

**ASPECTS OF AGRICULTURAL DEVELOPMENT IN MANIPUR :
1970-71 TO 1984-85.**

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In Memory Of My Dear Sister


Eche Suba




DECLARATION

Certified that the dissertation entitled "ASPECTS OF AGRICULTURAL DEVELOPMENT IN MANIPUR: 1970-71 to 1984-85" submitted by Mr. Ningthoujam Sukajit is for the award of the Degree of Master of Philosophy of this University. This dissertation has not been previously submitted for any other degree of this or any other University and is his own work.

We recommend that this dissertation may be placed before the examiners for evaluation.


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INTRODUCTION

This work "Aspects of Agricultural Development in Manipur: 1970-71 to 1984-85" is an attempt to understand the problems of Manipur agriculture with a view to suggesting some policies for its future agricultural development. The fact is that very little work has been done on any aspect of the Manipur economy which has remained neglected over the years. This part of India, (and the North Eastern Region as a whole) has been neglected for a long time not only by economists but also by statisticians and to a lesser degree by sociologists as well. This has inevitably led to the lack of an informed and coherent overview of the development performance and prospects of the area. This leads to serious constraints on the formulation of appropriate policies and programmes for planning for the development of the region. A great deal of work has yet to be done. This study is an attempt to focus attention on the changes taking place within the agricultural sector and also to get an intimate picture of agricultural development in Manipur.

The study focusses mainly on the time period from 1970-71 to 1984-85. The reference period of the study was chosen on the basis of two important considerations. Firstly, there has been a paucity of data on important state level economic indicators, for earlier years. Secondly, the year

1971-72 was an important landmark in the administrative set up of Manipur. Manipur attained statehood in 1972. From that year onward the state government got greater administrative autonomy which facilitated the making of appropriate policies and programmes for overall development. Thus, the study is also an attempt to assess the state's economic progress especially in the agricultural sector, since the attainment of statehood.

Structurally, Manipur is one of the least developed states of India.¹ Since the introduction of planning in India in 1951-52, till today, the state has been virtually left untouched so far as industrialisation goes. The main reasons are generally believed to be lack of necessary infrastructure such as roads, railways, other communications, power, skilled manpower and so on. Besides this, the remoteness of the state from the markets and sources of non-agricultural raw materials in the rest of the country, worsens the problem. Thus Manipur^{has} remained backward with a predominantly agricultural economy. In view of the virtual absence of industry of any kind and the predominance of agriculture as reflected in its high share in the state's

1. The share of primary sector in State domestic product is about 45 per cent in 1984-85. About 74 per cent of the total population live in rural area and Agricultural sector gives employment to about 70 per cent of total work force according to 1981 census.

domestic product, the agricultural sector merits close examination. It would appear that any strategy for the state should begin with development of the agricultural sector. The primitiveness of current cultivation practices has to be transformed. Jhuming is still widespread, fertilizer use is limited by all India standards,² and the extension of area under double cropping exceedingly slow. There is, in short, a great deal of room for the development of agriculture through the adoption of modern inputs and cultivation practices. Such improvements would help lay the foundations for the development of agro-based industries, and provide a wider local market for goods and services produced in the non-agricultural sectors of the Manipur economy.

The main objectives of the study are:

- i) To assess the agricultural potential of the state in relation to land and the use of other inputs conducive to rapid agricultural growth;
- ii) To understand the problems and prospects for agricultural development given the existing level of agricultural infrastructure; and
- iii) To identify the constraints on agricultural development by analyzing the changes in important factors which influence agricultural development.

2. However, the rate of growth of adoption of both fertilizer and high yielding variety seeds is high, see chapter V.

The experience of the economically developed countries of the world during the process of economic development highlighted the crucial role of the agricultural sector. Many economists have agreed that industrialisation is limited by the extent of the development in the agricultural sector. What is called for is a balance between the development of the agricultural and the industrial sectors for sustained economic growth. Chapter I deals with questions of the contribution of agriculture to economic growth and the strategy for agricultural development.

In a predominantly agricultural economy where industrial development has not proceeded far and where land still provides the main source of livelihood, the importance of understanding the nature and changes in the land holding structure cannot be underestimated. For rapid development in the agricultural sector, a favourable land system is a necessary condition. In chapter II an attempt has been made ^{to} trace the historical development of the land holding system in Manipur since the periods before and after the British and the subsequent land reforms legislation. Chapter II also assesses the implementation of the land reforms by the Government. After this, Chapter III deals with the structure of land holdings and changes in it during recent years. The policy implications for development strategy in the agricultural sector are also considered.

Following this discussion of institutional factors, the focus of the study shifts to the production process proper. In Chapter IV the result of an analysis of trends in foodgrains production are reported, including estimates of the separate contributions of area and yield to observed changes in production.

Having examined the trends in foodgrains output, Chapter V goes on to deal with the trends in the use of agricultural inputs and their impact on agricultural production. Thus, this chapter highlights the changes in technology in Manipur agriculture. The summary and conclusions of this study constitute Chapter VI.

At this juncture, it is appropriate to mention the major limitations faced in the course of this research work. They are of two kinds. The first and most important limitation has been the non-availability of relevant comprehensive data for the period of study.³ For Manipur, the main constraint upon economic research work over the years has been the paucity of suitable published information. Due to the scant availability of cross-section

3. For example, "Fertilizer statistics" published by Fertilizer Association of India, New Delhi, furnishes districtwise data on the use of HYV seeds and fertilizer consumption for states like Punjab, Haryana, U.P. and so on, while the same was not available for Manipur. For details, see various issues of "Fertilizer Statistics".

data, (for example, at the district level), the analysis had to be confined to the State level only. In the absence also of adequate and consistent time series data, resort had to be taken sometimes to isolated pieces of information, a procedure which is not always appropriate for systematic analysis and comparison. In some cases, analysis had to be restricted to single year data only. Secondly, another important constraint has been the scarcity of relevant literature and research work in fields related to the Manipur economy. Indeed, the present study constitutes a pioneering effort to analyse the performance of Manipur agriculture.

CHAPTER I

THE CONTRIBUTION OF AGRICULTURE TO ECONOMIC GROWTH AND STRATEGY FOR ITS DEVELOPMENT

The diversities among regions in their physical endowment, cultural heritage and historical context precludes any universally applicable definition of the role that agriculture should play in the process of economic growth. However, certain aspects of agriculture's role appear to have a high degree of generality because of special features that characterise the agricultural sector during the process of economic development. The special features are (1) that initially the agricultural sector is a major industry whose share in the national income and total labour force are high and (2) that subsequently, a secular decline occurs in the relative size of the agricultural sector. The basic causes for this secular decline are said to be the existence of (i) declining income elasticity of demand for food as income increases and (ii) the possibility of a substantial expansion of agricultural output with a constant and ultimately a declining farm labour force. These possibilities can be realised only in the event that both output and employment in the non-agricultural sector of the economy expand at a rate greater than the corresponding growth rate in the agricultural sector.

Economic growth in common parlance involves the structural transformation of an economy in which agricultural,

output and employment dominates into one characterised by a decline in the share of agriculture to national income and labour force, while the share of industrial output in national income and industrial employment in total employment increases. As Kaldor¹ argues, economic development is basically associated with industrialisation and the contribution of agriculture to economic growth cannot be approached in isolation without relating it to the development of industry. In the words of Kaldor, "The emergence of a progressive agriculture was the key to the progress of industrialisation in Europe. It is no accident that in England, as elsewhere in Europe, the so called "agricultural revolution" historically preceded the "Industrial revolution".² However while an agricultural surplus constitutes a precondition for accelerated industrial development, the prime mover in the economic development process is manufacturing. This is because it is this sector of the economy, above all others that enjoy economies of scale in production.

