unintended consequences. This study dealt with changes in land use, land tenure and labour organisation adopted by members of the Kundasang community in response to new economic opportunities. Many of these changes and responses were not planned by development planners. As a result, development strategies did not include measures to control changes in land use and land tenure that emerged during the process of development. Though they enhance household income, they may constitute a potential threat to the long term sustainability of the project (see Chapter 8). This is not new. Many other studies have noted such unplanned consequences. It is not always possible to plan or account for all outcomes of a project because people tend to react in many different ways. Maybe projects such as Kundasang work because they do not try to do too much. They provide the infrastructure then leave people largely to it —
unlike FELDA and resettlement schemes, which are planned in great detail and tightly controlled by the authorities, and which still have unintended consequences (Wong 1989). Maybe rural development should be about facilitating development rather than prescribing it.

Finally, the Kundasang case has shown that people respond in a variety of ways to rural development. They have their own plans and priorities and different resources to work with. This has led to very diverse outcomes (and some differentiation), which are contrary to the expectations of the government and development institutions. Studies of the geography of rural development, then, should appreciate that diversity, rather than conformity, is necessary in understanding why rural development turns out the way it does. We need to further develop techniques to allow us to understand this — notably life history and individual case study approaches that focus on understanding individual situations and actions rather than describing the average or ideal response.
APPENDIX 1. QUESTIONNAIRE USED FOR SURVEY OF OWNERS AND OCCUPIERS OF IRRIGATED LAND IN THE KUNDASANG STUDY AREA.

THE AUSTRALIAN NATIONAL UNIVERSITY
Department of Human Geography

DATE: _______ BLOCK: _____ LOT NO.: ______

1. Who is the registered owner? ____________________________

2. Who lives on the farm? (tick one or more)

<table>
<thead>
<tr>
<th>a. Owner and family</th>
<th>d. Lessee</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Share-croppers</td>
<td>e. Other (Specify)</td>
</tr>
<tr>
<td>c. Labourers</td>
<td></td>
</tr>
</tbody>
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3. Number of people living on the farm:

<table>
<thead>
<tr>
<th>Age</th>
<th>Sex</th>
<th>Age</th>
<th>Sex</th>
<th>Age</th>
<th>Sex</th>
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<th>Sex</th>
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4. Who does the farming (tick one or more)

<table>
<thead>
<tr>
<th>a. Owner and family</th>
<th>d. Lessee</th>
</tr>
</thead>
<tbody>
<tr>
<td>b. Share-croppers</td>
<td>e. Other (Specify)</td>
</tr>
<tr>
<td>c. Labourers</td>
<td></td>
</tr>
</tbody>
</table>

5. If the owner does not live on the farm, where does he/she live? (tick one)

<table>
<thead>
<tr>
<th>Kundasang Irrigation area</th>
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<tbody>
<tr>
<td>Kundasang other</td>
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<tr>
<td>Other local area (Specify)</td>
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<tr>
<td>Elsewhere (Specify)</td>
</tr>
</tbody>
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Notes

______________________________
APPENDIX 2. QUESTIONNAIRE USED FOR DEMOGRAPHIC AND EMPLOYMENT SURVEY OF THE 50 SAMPLE DUSUN LAND OWNERS

THE AUSTRALIAN NATIONAL UNIVERSITY
Department of Human Geography

POPPULATION AND AGE STRUCTURE

A. AREA ______________________ INTERVIEWER ______________________

LOT NO. ______________________ DATE ______________________
SAMPLE NO. ______________________ VENUE ______________________

B. FARM OWNER

ETHNICITY ______________________
ACREAGE OF FARM ______________________

C. RESPONDENT ______________________

RELATIONSHIP TO FARM OWNER ______________________
SEX ______________________ AGE ______________________

D. POPULATION AND AGE STRUCTURE

<table>
<thead>
<tr>
<th>H\HOLD MEMBERS</th>
<th>AGE</th>
<th>SEX</th>
<th>PLACE OF BIRTH</th>
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<tbody>
<tr>
<td>H\HOLD HEAD</td>
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<tr>
<td>WIFE\HUSBAND</td>
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</tr>
<tr>
<td>OTHERS</td>
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</table>

D. LABOUR Organisation

1. What are the main tasks performed by the different members of the household at different times of the year?
   a. Household head: ______________________

b. Wife\Husband

c. children:
i. 

ii. 

iii. 

iv. 
v. 