The contribution of agriculture to overall economic development has been widely discussed. The most important ways in which increases in agricultural output and productivity contribute to overall economic growth can be categorised

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1. Kaldor, Strategic Factors in Economic Development, New York State School of Industrial & Labour Relations, Cornell University, Ithaca, New York, 1967.
 2. Ibid., pp.56-57.

in the following ways. First, the agricultural sector is a source of food-supply to the non-agricultural sector which must keep pace with the growth of demand if non-inflationary development processes are to be sustained. Secondly, the labour force for the non-agricultural sector of the economy is drawn mainly from agriculture. Thirdly, the agricultural sector may be a source of capital for the expanding non-agricultural sector; moreover, it may serve as a source of foreign exchange earnings particularly in the early stage of development. And finally, it provides a domestic market for the output of the non-agricultural sector. Simon Kuznets³ summarises the above in the following way, "Thus if agriculture itself grows, it makes a product contribution; if it trades with others, it renders a market contribution; if it transfers resources to other sectors, these resources being productive factors, it makes a factor contribution".

Agriculture's contribution of foodstuffs or wage goods is clear. If the labour force for the non-agricultural sector is to be drawn from the agricultural sector, then the new workers must be provided with food. In view of high population growth rates in the less developed countries, the rate of growth of demand for foodgrains is also high. The agricultural sector should be able to supply food for the increasing population as well as for

3. Simon Kuznets, Economic growth & structure; Selected Essays, Oxford & IBH Co., Calcutta, 1962, p.250.

the new workers. Johnston and Mellor⁴ observed that, "If food supplies fail to expand in pace with the growth of demand the result is likely to be substantial rise in food prices leading to political discontent and pressure on wage rates with consequent adverse effects on industrial profits, investment, and economic growth." Kaldor⁵ also pointed out that growth of the secondary and the tertiary sectors is dependent on the growth of the agricultural surplus. The role of the agricultural surplus has two aspects. Firstly, the rate at which non-agricultural employment can increase depend upon the rate of growth of marketed food supplies. Secondly, the growth of the agricultural surplus is an essential condition for providing the growth of purchasing power necessary for sustaining the industrial expansion. Moreover, Kaldor recognised that unless the expansion of food supplies is ensured, the growth of the industrial sector could not be sustained, because the phase of industrialisation involved the rapid growth of non-agricultural employment and hence rapid increases in the demand for food. If the agricultural sector failed to respond to this stimulus in an adequate manner, then

4. Johnston and Mellor, "The role of agriculture in Economic development", American Economic Review, Sept. 1961, p.573.

5. Kaldor, op. cit., p.55.

the result may be high inflation.⁶

As regards the agricultural sector as a source of labour force for the non-agricultural sectors, Lewis⁷ dual sector model has highlighted it. To the extent that the assumption of a perfectly elastic supply of labour is applicable, then man-power for manufacturing or other non-farm activities can be drawn easily from agriculture. Nurkse⁸ also visualised that surplus labour from the farm sector can be successfully shifted to productive activities in the non-agricultural sector without reduction of agricultural output, if food can be provided to them. In the above two cases, the release of labour arises from two sources. First, the natural increase in the farm population is greater than the non-farm population. Hence, a continuous outflow of labour force with constant farm population is possible and consequently it reduces the relative role of agriculture in the occupational structure of the country. Secondly, increasing labour productivity in agriculture in the later stages of development enables an absolute decrease in agricultural employment. This release of

6. Kaldor, op. cit., pp.59-60.

7. Lewis, "Economic Development with Unlimited Suppliers of Labour", The Manchester School, May 1954.

8. Nurkse, Problems of Capital formation in Under-developed countries, Oxford University Press, Delhi, 1952.

workers from the agricultural sector constitutes a significant human capital contribution to the non-agricultural sector.

Apart from providing food and manpower, agriculture may also contribute to industrial capital formation. In the early phase of economic development, agriculture's contribution to economic growth may be made in three ways: firstly, increased agricultural productivity benefits the non-agricultural sector through lowering food prices, enlarging its real income and so providing the means of increased savings and hence capital accumulation. Secondly, the increase in productivity may generate higher levels of farm income and hence part of it may be saved. However, this contribution is less important in the later stages of development because as the economy grows the relative share of agricultural income to the total declines and hence the share of savings also tends to fall. Johnston and Mellor also shared the above view. "Since there is large scope for raising productivity in agriculture by means that require only moderate capital outlays, it is possible for the agricultural sector to make a net contribution to the capital requirements for infrastructure and for industrial expansion without reducing the low levels of consumption characteristic of farm populations in underdeveloped country. An increase in agricultural productivity implies some combination of reduced inputs, reduced agricultural prices, or increased farm receipts."⁹

9. Johnston and Mellor, op. cit., p.577.

The third contribution may take the form of compulsory transfers from agriculture for the benefit of other sectors through taxation in which the burden on agriculture is far greater than the services rendered by the government to agriculture. According to Kuznets¹⁰ this contribution was very large in the early stage of development of Japan and the U.S.S.R. In the late nineteenth century, the Japanese government imposed heavy land taxes which represented over 80 per cent of the central government taxation: the ratio of direct tax to income was between 12 to 22 per cent in agriculture compared with 2 to 3 per cent in the non-agricultural sector.¹¹ In the U.S.S.R. too, the forced extraction of surplus from agriculture by taxation and confiscation financed a considerable portion of the industrialisation.¹²

Besides providing wage goods to industry an expanding agricultural sector widens the home market for industrial products. The demand for industrial output partly depends on the growth of farm cash income. The increase in agricultural productivity which results in higher per capita farm incomes allows farmers to buy more agricultural inputs and to consume goods from the industrial sector thus expanding

10. Kuznets, op. cit.

11. Ibid., p. 250.

12. Ibid., p. 251.

the market for^{the} non-agricultural sector. Unless there are unlimited export possibilities; the increased agricultural productivity, a growing marketable surplus and rising income are necessary conditions for the marketability of industrial outputs in the early stages of development.

Kaldor¹³ argued that, "the increase in demand for manufactured products cannot be wholly self-generated, it depends on the increase in supply of other things^{for} which the products of industry are exchanged. Those other things are mainly the products of agriculture. Kuznet's "market contribution"¹⁴ of agriculture to economic growth is manifested in its demand, both domestic and foreign, for inputs as well as for consumer goods produced in non-agricultural sector. Kuznets points out that the "market contribution" of agriculture to a country's economic growth is likely to be more important in the early phases of development.¹⁵ At this stage, the extent to which agricultural output is traded with the other sectors has a significant influence upon the width of the economic base which other sectors may enjoy. However once growth occurs, as it proceeds, the relative share of agriculture in national product and the

13. Kaldor, op. cit., p.56.

14. Kuznets, op. cit., p.244.

15. Ibid., p.248.

labour force declines and this implies decreasing proportional contribution of such marketing to the total product of the economy.

Finally, the expansion of agricultural exports is likely to be one of the most promising means of increasing incomes and augmenting foreign exchange earnings in a country for stepping up its development effort. Given the lack of alternative opportunities and the urgent need for foreign exchange in the underdeveloped countries, Johnston and Mellor¹⁶ expressed the view that expansion of agricultural export production is a rational policy (even though the supply and demand situation is unfavourable), taking advantage of the fact that an individual country which accounts for only a small fraction of world exports faces a fairly elastic demand schedule.