OTHERS:

2. Are any members of the family involved in marketing, of produce, transportation or any other kind of business? If yes, who is involved and in what?

3. Do any members of the household commute to work in nearby towns or in other local agencies? If yes, then who do and where do they work, how often, and what work do they do?

4. Have any members of the household moved away to another area to live and work? If they have then where have they gone and what work are they doing?

5. Any other relevant information

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APPENDIX 3  QUESTIONNAIRE USED FOR SURVEY OF KUNDASANG LAND OWNERS TO STUDY THE IMPACT OF THE IN-SITU RURAL DEVELOPMENT PROJECT

THE AUSTRALIAN NATIONAL UNIVERSITY
Department of Human Geography

A. AREA/BLOCK  INTERVIEWER
FARM/LOT NO.  DATE
SAMPLE NO.  VENUE

B. FARM OWNER
ACREAGE OF FARM
ETHNICITY/RELIGION

C. BRIEF DESCRIPTION OF LAND (notes by interviewer)

C. RESPONDENT
RELATIONSHIP TO FARM OWNER
SEX  AGE

I. CONDITIONS PRESENT IN THE AREA BEFORE AND AFTER THE DEVELOPMENT PROJECTS
a. LAND
1. How many pieces (lots) of land do you occupy/own?

2. What is the area of each? Which of them have registered titles and which do not? Where are they? How, when and from whom were they acquired?

(i)  

(ii)  

(iii)  

(iv)  

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3. If you are not the owner of any of this land, then what kind of arrangement do you have to use the land? (renting, share-cropping, traditional rights etc.)

4. How long have you had this kind of arrangement? What was the situation before then?

5. How many lots or acres of land are uncultivated and why are they not cultivated?

6. How many lots or acres of land have been sold by you? When and why have you sold them? Who has bought them?

7. How many lots or acres of land have you leased out? To whom? Under what conditions? For how long?

8. How many acres or lots are you share-cropping? Who are the share-croppers? What are the conditions of share-cropping? Why have you decided to share-crop? Why are you share-cropping this particular lot and not others? When did you give this land for share-cropping?

9. Have you given away any land to anyone? If yes, then to whom, when and why?

10. Have you given any land free of charge to anyone to farm? If yes, to whom? Since when and why?
11. Have you stopped farming on any of your land? If yes, since when and why?

II. FARMING

1. What crops do you grow now? (Crops, areas, seasons, etc.) Are you planting vegetables and other subsistence crops in the same area every year or on different patches of land?

2. How were you cultivating the land before the irrigation? What crops? (areas, seasons, etc.)

3. Which crops are produced for sale and which are produced for consumption or other uses?

<table>
<thead>
<tr>
<th>CROP PRODUCED</th>
<th>PURPOSE</th>
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</table>

4. What crops did you produce before the establishment of the Farmers' Organisation and what were they used for?

<table>
<thead>
<tr>
<th>CROP</th>
<th>PURPOSE OF PRODUCTION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. How much of each crop is/was sold per year? (Give weights)

Now

<table>
<thead>
<tr>
<th>CROPS</th>
<th>PIKULS SOLD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Before

<table>
<thead>
<tr>
<th>CROPS</th>
<th>PIKULS SOLD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

6. When and why did you change to the present method of farming?
7. What tools and implements do you use to cultivate your land and what did use before?

8. How is soil fertility maintained? (composting, mulching, fallowing, crop rotation etc.). Is it different from before? If yes, then explain how it is different.