In view of agriculture's contribution to economic growth, the ultimate question which arises is how to achieve development in the agricultural sector. As in the case of the role of agriculture in economic growth, the strategy for agricultural development may also vary from one region to another depending on soil, rainfall, human resources and so on. However, the basic cause for the low productivity of labour and land in agriculture is largely due to the lack

16. Johnston and Mellor, op. cit., p.575.

of certain complementary inputs which are of technical, educational and institutional nature. The most important thing is to identify these complementary inputs, to determine in what proportion they should be combined and to establish priorities among the programmes designed to increase their availability. "A development strategy is essentially an effort to bring together and adopt a combination of all the resources within the limits of their physical availability and spatial fixity, in such a manner that the stated objectives are realised over time. It is composed of three broad sets of elements: (1) a set of agrarian relations, (2) a set of techniques of production, and (3) a set of state policies".¹⁷ Johnston and Mellor, by defining three specific phases of agricultural development, attempted to identify generally applicable steps for agricultural development. The phases are¹⁸: phase I - development of agricultural preconditions; phase II - expansion of agricultural production based on labour intensive, capital saving techniques, relying heavily on technological innovations; and phase III - expansion of agricultural production based on capital intensive, labour saving techniques. Phase II requires an environment in which the possibility of change is recognised, and

17. AN ICSSR Working Group Report, Alternatives in Agricultural Development, Allied Publishers Pvt. Ltd., New Delhi, 1980, p.43.

18. Johnston and Mellor, op. cit., p.582.

accepted and in which individual farmers see the possibility of personal gain from technological improvement. Phase I is defined as the period in which these preconditions are met. According to Mellor and Johnston, in Phase I the most important requirement for agricultural development has been land tenure improvement. In the absence of a favourable land tenure system, the incentive for a change in Phase II may not be realised in spite of the potential for large scale increases in output. In Phase II the productivity of labour and land could be increased greatly by technical innovations involving key elements such as agricultural research leading to development and selection of high yielding variety seeds (HYV); increased application of chemical fertilizers and a range of activities such as credit, marketing agencies and rural governmental bodies for fostering collective action such as building feeder roads.

The rationale behind suggesting ^{the} above labour-intensive and capital saving policy in Phase II is on two counts.¹⁹ Firstly, these inputs are neutral to scale and highly divisible and readily incorporated in the existing system. Secondly, this type of intensification of agricultural production can make a notable contribution to the problem

19. Johnston, "Agricultural and Structural Transformation in Developing Countries: A Survey of Research", Journal of Economic Literature, vol. 8 (American Economic Association), 1970.

of absorbing a rapidly growing labour force in productive employment. The growing recognition of the impact of rapid population^{growth} on the size of the farm labour force has been an important consideration underlying the emphasis on promoting a labour intensive expansion path for agricultural production. Johnston²⁰ argued that when the farm labour force initially weighs very heavily in the total labour force and^{the} total labour force is increasing rapidly, non-farm employment would have to increase at an impossibly high rate to absorb fully the annual addition to the total labour force. Phase II, as stated by Johnston and Mellor, is the most relevant stage in most of the under-developed countries of today. Phase III characterising a capital intensive, labour saving^{technology} represents a fairly late stage of development. In this phase the opportunity cost of most inputs is high by past standards and rising. At this stage the shares of agriculture to national product and labour force are generally already low.

Shigeru Ishikawa²¹ argued that the task of increasing agricultural production for economic development in most Asian countries, should be met by an increase in the productivity of the existing cultivated land. He concluded this

20. Ibid., p. 381.

21. Shigeru Ishikawa, "Economic development in Asian Perspective", Kinokuniya Book Store Co. Ltd., Tokyo, 1967, Reprinted in 1974.

in the light of ^{the} virtual disappearance of arable land frontiers in these countries since the 1950's. Under any system of agrarian relations (disregarding its favourable or unfavourable impact on investment incentive for land improvement) Ishikawa stressed the investment in two sets of agricultural inputs which he termed as "leading inputs"* for the strategy of agricultural development. These so called "leading inputs" are (i) irrigation, drainage and flood control; the investment on these inputs, he called "basic investment" and (ii) fertilizer, better seeds and dissemination of better farming techniques. However, he recognised the complementary nature of these inputs. Ishikawa observed that in a region where land productivity is very low, the marginal increases in productivity seem to be most significantly explained by the "irrigation ratio".** Irrigation may be said to be a 'leading input' at this stage. Ishikawa argued that irrigation plays three important roles. The first is the role of stabilizing the harvest fluctuations due to deficient or untimely rainfall.

* Leading inputs, Ishikawa (in spite of technical nature and complementarity prevailing in agricultural production) defined the leading inputs as those categories of inputs contributing most to the output increase.

** Irrigation ratio, Ishikawa defined Irrigation ratio in 3 ways: Irrigation I as proportion of gross irrigated area to net cultivated area; Irrigation ratio II as the proportion of gross irrigated area to gross cropped area; and Irrigation ratio III the proportion of net irrigated area to net cropped area.

The second is the role of making possible the introduction of a second crop. The third is the role of making possible the increased application of fertilizer, the use of better seeds, and the introduction of improved farming techniques. There exists a set of economic preconditions for successful use of "leading inputs" for agricultural development. This is because of the fact that while the "basic investments" carry the character of social overheads, the use of inputs such as fertilizer, improved seeds, improved techniques is fundamentally a matter for individual private decision. Therefore, the successful use of these "leading inputs" is dependent on factors such as the availability of capital requirements, the expectation of profitability vis-a-vis relative prices of inputs and outputs, credit facility and so on. The detailed discussion of these factors is beyond the scope of this chapter.

Concluding remarks

In the early stages of economic development, the agricultural sector plays a crucial role in providing food, manpower and funds for the expansion of the industrial sector. In view of the important place that agriculture occupies in the early stages of development, it is necessary for sustained economic development to develop agriculture along with industrial expansion. Apart from institutional reforms, special emphasis needs to be placed upon the "basic investments" and technical progress which takes the form of

improved seeds, increasing application of fertilizers and better farming techniques, for the strategy of agricultural development to succeed.

It may be mentioned here that the various contributions of agriculture to economic growth and its strategy for development discussed above is normally applicable to a national economy. In this case the economy is self-contained in the sense that it enjoys a political, administrative autonomy within a specified geographical boundary. However, Manipur cannot be treated as an economy in the above sense. However this does not constitute a limitation on the study of the development of agriculture at the state level. On the contrary it helps in understanding the basic structure and nature of the role that agriculture plays in a region's economic development.

CHAPTER II

HISTORICAL DEVELOPMENT OF LAND HOLDING SYSTEM AND LAND REFORM LEGISLATION IN MANIPUR

2.0 Introduction:

In the past in India, the changes in land holding structure were often associated with the motive of extracting tax from cultivators. The colonial rulers initiated changes in ^{the} structure of land holdings in order to extract more land tax from the people. Moreover, in the words of P.C. Joshi, "Enquiries into the land problem were thus initiated by those concerned directly with formulation of land and revenue policies (or critique of these policies) and not by professional social scientist".¹ Hence, the land reform process in India was inextricably mixed up with the land revenue system adopted by the state. In India, land problem as an area of research was the gift of colonial rule during the earlier and more dynamic phase before the so called Mutiny of 1857. To quote Ranade, "the earlier phase of colonial rule was characterised by the tendency to innovation and levelling of oriental institutions to the requirements of the most radical theorists in Europe."² The

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1. P.C. Joshi, Land Reforms in India, Trends & Perspectives, Institute of Economic Growth, 1982, p.7.
 2. M.G. Ranade, Essays on Indian Economics, 3rd Edn., G.A. Nateson & Co., Madras, 1916, p.265.

contribution of British rule to the development of enquiry into the land problem was three-fold.^{2a} Firstly, they initiated a discussion of questions relating to the character of indigenous land and revenue systems and their compatibility with economic and social progress. Secondly, their examination of these questions marked the beginning of an intellectual effort at the level of both theorising and empirical investigation. Finally, the search for answers to these questions created the need for precise and authentic data regarding the institutional framework of Indian society including the land and revenue systems.

The historical development of land holding structures in Manipur can be traced from the time of the British rule. Manipur was put virtually under British rule governed by a British political agent in 1891. With British rule a gradual change in the land revenue system emerged. This evolution from the British period to the present has been discussed in this section. The first part of this section deals with land holding structure prior to and during the British period. The second part deals with the land system after independence and the subsequent land reform legislation in Manipur. The last part examines how far the land reform so legislated has been implemented in Manipur.

2.1 Land holding structure prior to and during British period:

In 1874, R. Brown described the land system in Manipur as follows: "The whole system of the valley starts with the

2a. P.C. Joshi, op. cit.

assumption that all land belongs to the raja and is his, to give away or retain as he pleases. Under the raja is an official named the Phunan Salungba, whose duty it is to superintend all matters connected with land cultivation; he looks after the measurement, receives the rent in kind, and transacts all business matters connected with land on behalf of the raja. The land is sub-divided into villages and their surroundings: the headman of each division or village looks after the cultivation, and is responsible for the realisation of tax payable in kind by each cultivator; he holds no interest in the land, and is merely an agent of the raja."³

Before the British came to control the administration of Manipur the land system was simple. The ryots paid land revenue in kind and in labour. Land revenue was collected by an official called locally the "panna lakpa". These officials instead of receiving salaries in cash were given allowances in land and rice.⁴ After the British came and took over the administration in 1891, a survey establishment was organised and the occupied area was gradually

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3. R. Brown, Statistical account of Manipur, Sanskaran Prakashak, Delhi, First publication 1874, reprinted 1975, p.85.
 4. G.D. Patel, Land system of Union territories of India, Charotar Book Stall, Tulsī Sudān Station Road Anand (W Rly) India, New Delhi, 1970, p.353.

surveyed. The distinctive feature of land holding structure during this time was that one-third of the whole area cultivated was accounted for by the raja. A little more than one-third of the area was in possession of the members of the ruling family, brahmins and sepoys, and the rest was in the possession of headmen, officials and so on.

In the pre-British period the tax in kind was realised from each cultivator and paid to the raja. The tax varied from two baskets to thirteen baskets per pari*. Since the average yield per pari was about 150 baskets annually, the normal tax burden ranged from less than 2 percent to nearly 10 per cent of the crop. In cases where middle men were involved the tax burden was heavier running as high as 24 baskets per pari or roughly 16 per cent of the crop. This burden of taxes in kind in terms of output, may appear, at first glance, to be light. However, the tax on production constituted only a minor proportion of the total burden of tax in kind. Besides the output tax levied in kind, each male between 17 to 60 years was supposed to render to the state 10 days of labour out of every 40 days, a labour tax rate of the order of 25 per cent. The tax is called locally 'lalup'** or more generally the "corvee" system. In the

* Pari: A local unit of measurement of a field, 1 pari = $\frac{2}{3}$ acres is approximately equal to 60 lbs of rice.

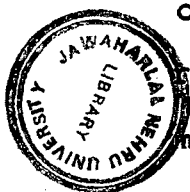
** Lalup: A form of forced labour.

Manipuri version, skilled craftsmen also were obliged to work under the 'lalup' system. The idea behind this compulsory labour to the state was mainly to provide public utility services like, construction of roads, bridges, irrigation canals and so on, but also to provide luxury goods to the raja. Quite interestingly the people of Manipur did not find the imposition of the labour tax irksome or oppressive. It was accepted as legitimate. This may be in part due to the fact that the system existed during a period in which most of the people were without employment for about 6 to 7 months a year. However in individual cases, it actually caused a lot of distress. For example, when sickness entered a house the lalup members had either to carry out their lalup or purchase a substitute. It was also iniquitous. Poor people assumed the greatest burden because the duty of lalup felt heavily on them, while brahmins and the well-to-do class escaped the duty.

In Manipur, it thus appears that as recently as 1891 no distinction was made between taxes and rent. The two were coterminous. Over and above land-tax in produce and tax in labour, no form of rent was paid. Marx also visualised the co-incidence of rent and taxes⁵ in the early

5. See Karl Marx, Capital, vol.III, Genesis of ground rent, Progress Publishers, Moscow, 1977, p.791.

stage of the development of ground rent. As stated earlier, in Manipur, however, the labour tax or "lalup" constituted the major portion of the tax burden while the produce tax accounted for a relatively low share. Thus there was a tax regime in which labour tax "lalup" and the produce tax were levied side by side in Manipur. However the first dominated the latter. The relatively primitive form of tax-cum-rent was converted into cash payment under the British Rule. This is briefly stated later in this section. This sequence of development in Manipur bears a close resemblance to Marx's⁶ account of the genesis of capitalist ground rent. According to Marx, the development of capitalist ground rent began with the emergence of labour rent. Labour rent itself evolved from the taxation of unpaid "surplus labour" which initially took the form of forced labour. Historically, this labour rent was generally transformed into kind rent and subsequently into money rent as the capitalist mode of production reached a relatively advanced stage. However, in the case of Manipur, it appears that ^{the} gradual transformation of rent through its various stages as envisaged by Marx, has been deliberately quickened by the British.

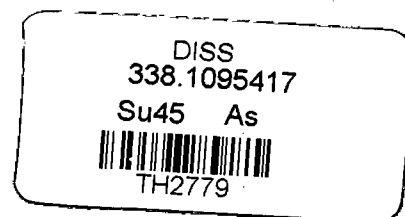


6. Ibid., p.782.

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Major Maxwell, a political agent, and superintendent of state, announced the abolition of the lalup system in 1892. Thus, the year 1892 was an important landmark in the land system in Manipur. In this year the lalup system was substituted by (1) a house tax of Rs.2 per annum in the valley, (2) the imposition of land revenue assesement at Rs.5 per pari ($2\frac{1}{2}$ acre), (3) a house tax of Rs.3 per annum in the hills.⁷ The effect of Maxwell's measure was succinctly stated in the Census report of Manipur 1961:⁸ "Thus Maxwell's measure introduced a break from the past in that it did away the assumption that all land belongs to the ruler. The cultivator now held land directly under the state on the payment of land revenue in cash. Though land revenue was not regulated under any codified law, the cultivator in effect held land as tenants of the state and has rights of occupancy, inheritance and transfer subject to the payment of land revenue to the state." When the state came under the British administration the land revenue was directly managed from the superintendent's office. In 1894 a slight change in the land system was introduced. The valley area was divided into tehsils or pannas and the

7. Robert Reid, History of the frontier areas bordering Assam from 1883 to 1941 (1942), p.73, quoted in G.D. Patel, op. cit., p.355.

8. Census of India 1961, vol.XXII, Manipur, Part 1A, p.232.

collection of land revenue was entrusted to officials called Lakpas or tehsildars. The rate of assessment of land revenue was also revised to meet the needs and exigencies of the state administration. The rate of tax was revised to Rs.5 per pari (2 $\frac{1}{2}$ acre) for all classes. The house tax was abolished in the valley but still remains in the hills. Subsequently, the existing land system underwent hardly any change and continued till 1946.

2.2 The Evolution of the Land System after Independence in Manipur:

The effect of the abolition of the lalup system, which brought the cultivators directly in terms with the state as to land rights and taxation, has been highlighted in the preceding section. However, with increasing pressure on land, a new class of cultivators gradually emerged who held land, not directly from the state, but as tenants of the pattadars who held land directly from the state. This new class of cultivators cultivated land on payment of grain rent locally known as lousal, to the landlord. Lousal per pari is about 18 maunds which is approximately equal to 12 baskets of paddy, or about 8 per cent of output. Thus, by the eve of Independence there were (a) persons holding land directly under the state as pattadars on payment of land revenue, and (b) persons holding and cultivating land under the pattadars on payment of grain rent. This is what emerged as the Manipur land system during the period of British administration.