9. How do you control weeds and pests? How do these methods differ from the ones used before?

10. Do you have or have you had any problems with soil erosion? If so, what do you do to stop soil erosion now? How did you control soil erosion before?

11. How many of your plots are irrigated by KPD now? When did you get the irrigation installed?

12. Did you irrigate your farms before the coming of KPD irrigation scheme? If yes, then explain how you did it and since when?

13. Has the increased production of vegetables affected the production of other crops?

III. MARKETING

1. How do you market your produce? (sell in the markets, sell to middlemen, both; where, what proportion etc.). When did you start this form(s) of marketing? How were you marketing before?
2. Who buys most of the produce now, and who bought them before?


3. Are there any problems with marketing now?


IV. OTHER SOURCES OF INCOME

1. Income from employment available in nearby towns/industries, other people's farms etc or from other income generating activities.

<table>
<thead>
<tr>
<th>TYPE OF EMPLOYMENT/ACTIVITY</th>
<th>PARTICIPANT</th>
<th>FREQUENCY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Before the coming of the Development Programmes


2. What happens/happened to the additional income earned? (saved, spent on weddings, education or children, invested in improvement of the farm, or in other enterprises etc)

Now


Before


V. STANDARD OF LIVING

1. How many houses do you own now?


2. When did you get them built? What type and how big are they?


302
3. Which of the following things do you own and how many?

<table>
<thead>
<tr>
<th>ITEMS</th>
<th>NUMBER</th>
<th>TYPE</th>
<th>WHEN BOUGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stove</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sewing Machine</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Refrigerator</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radio</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Television</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Video sets</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bicycles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Motor cycles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cars</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vans</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trucks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knapsack sprayer</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. What other facilities did you have in your house? (telephone, electricity, piped water supply etc.)

<table>
<thead>
<tr>
<th>FACILITY</th>
<th>WHEN INSTALLED</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

5. What can you say about the overall standard of living now compared to that of time before the coming of Farmers’ Organisation and KPD?

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
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<tr>
<td></td>
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<tr>
<td></td>
</tr>
</tbody>
</table>

VI. LABOUR Organisation

1. What are the main tasks performed by the different members of the family?

a. 

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td></td>
</tr>
</tbody>
</table>

b. Wife/Husband

<p>| |</p>
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
c. Children

i. 

ii. 

iii. 

iv. 

v. 

vi. 

vii. 

viii. 

ix. 

x. 

d. Other members of the household

i. 

ii. 

iii. 

Hired labour
2. Are any members of the family involved in marketing of produce (selling own produce in the market, middlemen etc), transportation, or any other kind of business? If yes who is involved and in what?

3. Do any members of the household commute to work in nearby towns or in other local agencies? If yes, then who do and where do they work, how often and what work do they do?

4. Have any members of the household moved away to another area to live and work? If they have then where have they gone and what work are they doing? Do they help at any time with the farm work or marketing etc, or send any money home?

5. What were the main tasks performed by the different members of the family at different times of the year before the coming of Farmers' Organisation and the KPD?
   a. Household head
   b. Wife/Husband
   c. Children:
      i. 
      ii. 

305
iii. 

iv. 

v. 

vi. 

vii. 

viii. 

d. Other members of the household

i. 

ii. 

iii. 

iv. 

e. Hired labour
f. Helpers etc.

6. Were any members of the family involved in marketing of produce, transportation or any other kind of business? If yes, then who and in what?

7. Did any members of the household commute to work in nearby towns or in other local agencies? If yes, then who, where, how often, and what work did they do?

8. Had any members of the household moved to another area to live and work? If they had then where had they gone and what work did they do?