On the positive side there was no problem relating to increasing concentration of land in few hands and also no growth of really big landlords and sub-infeudation as in some other eastern states of India. This perhaps was partly due to the restriction imposed by the Manipur administration before Independence to the effect that no person was allowed to hold more than 25 acres of land without obtaining special permission. On the other hand, there was no well defined and comprehensive land reform policy during the pre-independence period. After Independence the Manipur government felt the increasing need for comprehensive land reform legislation not only to develop an appropriate revenue system but also in the interests of the cultivators. The first comprehensive land reform and revenue legislation was passed in 1960.⁹ But before this, the administration adopted some ad hoc measures to fill the gap. In February 1952, in order to provide legal sanction for the collection of land revenue, "the Assam land and revenue regulation, 1886", was extended to Manipur by the government of India, under the Ministry of state order S.R.O.443. This empowers the chief commissioners to collect the land tax and also restricts the transfer of land belonging to tribals to non-tribals. For security of tenure and

9. Manipur Land Revenue and Land Reforms Act 1960.

regulation of rent, the South Kanara Cultivating Tenants Protection Act, 1954 and The Bombay Vidharbha Region Agricultural Tenant (protection from eviction and amendment of tenancy laws) Act, 1957, was extended to Manipur in 1956 and in 1967 respectively.

2.3 Land Reforms in Manipur:

2.3.1 Manipur Land Revenue and Land Reforms Act 1960

The first comprehensive land revenue and reforms policy came in 1960. The Manipur Land Revenue and Reforms Act No. 33 of 1960 was passed by the Parliament. However, the act did not cover the whole state. The hill areas have been exempted except for some areas of Jiribam and Churachandpur (south district) where the cultivation of rice is carried out on settled lines.

This act comprises broadly of two sections. The first section deals with the land revenue aspect and the second section deals with land reforms. However, the present discussion is confined to the legislation on land reforms.

Land reforms

The main features of the land reforms act deal with (1) tenancy reforms, (2) ceilings on land holdings, and (3) measures to prevent fragmentation of holdings.

Tenancy reforms

The important provisions of tenancy reforms relate to rent fixation, security of tenure and the reservation

of land for personal cultivation. The act fixed the maximum rent chargeable. The customary rent was 12 pots of paddy (about 18 maunds) per pari. Under the new law where the rent is payable in kind it shall not exceed $\frac{1}{4}$ th of the produce or its value if the landowner supplies the plough, cattle and $\frac{1}{5}$ th if he does not supply. Further, the rent is not to exceed four times the land revenue payable for land (section 112).

The act defined tenants as persons cultivating land or holding land of another on payment of rent either in cash or in kind and includes a person, who cultivates land of another on payment of lousal or any other similar system. Such tenants are given security of tenure and are not liable to eviction except under the following circumstances:

1. The land is reserved or deemed to have been reserved for personal cultivation by the land owner.
2. A person in the armed forces on discharge has given notice of terminating the tenancy.
3. The tenant has intentionally and willfully committed acts as are calculated to impair materially or permanently the value of utility of land for agricultural purposes.
4. The tenant has failed to pay rent within 3 months after it falls due, provided that the period may extend to six months.
5. The tenant has sublet the land without the written consent of the land owner.

The eviction order shall not be executed till the standing crops are harvested.

An individual holding land in excess of the basic holding of $2\frac{1}{2}$ acres was entitled to be given permission to reserve land for personal cultivation. However the land so reserved, has not to exceed a permissible limit and this limit varies with different categories of persons. In the case of a person who is disabled, the maximum permissible limit is 25 acres. In the case of a person who owned a basic holding¹⁰ (1 pari), the permissible limit is the entire area owned. For those owning more than a basic holding but less than a family holding ($7\frac{1}{2}$ acres) then the person may resume for personal cultivation one half of the area leased to the tenants or the area by which the land under his personal cultivation falls short of a basic holding, whichever is greater. If a person who owns more than a family holding, has no land under personal cultivation, or any land which is less than a family holding under his personal cultivation, then he may resume upto one half of the area leased out provided that the tenant is left with a basic holding. The underlying principle is that the land owner should be able to resume area so as to make up a family holding under personal cultivation. The more general

10. A basic holding is equal to 1 pari which is equal to $2\frac{1}{2}$ acres.

principle is that neither the owner nor tenant should be left with less than a basic holding. If a person has a family holding or more under his personal cultivation, the owner can resume "the area leased to any tenant in excess of a family holding but not exceeding the area by which land in his personal cultivation falls short of 25 acres".¹¹

Ceiling on Land holding

The ceiling on existing holdings as well as future acquisition is placed at 25 acres (10 paris). In determining the ceiling, a family includes husband, wife and dependent children and grand children of the holder and the land used for non-agricultural purpose is excluded. In the case where the number of the family exceeds five, 5 additional acres of land are allowed to each excess member subject to an outside limit of 50 acres. In the case of a company, an association or any other body of individuals, the ceiling limit is 25 acres. The excess or surplus land shall rest in the government on payment of compensation to the land-owner.

The amount of compensation payable to the land owner is fixed at 20 times the net annual income from such land. The net annual income is calculated at one-fifth of the

11. Th. Joychandra Singh, Study of the Manipur Land Revenue & Reforms Act 1960, published by Th. Sudhir Chandra Singh, Meena Clinic, Imphal, 1971, p.

gross produce. Besides he will be paid the value of trees planted and the market value of any structure or buildings standing on the land. Where the land is in possession of a tenant, the compensation consisting of the net annual income will be shared between the landowner and the tenant, having regard to their respective shares in the net income from such land. The act however provides for exemption from the operation of the ceiling limit to certain categories of land. They include: land used for growing tea, coffee and rubber including ancillary and extension purposes, any sugarcane farm operated by a sugar factory, any specialised farm used for cattle-breeding, dairying or wool raising, orchards in compact block in use before 1st Jan. 1958, farms in a compact block in which heavy investment or permanent structural improvements have been made and which is^{so} efficiently managed that its break-up is likely to bring a fall in production, and land held by a co-operative farming society, provided that where a member of such society holds a share in such land, his share shall be taken into account in determining the ceiling limit.¹²

Prevention of fragmentation of
land holding

The act provides^{for} the prevention of fragmentation of holdings but does not provide for consolidation of holdings.

12. Ibid., Section 150, p.227.

A fragment is defined as a holding of less than one pari ($2\frac{1}{2}$ acres). The act also restricts the transfer of holdings by way of sale, or mortgage with possession, gift, or exchange so as to create a fragment. But this provision does not apply to gift of land made in connection with the Bhoodan movement. No portion of a holding can be leased unless the portion retained by the lessor is $2\frac{1}{2}$ acres or more or the aggregate area held by the lessee exceeds $7\frac{1}{2}$ acres.

No holding shall be partitioned so as to create a fragment. A fragment cannot be partitioned unless as a result of its partition, its portion gets merged into a holding of $2\frac{1}{2}$ acres or more.

2.3.2 Manipur Hill Areas (Acquisition of Chiefs Rights) Act 1967

In the hill areas of Manipur there is no tenancy system. The land theoretically belongs to the state but in practice it is owned and controlled by the village chief. A sort of land tax claimed by the chief for allotting land to the people of the village is called locally "Chagedo" or "Bushum". There is no well spelt out land revenue system. However there is the practice that the chief takes some portion of the produce from the households who till land. Under this system prevailing in the hill areas of Manipur, the village chief allots land to the inhabitants of the village for a season and it is not certain that the same

plot of land will be allotted in the next season too. Hence, there is no incentive for land improvement or investment.

In order to establish a direct link between the tillers of the soil and the government in the hill areas of Manipur, legislation has been passed which enables the government to acquire the chief rights over land. This legislation was assented to by the President and became effective in 1967. It is known as "the Manipur Hill areas (Acquisition of chiefs right) bill 1966. By this legislation the land administration of the hills and valley are brought on to a uniform basis within the framework of ^{the} Land Revenue and Land Reform Act 1960. This act provides for the acquisition of certain rights, title and interest of the chiefs in and over land in hill areas of Manipur.

With this act the Government is empowered, by notification, to acquire all rights, title and interest of chiefs in the lands in specified villages, which should then vest in the government. A copy of the notification shall be served on every chief whose interests are affected. On publication of such notification, the chiefs shall cease to have any legal rights to collect 'Chagseo'. After the publication of this notification, the Government shall appoint officers to work out the compensation to be paid to the chiefs. The compensation payable to the chief shall consist of (i) 3 tins* of paddy per year per household for the first

* 1 tin means kerosene tin of 18 litres.

100 houses in the gam* and (ii) 2 tins of paddy for every additional household in excess of 100 houses. The compensation shall be paid for 10 years from the date of acquisition either in lump or in annual instalments in cash or kind. When it is paid in cash, the amount shall be calculated on the market price of paddy prevailing at the time of the payment in the locality. The act also allows ownership over the land to the chief or any person who has brought land under settled cultivation. This ownership right shall be permanent, heritable and transferable. This act empowers the Government to reserve land for Jhum cultivation and also regulate Jhum land.

2.4 Government Implementation of Land Reforms

For the implementation of the land reform Acts, the Manipur Government since 1975-76 has formulated 3 schemes.¹³ They are (i) the extension of survey and settlement in hill areas of Manipur, (ii) Land ceilings implementation and (iii) provisions for compensation. The first scheme was implemented in 5 hill districts of Manipur. The land ceilings

* Gam - means a tract or tracts of land in the hill areas held by a chief under a boundary paper or grant issued or made by government or in accordance with any law in force.

13. Pre-budget 1987-88 Economic Review of Manipur, Directorate of Economics & Statistics, Government of Manipur, Imphal, June 1987, p.31.

and compensation schemes were implemented in the three valley districts only. The physical target for the first scheme in the Sixth Five Year Plan period (1980-85) was 12,500 hectares; but the achievement was 3,206 hectares only. This shortfall in achieving the target was due to the non-extension of ^{the} Manipur land revenue and land reforms Act 1960 to hill areas.¹⁴ The hill survey could only be carried out where there was no opposition. Even written objections had also been submitted by some headmen .

The Seventh Five Year Plan also evolved 4 schemes.¹⁵ They are: (i) extension of survey and settlement in the hill areas, (ii) re-survey operations to update the land records in the valley areas with implementation of land ceiling laws, (iii) establishment of a survey and settlement training institute and (iv) financial assistance to the allottees of ceiling surplus land and Government waste land.

The total area surveyed during 1985-86 was 397.80 hectares as against the target of 2,500 hectares. The physical target for 1986-87 was also 2,500 hectares.¹⁶ The scheme of re-survey operations and updating land records in the

14. Ibid.

15. Ibid.

16. Ibid.

valley districts was continued with the implementation of land ceiling laws under the 20 point programme. There was a target for taking up re-survey in 20 villages during 1986-87. During 1985-86, 255.00 acres were acquired and 250.85 acres were distributed to the landless persons under the third scheme.¹⁷ Necessary steps had been taken up for construction of buildings and ground improvement for the institute during 1986-87. All the schemes except financial assistance programme are to be continued during 1987-88. The total outlay for the Seventh Five Year Plan (1985-90) is Rs.150 lakhs while the actual expenditure for 1985-86, the anticipated expenditure for 1986-87 and approved outlay for 1987-88 are respectively Rs.24.14 lakhs, Rs.30 lakhs and Rs.25 lakhs.¹⁸

17. Ibid.

18. Ibid.

CHAPTER III

CHANGES IN LAND HOLDING STRUCTURE IN MANIPUR (1971-1982)

3.0 Introduction

In the preceding chapter the historical background of land holding patterns and subsequent land reform legislation in Manipur has been outlined. The purpose of this chapter is to examine whether there has been any significant change in the agrarian structure of Manipur in recent years. To the extent that there has been substantial change, the study attempts to find out what are the factors responsible and the policy implications with special reference to the development of the agricultural sector. In the context of any strategy for agricultural development, detailed knowledge of the structure and characteristics of agricultural holdings is imperative for effective and efficient planning and implementation of programmes. For this purpose it is essential to have information on an operational holdings¹ basis, as well as on an ownership holdings basis.

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1. An operational holding is defined as all land which is used wholly or partly for agricultural production and is operated as one "technical unit" by one person alone or with others without regards to titles, legal form, size or location. A "technical unit" is defined as that unit which, under the same management and has the same means of production such as labour, machinery and animals.

Information by ownership holding size class serves to provide an idea about the distribution of wealth but information by operational holdings is more important for the implementation of production oriented programmes. It is the operational holding which is the fundamental unit of decision making in agriculture and hence, the key unit for development programmes aimed at improving the lot of individual cultivators. The specific objectives of this part of the study are ; first, to find out the nature and extent of variation over time in the pattern of ownership and operational holdings and secondly, to examine what policy implications can be derived from the findings.

3.1 Data base

Data on various aspects of land holdings in Manipur have been collected mainly from two sources: (i) All India report on Agricultural Census² 1970-71 and 1981-82, and (ii) National Sample Survey organisation³ ^{reports} on landholdings for 1970-71 and 1981-82. However, the analysis is largely based on N S S data by virtue of its comparability due to the similarity of definition of variables and methodology

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2. All India Report on Agricultural Censuses 1970-71 and 1981-82, Directorate of Eco. Stat., Ministry of Agriculture, GOI, New Delhi.
 3. N S S O., (i) N S S 26th Round No.215, 1970-71, (ii) N.S.S 37th Round No.330 and 331 of 1982-82, Department of Statistics, New Delhi.

of data collection over time. The same cannot be said of the Agricultural Census in the case of Manipur. Also the "All India report on agricultural census" series is limited to a report on the area and the number of operational holdings.⁴ The other sources of data include the population census of India⁵ and the Statistical Handbook of Manipur series.

3.2 Approach and Methodology

In the process of analysing the changing structure of land holdings in Manipur, the following aspects have been examined. First of all, the changes in the operational holdings in terms of total number and size class distribution have been discussed. Secondly, changes in the average size of the holdings have been examined. Subsequently, an attempt is made to find out the extent to which observed changes with respect to operational holdings can be accounted for by changes in ownership holdings, changes in the lease market, changes in total cultivated area and demographic changes including changes in the occupational structure. The

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4. Data on Ownership holdings aspect are not given for Manipur in 'All India report on Agricultural Census' 1970-71 and 1980-81.
 5. 'Population Census of India, Manipur, Series 13, 1971 & 1981.

analysis is done in terms of the broad size classes⁶ adopted by the Agricultural censuses. These size classes are (1) Marginal, (2) Small, (3) Semi-medium, (4) Medium and (5) Large holdings.