VII. VIEWS ON INTERVENTION BY FARMERS' Organisation AND KPD.

a. FARMERS' ORGANISATION

1. Are you a member of the Farmers' Organisation ____________________________
2. When did you become a member?

3. Has the Farmers' Organisation helped you in improving your farming? State specific assistance give by the Organisation.

b. KORPORASI PEMBANGUNAN DESA (KPD)

1. Has KPD helped to increase vegetable production from your farm?

2. Are there any problems with KPD's irrigation water supply?

A. Sample Dusun Land Owners

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Name</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>D001*</td>
<td>Johalin Kindayuh</td>
<td>57</td>
</tr>
<tr>
<td>D002</td>
<td>Junain Gimpuyuh</td>
<td>60</td>
</tr>
<tr>
<td>D003</td>
<td>Gabbas Bangalloi</td>
<td>55</td>
</tr>
<tr>
<td>D004</td>
<td>Sagin Balinsai</td>
<td>54</td>
</tr>
<tr>
<td>D005</td>
<td>Suplin Gutal</td>
<td>36</td>
</tr>
<tr>
<td>D006</td>
<td>Rosman Sariman</td>
<td>58</td>
</tr>
<tr>
<td>D007</td>
<td>Bahinding Kikas</td>
<td>57</td>
</tr>
<tr>
<td>D008</td>
<td>Nalibin Kiki</td>
<td>40</td>
</tr>
<tr>
<td>D009</td>
<td>Dalinting Batina</td>
<td>56</td>
</tr>
<tr>
<td>D010</td>
<td>Hamini Sidan</td>
<td>50</td>
</tr>
<tr>
<td>D011</td>
<td>Milah Bongoloi</td>
<td>41</td>
</tr>
<tr>
<td>D012</td>
<td>Salim Samudin</td>
<td>52</td>
</tr>
<tr>
<td>D013</td>
<td>Gumbiloi Samuling</td>
<td>48</td>
</tr>
<tr>
<td>D014</td>
<td>Winah Kindayuh</td>
<td>57</td>
</tr>
<tr>
<td>D015*</td>
<td>Hartily Nordin</td>
<td>48</td>
</tr>
<tr>
<td>D016</td>
<td>Saimin Songkaling</td>
<td>50</td>
</tr>
<tr>
<td>D017</td>
<td>Japin Gandor</td>
<td>60</td>
</tr>
<tr>
<td>D018</td>
<td>Lainah Kohong</td>
<td>56</td>
</tr>
<tr>
<td>D019</td>
<td>Gikin Garang</td>
<td>31</td>
</tr>
<tr>
<td>D020</td>
<td>Mahadin Udin</td>
<td>33</td>
</tr>
<tr>
<td>D021*</td>
<td>Siman Kindayuh</td>
<td>59</td>
</tr>
<tr>
<td>D022</td>
<td>Naim Yubu</td>
<td>72</td>
</tr>
<tr>
<td>D023</td>
<td>Jamin Paigi</td>
<td>33</td>
</tr>
<tr>
<td>D024</td>
<td>Lajim Bin Bahantin</td>
<td>60</td>
</tr>
<tr>
<td>D025*</td>
<td>Yapisha Sipar</td>
<td>63</td>
</tr>
<tr>
<td>D026*</td>
<td>Julani Gudalan</td>
<td>60</td>
</tr>
<tr>
<td>D027*</td>
<td>Jaluman Sahajali</td>
<td>48</td>
</tr>
<tr>
<td>D028*</td>
<td>Tahir Ansuru</td>
<td>70</td>
</tr>
<tr>
<td>D029</td>
<td>Haidin Johaman</td>
<td>60</td>
</tr>
<tr>
<td>D030</td>
<td>Bahanti Bilog</td>
<td>50</td>
</tr>
<tr>
<td>D031</td>
<td>Jupin Gandor</td>
<td>52</td>
</tr>
<tr>
<td>D032*</td>
<td>Gurusin Lumambas</td>
<td>42</td>
</tr>
<tr>
<td>D033</td>
<td>Kaisin Watiman</td>
<td>33</td>
</tr>
<tr>
<td>D034</td>
<td>Majimim Samudin</td>
<td>35</td>
</tr>
<tr>
<td>D035</td>
<td>Gandor Pinsin</td>
<td>47</td>
</tr>
<tr>
<td>D036*</td>
<td>Waimin Bandaran</td>
<td>50</td>
</tr>
<tr>
<td>D037</td>
<td>Supinah Udin</td>
<td>64</td>
</tr>
<tr>
<td>D038</td>
<td>Kawasa Kasimin</td>
<td>46</td>
</tr>
<tr>
<td>D039</td>
<td>Kamin Saidi</td>
<td>32</td>
</tr>
<tr>
<td>D040*</td>
<td>Sitina Dani</td>
<td>45</td>
</tr>
<tr>
<td>D041*</td>
<td>Mugin Lintuhun</td>
<td>52</td>
</tr>
<tr>
<td>D042</td>
<td>Jaibi Laiman</td>
<td>36</td>
</tr>
<tr>
<td>D043*</td>
<td>Munting Banggaloi</td>
<td>46</td>
</tr>
<tr>
<td>D044*</td>
<td>Luhinen Gunahau</td>
<td>49</td>
</tr>
<tr>
<td>D045*</td>
<td>Haidin Gandor</td>
<td>56</td>
</tr>
<tr>
<td>D046*</td>
<td>Sidan Kindayun</td>
<td>50</td>
</tr>
<tr>
<td>D047*</td>
<td>Padasian Sidal</td>
<td>58</td>
</tr>
<tr>
<td>D048*</td>
<td>Rusimim Juriman</td>
<td>46</td>
</tr>
<tr>
<td>D049*</td>
<td>Yasimil Manjun</td>
<td>33</td>
</tr>
<tr>
<td>D050*</td>
<td>Jadi Kinte</td>
<td>55</td>
</tr>
</tbody>
</table>
B. Relatives of sample land owners