3.3 Inconsistency between Agricultural Census and N S S O Data regarding Operational Holdings

Comparison of data from the two major sources on operational holdings reveals glaring inconsistencies (see tables 3.1 and 3.1a). The number of household operational holdings according to the Agricultural census, was estimated at 136,100 in 1981-82 as against 80,000 in 1970-71, whereas the NSS for the same period shows 159,300 in 1981-82 as against 115,400 in 1970-71. The average size of operational holdings increased from 1.15 hectares in 1970-71 to 1.24 hectares in 1981-82, according to Agricultural census. On the other hand average size of operational holdings according

6. According to the All India Report on Agricultural Census, the size classes are defined as follows:

- (i) Marginal holdings - Below 1 hectare
- (ii) Small holdings - 1 to 2 hectares
- (iii) Semi-Medium holdings - 2 to 4 hectares
- (iv) Medium holdings - 4 to 10 hectares
- (v) Large holdings - 10 & above hectares

As of 1981-82, the NSS adopts the same nomenclature for the intervals under 1.01 hect., 1.01-2.02 hect., 2.3 to 4.04 hect., 4.05 to 10.2 hect. and 10.13 hect. & above respectively.

Table 3.1: Estimated no. of operational holdings and area operated by size class of operational holdings - Manipur

Size class of operational holdings	Estimated no. of operational holdings in '00s (1970-1971)	Estimated area operated in '00 hect. (1970-1971)	Estimated no. of operational holdings in '00s (1981-1982)	Estimated area operated in '00 hect. (1981-1982)	Changes in no. of operational holdings in '00s (1981-82 - (1970-71))	Changes in area operated in '00 hect. (1981-82 - (1970-71))	Average operational holdings for each size class 1970-71	Average size of operational holdings in each size class 1981-82
Below 1 hect.	595	324	839	390	244	66	0.54	0.46
1 - 2 hect.	410	565	611	731	201	166	1.38	1.20
2 - 4 hect.	135	336	130	307	-5	-29	2.49	2.36
4 - 10 hect.	13	65	12	57	-1	-8	5.0	4.75
10 - above	1	8	1	38	-	30	8	38
All sizes	1154	1298	1593	1523	439	225	1.12	0.96

Source: National Sample Survey,

(i) For 1970-71, N S S 26th Round, No. 215

(ii) For 1981-82, N S S 37th Round, No. 331

Report on Land holdings - 2 operational

Some aspects of Household holdings 1987

Department of Statistics, New Delhi.

Table 3.1a: Distribution of operational holdings and area operated in Manipur, 1970-71 and 1980-81

Size class of operational holdings (in hectatres)	Area (in '00 hect)		Difference	Number of hold-ings (in '00s)		Difference
	1970-71	1980-81		1970-71	1980-81	
	1	2	3	4	5	6
Below 1 hect.	175	356	181	327	651	324
1 - 2 hect.	406	650	244	343	476	133
2 - 4 hect.	292	534	242	120	206	86
4 - 10 hect.	47	150	103	10	28	18
10 & above	7	4	0	Neg	Neg	-
All sizes	924	1694	770	800	1361	561

Note: (i) The 1970-71 data have been rounded by nearest whole number while converting into hundreds in order to bring consistency with 1980-81 data.

(ii) Neg = Negligible.

Source: All India Report on Agricultural Census, 1970-71 and 1980-81, Department of Agriculture and Co-operation, Ministry of Agriculture, Govt. of India, New Delhi.

Table 3.1b: Percentage distribution of number of operational holdings and area operated in Manipur, 1970-71 and 1980-81

Size class	Area		No. of holdings	
	1970-71	1980-81	1970-71	1980-81
Below 1 hect.	18.9	21.0	40.8	47.8
1 - 2 hect.	43.9	38.3	42.8	34.9
2 - 4 hect.	31.6	31.5	15.0	15.1
4 - 10 hect.	5.0	8.8	1.2	2.0
10 & above	*Neg.	*Neg.	*Neg.	-

* Negligible

Source: computed from table 3.1a.

to N S S O data decreased from 1.12 hectares in 1970-71 to 0.96 hectares in 1981-82. Thus, even qualitatively, the data does not tell a consistent story. The reason is that in the 1970-71 Agricultural census, only the central districts and 13 villages of the South district of Manipur were covered while in Agricultural censuses of 1976-77 and 1981-82, all the six districts of Manipur were covered.⁷ In view of the differences in coverage, it is not possible to compare the data for 1981-82 census with that of the 1970-71 census. Since, there has been a change in the coverage even from one census to the next, the comparison between Agricultural census data and NSS data is not possible. N S S data alone has to be relied upon in any attempt to trace the processes of change in the structure of land holdings over time.

3.4 Main Findings According to N S S Data

3.4.1 Operational holdings and distribution by size groups

The N S S report 215 on the 26th Round of 1970-71 placed the total number of operational holdings in Manipur at 115,400. As against this, the number of holdings at the

7. See (i) Agricultural Situation in India, June 1981, p.177 (Ministry of Agriculture, Dept. of Agriculture and Co-operation, Directorate of Economics and Statistics; (ii) In the case of Punjab State too, the two censuses depict different methodology - Sidhu and Grewal, "Changing land holding structure in Punjab", IJAE, 1987, p.297.

time of N S S , 37th round (Report 331) in 1981-82 was estimated at 159,300. (see Table 3.1) Thus the number of holdings has increased by 43,900 or by 38 per cent during the decade between the 26th and 37th rounds of the N S S surveys.

It will be seen from the evidence presented in table 3.2 that the number of holdings in the lowest size group, (marginal holdings having less than one hectare) accounted for about half the total number of holdings in both 1970-71 and 1981-82. There is a slight percentage increase of marginal holdings over the period viz. 51.55 per cent in 1970-71 to 52.66 per cent in 1981-82. If the number of holdings in the two lowest size groups namely marginal and small, ^{are} combined, then they accounted for about 87 per cent and 91 per cent of the total number of holdings in 1970-71 and in 1981-82 respectively. The number of semi-medium and medium holdings in absolute terms as well as in percentage terms showed a decline during the period. The share of large holdings also declined from 0.12 per cent to 0.8 per cent during the same years.

From the table 3.1 it is seen that the total area operated by all holding sizes combined in 1981-82 was 152,300 hectares as against 129,800 hectares in 1970-71. The percentage change in operated ^{area} in 1981-82 over 1970-71 was 17.3 per cent whereas the percentage change of number of holdings

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Table 3.2: Percentage distribution of household operational holdings and area operated by size class of operational holdings 1970-71 & 1981-82, Manipur

Size class of operational holdings	% opera- tional holdings	% area operat- ed	% opera- tional holdings	% area operat- ed	Cumu. % dist. of opera- tional holdings	Cumu. % dist. of area operated	Cumu. % dist. of ope- rational holdings	Cumu. % dist. of area opera- ted
	(1970-1971)		(1981-1982)		(1970-1971)	(1970-1971)	(1981-1982)	(1981-1982)
Below 1 hect.	51.55	25.0	52.66	25.60	51.55	25.0	52.66	25.60
1 - 2 hect.	35.52	43.53	38.35	48.0	87.07	68.53	91.01	73.6
2 - 4 hect.	11.69	26.00	8.16	20.15	98.76	94.53	99.17	93.75
4 - 10 hect.	1.12	5.0	0.75	3.74	99.88	99.53	99.92	97.49
10 & above	0.12	0.6	0.08	2.5	100	100	100	100
All sizes	100	100	100	100				

Cumu. - Cumulative

Source: Computed from table 3.1

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in 1981-82 over 1970-71 was 38 per cent. This obviously means that there has been a decline in the average area per operated holding.