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Name</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>L022</td>
<td>Mugin Lituhin</td>
<td>26</td>
</tr>
<tr>
<td>L023</td>
<td>Rasini Zaludin</td>
<td>30</td>
</tr>
<tr>
<td>L024</td>
<td>Samlee Diam</td>
<td>35</td>
</tr>
<tr>
<td>L025</td>
<td>Adlan Sahajali</td>
<td>28</td>
</tr>
<tr>
<td>L026</td>
<td>Zaimin Daras</td>
<td>29</td>
</tr>
<tr>
<td>L027</td>
<td>Chin Ah Pin</td>
<td>48</td>
</tr>
<tr>
<td>L028</td>
<td>Nordin Kaindor</td>
<td>28</td>
</tr>
<tr>
<td>L029</td>
<td>Maidin Kunsiong</td>
<td>26</td>
</tr>
<tr>
<td>L030</td>
<td>Saiman Jaafar</td>
<td>29</td>
</tr>
</tbody>
</table>

C. Retired Dusun farmers of the Kundasang study area

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Name</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>RFD01</td>
<td>Roshman Sahidin</td>
<td>72</td>
</tr>
<tr>
<td>RFD02</td>
<td>Sidan Bandaran</td>
<td>58</td>
</tr>
<tr>
<td>RFD03</td>
<td>Jolani Agas</td>
<td>61</td>
</tr>
<tr>
<td>RFD04</td>
<td>Jupin Gandor</td>
<td>62</td>
</tr>
<tr>
<td>RFD05</td>
<td>Suhaiman</td>
<td>64</td>
</tr>
</tbody>
</table>

D. Village headmen of the Kundasang study area

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Name</th>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>VH01</td>
<td>Amin Bahanti (Kinandusan)</td>
<td>45</td>
</tr>
<tr>
<td>VH02</td>
<td>Samin Milly (Kouluan)</td>
<td>50</td>
</tr>
<tr>
<td>VH03</td>
<td>Lasim Botindoh (Lambah Permain)</td>
<td>48</td>
</tr>
<tr>
<td>VH04</td>
<td>Haji Jalin Bandaran (Kundasang)</td>
<td>64</td>
</tr>
</tbody>
</table>

E. Middlemen operating in the Kundasang study area

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Name</th>
<th>Age</th>
<th>Ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>MM01</td>
<td>Gurusin Lumabas</td>
<td>50</td>
<td>Dusun</td>
</tr>
<tr>
<td>MM02</td>
<td>Kasimin Watimin</td>
<td>35</td>
<td>Dusun</td>
</tr>
<tr>
<td>MM03</td>
<td>Chew Soon Eng</td>
<td>36</td>
<td>Chinese</td>
</tr>
</tbody>
</table>

F. Non-Dusun who bought land in the Kundasang study area

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Name</th>
<th>Age</th>
<th>Ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>LB01</td>
<td>Lim Teck On</td>
<td>48</td>
<td>Chinese</td>
</tr>
<tr>
<td>LB02</td>
<td>Steven Wong</td>
<td>60</td>
<td>Chinese</td>
</tr>
<tr>
<td>LB03</td>
<td>Chong On Tet</td>
<td>62</td>
<td>Chinese</td>
</tr>
<tr>
<td>LB04</td>
<td>Johnny Fong</td>
<td>58</td>
<td>Chinese</td>
</tr>
<tr>
<td>LB05</td>
<td>Sue Eng Bin</td>
<td>44</td>
<td>Chinese</td>
</tr>
<tr>
<td>LB06</td>
<td>Mohamad Ali</td>
<td>48</td>
<td>Malay</td>
</tr>
</tbody>
</table>
### G. Lessees farming in the Kundasang study area

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Name</th>
<th>Age</th>
<th>Ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>L01</td>
<td>Ah Loy</td>
<td>43</td>
<td>Chinese</td>
</tr>
<tr>
<td>L02</td>
<td>Simon Lee</td>
<td>44</td>
<td>Chinese</td>
</tr>
<tr>
<td>L03</td>
<td>Siew Laimon</td>
<td>41</td>
<td>Chinese</td>
</tr>
<tr>
<td>L04</td>
<td>Koh Bon Eng</td>
<td>38</td>
<td>Chinese</td>
</tr>
<tr>
<td>L05</td>
<td>Anthony Lo En Yaw</td>
<td>44</td>
<td>Chinese</td>
</tr>
<tr>
<td>L06</td>
<td>Anton Ola</td>
<td>29</td>
<td>Timorese</td>
</tr>
<tr>
<td>L07</td>
<td>John Husin</td>
<td>37</td>
<td>Timorese</td>
</tr>
<tr>
<td>L08</td>
<td>Polpus</td>
<td>39</td>
<td>Bugis</td>
</tr>
<tr>
<td>L09</td>
<td>Amir</td>
<td>26</td>
<td>Bugis</td>
</tr>
<tr>
<td>L10</td>
<td>Ruhul Khan</td>
<td>33</td>
<td>Bangladeshi</td>
</tr>
</tbody>
</table>

### H. Share-croppers farming in the Kundasang study area

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Name</th>
<th>Age</th>
<th>Ethnicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>SH01</td>
<td>Josep Isaporet</td>
<td>26</td>
<td>Timorese</td>
</tr>
<tr>
<td>SH02</td>
<td>Herman Pati</td>
<td>30</td>
<td>Timorese</td>
</tr>
<tr>
<td>SH03</td>
<td>Juis Alia John</td>
<td>32</td>
<td>Timorese</td>
</tr>
<tr>
<td>SH04</td>
<td>Andaras Bin Haju</td>
<td>35</td>
<td>Timorese</td>
</tr>
<tr>
<td>SH05</td>
<td>Galsi Lanangan</td>
<td>28</td>
<td>Timorese</td>
</tr>
<tr>
<td>SH06</td>
<td>Pahaluan</td>
<td>23</td>
<td>Timorese</td>
</tr>
<tr>
<td>SH07</td>
<td>Nordin Rahman</td>
<td>31</td>
<td>Bugis</td>
</tr>
<tr>
<td>SH08</td>
<td>Joseph Doan Hayon</td>
<td>28</td>
<td>Timorese</td>
</tr>
<tr>
<td>SH09</td>
<td>Gilis Isamil</td>
<td>26</td>
<td>Bugis</td>
</tr>
<tr>
<td>SH10</td>
<td>Abdullah Yasin</td>
<td>28</td>
<td>Dusun</td>
</tr>
<tr>
<td>SH11</td>
<td>Gilion Ganipal</td>
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<td>Timorese</td>
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<tr>
<td>SH12</td>
<td>Aloysis Pilipos</td>
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<td>Timorese</td>
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<tr>
<td>SH13</td>
<td>Berandus Masan</td>
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<td>Timorese</td>
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<tr>
<td>SH14</td>
<td>Anis Anton</td>
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<td>Timorese</td>
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<tr>
<td>SH15</td>
<td>Idris Marla</td>
<td>30</td>
<td>Timorese</td>
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</table>

### I. Farmers’ Organisation (FO) staff

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Name</th>
<th>Designation</th>
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<tbody>
<tr>
<td>FO01</td>
<td>Matlan U. Gamale</td>
<td>Area Manager, FO Kundasang 1980-1990</td>
</tr>
<tr>
<td>FO02</td>
<td>Mahidin Hibin</td>
<td>Store Manager, FO Kundasang 1972-1990</td>
</tr>
<tr>
<td>FO03</td>
<td>Chin Ah Pin</td>
<td>Accountant FO Kundasang 1970-1990</td>
</tr>
<tr>
<td>FO04</td>
<td>Maidin Guhaman</td>
<td>Field Officer, FO Kundasang 1980-1990</td>
</tr>
<tr>
<td>FO05</td>
<td>Mohamad Saufi Limmuddin</td>
<td>Principal Agricultural Officer, FO Kota Kinabalu</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Area Manager, FO Kundasang 1971-1979</td>
</tr>
<tr>
<td>FO06</td>
<td>Alix Jamin</td>
<td></td>
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### J. Korporasi Pembangunan Desa (KPD) staff

<table>
<thead>
<tr>
<th>Sample No.</th>
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<tbody>
<tr>
<td>KPD01</td>
<td>Philip Chung</td>
<td>Area Manager KPD, Kundasang 1989-1990</td>
</tr>
<tr>
<td>KPD02</td>
<td>Seto Mun Yee</td>
<td>Area Manager KPD, Kundasang 1983-1988</td>
</tr>
<tr>
<td>KPD03</td>
<td>Firus Bandar</td>
<td>Asparagus Project Manager 1986-1988</td>
</tr>
<tr>
<td>KPD04</td>
<td>Mahidin Johalin</td>
<td>Field Staff KPD 1986-1990</td>
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### K. Agriculture Department staff

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Name</th>
<th>Designation</th>
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<tbody>
<tr>
<td>AG01</td>
<td>Peter Chong</td>
<td>Agricultural Officer-in-Charge, Kundasang station, 1987-1990</td>
</tr>
<tr>
<td>AG02</td>
<td>Ronald Cheong</td>
<td>Assistant Research Officer, Agriculture Department, Kundasang, 1974-1986</td>
</tr>
<tr>
<td>AG03</td>
<td>Sahimat Kambakis</td>
<td>Agricultural Officer, Ranau 1985-1990</td>
</tr>
<tr>
<td>AG04</td>
<td>Liaw Hew Lian</td>
<td>Research Officer (Food Crops) Tuaran Research Station</td>
</tr>
<tr>
<td>AG05</td>
<td>Sapin Gamali</td>
<td>Retired Field Officer Worked at Kundasang Agricultural Station from 1956 to 1968</td>
</tr>
<tr>
<td>AG06</td>
<td>Deratil Bin Boaklan</td>
<td>Retired Agricultural Officer worked at Kundasang Agricultural Station from 1955 to 1968</td>
</tr>
<tr>
<td>AG07</td>
<td>Sekodal</td>
<td>Assistant Director, Research Division, Department of Agriculture, Kota Kinabalu</td>
</tr>
<tr>
<td>AG08</td>
<td>Dr. Tay</td>
<td>Technical Advisor, Ministry of Agriculture, Kota Kinabalu.</td>
</tr>
<tr>
<td>AG09</td>
<td>William Yapp</td>
<td>Assistant Director of Agriculture, Kota Kinabalu</td>
</tr>
<tr>
<td>AG10</td>
<td>Blaise Yapp</td>
<td>Officer-in-Charge, Tuaran Research Station</td>
</tr>
<tr>
<td>AG11</td>
<td>Lee Yu Man</td>
<td>Research Officer, Soil Conservation Section, Tuaran Research Station</td>
</tr>
<tr>
<td>AG12</td>
<td>Paun K.</td>
<td>Deputy Director of Irrigation and Drainage Division, Department of Agriculture, Kota Kinabalu</td>
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L. Lands Department staff

<table>
<thead>
<tr>
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<th>Name</th>
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</thead>
<tbody>
<tr>
<td>LD01</td>
<td>Justin Jiobi</td>
<td>Registrar of Titles, Lands &amp; Surveys Department, Kota Kinabalu</td>
</tr>
<tr>
<td>LD02</td>
<td>Amid Sadik</td>
<td>Officer-in-Charge, Lands Department, Ranau 1990</td>
</tr>
<tr>
<td>LD03</td>
<td>Yakin Sanit</td>
<td>Officer-in-Charge, Lands Department, Ranau, 1981-1989</td>
</tr>
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</table>

M. Other individuals

<table>
<thead>
<tr>
<th>Sample No.</th>
<th>Name</th>
<th>Designation</th>
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<tbody>
<tr>
<td>OT01</td>
<td>Amin Hamid</td>
<td>Technical Officer PWD, Ranau</td>
</tr>
<tr>
<td>OT02</td>
<td>Sepital Subeh</td>
<td>Officer-in-Charge, Sabah Credit Corporation, Ranau</td>
</tr>
<tr>
<td>OT03</td>
<td>Darshan Singh</td>
<td>Assistant Director of Labour, Labour Department, Kota, Kinabalu</td>
</tr>
<tr>
<td>OT04</td>
<td>James Saliun</td>
<td>Manager, Bank Bumiputra, Ranau</td>
</tr>
<tr>
<td>OT05</td>
<td>Martin Augustin</td>
<td>Sabah Agricultural Marketing Authority, Ranau</td>
</tr>
<tr>
<td>OT06</td>
<td>Brother Ben Snoweren</td>
<td>Catholic Missionary at Bundu Tuhan since 1956</td>
</tr>
<tr>
<td>OT07</td>
<td>Luis Rampas</td>
<td>District Officer, Ranau</td>
</tr>
<tr>
<td>OT08</td>
<td>Eric Wong</td>
<td>Warden, Kinabalu National Park, Kundasang</td>
</tr>
<tr>
<td>OT09</td>
<td>Frances Guansing</td>
<td>Manager, Kinabalu Resort Hotel, Kundasang</td>
</tr>
<tr>
<td>OT10</td>
<td>Teoh Tong</td>
<td>Manager, Perkasa Hotel, Kundasang</td>
</tr>
<tr>
<td>OT11</td>
<td>Dawood Airitt</td>
<td>Manager, Mountain View Motel, Kundasang</td>
</tr>
<tr>
<td>OT12</td>
<td>Ronald Tann</td>
<td>Officer-in-Charge of Forestry Department, Ranau</td>
</tr>
<tr>
<td>OT13</td>
<td>T.D.Z. Adlin</td>
<td>Deputy Director, Sabah Foundation, Sabah</td>
</tr>
<tr>
<td>OT14</td>
<td>Lungkiam Dambul-Minuudin</td>
<td>Manageress, Socio-economic Development Department, Yayasaan, Sabah</td>
</tr>
</tbody>
</table>
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