The average size of operational holdings provides the basis for judging whether a holding is viable or not, not merely from the point of view of enough surplus generation for reinvestment but also to what extent the produce therefrom would be adequate for his sustenance. The average size of an operational holding in 1981-82 was 0.96 hectares as against 1.12 hectares in 1970-71. This reflects the fact that as the population pressure on land increases in a backward and predominantly agricultural economy, the availability of cultivable land per head declines (see table 1 in the appendix). The decline in average area has been associated with an extension in the area under marginal holdings. Their share in total operated area in Manipur has shown a negligible increase during the period 1970-71 to 1981-82. Thus, marginal holdings which accounted for about one-half of the total number of holdings in Manipur in both time periods have remained a stable factor in the size structure of operational holdings in Manipur. Semi-medium, medium and large holdings which together accounted for about 13 per cent of all holdings in 1970-71 and 10 per cent in 1981-82, held a disproportionately large share of area throughout the period. Their share fell slightly, however from 31 per cent in 1970-71 to 26 per cent in 1981-82. But if we take only medium and large

holdings combined then they account for a very small proportion of the total (about 1.24 per cent in 1970-71 and less than 1 per cent in 1981-82) number of holdings and claim only 5 per cent of the total operated area. This indicates that there are hardly any big land holders in Manipur. Marginal and small holdings dominate both in terms of number of holdings and in terms of operated area. The number of operational holdings above 10 hectares are negligible. The Gini Co-efficient of operational holdings calculated for 1970-71 and 1981-82 showed an increase in value. The Gini value was 0.32416 in 1970-71 as against 0.33227 in 1981-82. This suggests a small increase in the inequality of distribution of land.

3.4.2 Ownership Holdings

In this section an attempt has been made to explain the causes of ^{the} changes in operational holdings as reported in the preceding section. The information regarding ownership holdings gives some insight into the wealth distribution. Moreover ownership holdings together with lease market behaviour will largely explain the reported changes in the operational holdings. The logic is simple - operated area is equal to owned area minus leased out area plus leased in area.

Before going into further details, it is important to make a point here in regard to the nature of the changes

that N S S data reported in respect of ownership holdings. Table 3.3 shows that there has been a remarkable increase in both area and number of ownership holdings during the interval between 1971 and 1981 while the Net Sown Area (NSA) reported by "Indian Agricultural Statistics"⁸, showed a decline during the same period. From the table 3.3 it is seen that the number of households owning land in Manipur was estimated at 236,400 in 1981-82, as against 132,300 in 1970-71 showing 78.6 per cent increase in the interval. While the total area owned by all sizes holdings in 1981-82 was 173,300 hectares as against 110,700 hectares in 1970-71 showing 56.5 per cent increase over the interval. In distinct contrast to this, the data on NSA given by "Indian Agricultural Statistics" showed a decline over the same period from 179 thousand hectares to 140 thousand hectares. This constitutes a gross inconsistency. This remarkable change reported in number of holdings as well^{as} in the owned area over the period gives grounds for skepticism about the reliability of the N S S data.

While the change in the absolute numbers reported may be an overestimation, the distribution of holdings by size class may still reflect true changes in terms of shares. From the table 3.4 it is seen that the number of holdings in the

8. For NSA data given by Indian Agricultural Statistics, refer table 3 in the appendix.

Table 3.3: Estimated number of Households and ownership area owned by size class of ownership holdings, 1970-71 & 1981-82, Manipur

Size class of ownership holdings	Estimated no. of households (in '00)	Estimated no. of area (in '00 hect.)	Estimated no. of households (in '00)	Estimated no. of area (in '00 hect.)	Changes in no. of households ('00)	Changes in estimated area ('00 hect.)	Average ownership holdings for each size class 1970-71	Average ownership holdings for each size class 1981-82
	(1970-1971)		(1981-1982)		(1981-82)-(1970-71)	(1981-82)-(1970-71)		
Below 1 hect.	880	342	1591	573	711	231	0.39	0.36
1 - 2 hect.	331	431	638	766	307	335	1.30	1.20
2 - 4 hect.	95	243	122	296	27	53	2.56	2.42
4 - 10 hect.	16	83	12	60	-4	-23	5.18	5.0
10 & above	1	8	1	38	0	30	8	38
All sizes	1323	1107	2364	1733	1041	626	0.84	0.73

Source: National Sample Survey

(i) For 1970-71, N S S 26th Round No. 215

(ii) For 1981-82, N S S 37th Round No. 330;

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number of

Table 3.4: Percentage distribution of households and area owned by size class of household ownership holdings (1970-71 and 1981-82), Manipur

Size class of ownership holdings	% of house-holds	% area owned	% of house-holds	% area owned	Cumu. % dist. of households	Cumu. % dist. of area owned	Cumu. % dist. of households	Cumu. % dist. of area owned
	(1970-1971)	(1970-1971)	(1981-1982)	(1981-1982)	(1970-1971)	(1970-1971)	(1981-1982)	(1981-1982)
Below 1 hect.	66.51	30.89	67.3	33.06	66.51	30.89	67.3	33.06
1 - 2 hect.	25.01	38.93	27.0	44.2	91.52	69.82	94.3	77.26
2 - 4 hect.	7.18	21.95	5.16	17.08	98.7	91.77	99.46	94.34
4 - 10 hect.	1.20	7.49	0.5	3.46	99.9	99.26	99.96	97.8
10 & above	0.1	0.74	0.54	2.2	100.0	100.0	100.0	100.0
All sizes	100.0	100.0	100.0	100.0				

Cumu. - Cumulative

Source: Computed from table 3.3.

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lowest size category group, namely, the marginal holdings (less than one hectare), accounted for about 67 per cent in both 1970-71 and 1981-82. The number of marginal and small holdings together accounted for about 91 per cent and 94 per cent in 1970-71 and 1981-82 of the total number of households owning land; while semi-medium, medium and large size holdings combined accounted for the rest of the number of holdings viz. 9 per cent in 1970-71 and 6 per cent in 1981-82. The stability in the distribution of ownership holdings across the size classes is remarkable. What is observed in most states of India is that the area and number of households owning land belonging to the bottom category tend to multiply over time as the land owned is subdivided among the heirs.⁹ However, in Manipur the data on occupational structure (see table 3.9) is consistent with the view that a large number of marginal owners sold out land during the decade and shifted into urban areas and particularly into tertiary sector occupations. This may be a possible explanation for ^{the} stability in the distribution of land ownership holdings. As in the case of operational holdings, the ownership holdings distribution also shows the predominance of marginal and small holdings. However the number of ownership holdings in the bottom size class is far above the corresponding number of operational holdings.

9 . See, for example, the discussion in the Mid Term Appraisal, Chapter 2, Seventh Five Year Plan, 1985-90, Planning Commission, Govt. of India, New Delhi.

and the gap between the two has been widening over time. In 1971, there were 88,000 owners, but only 59,500 operators of holdings below one hectare. Evidently 28,500 owners, (or 32 per cent) either leased out all their owned land, or leased in sufficient area to raise themselves above the one hectare operational holding mark. The corresponding figures for 1981 indicates that more than 47 per cent of marginal owners were either leasing out, or leasing in to enhance their operated area. This behaviour tends to reinforce the view that marginal holdings are being viewed by their owners, increasingly as uneconomic propositions, and that in the presence of alternative opportunities small owners are tending to shift out of self-cultivation.

As stated already, the percentage changes in owned area in 1981-82 over 1970-71 was 56.5 per cent while the change for number of household ownership holdings was 78.6 per cent. This implies that the average size of ownership holdings has decreased during the interval (refer table 3.3). Although the fall in average size of holdings is credible, the increase in the absolute number of hectares owned, as noted earlier on the face of it, is improbable. From table 3.4 it is seen that the area of marginal holdings and its share in total owned area has shown a slight increase. The marginal and small holdings which together accounted for more than 90 per cent in both time periods, of the total

number of holdings in Manipur, are reported to have owned more than 70 per cent of the total owned area. This is a clear indication that a large portion of land owned is held in uneconomic size holdings; the income accrued from such area holdings must be meagre. Many households must be supplementing their income by supplementary economic activity. The semi-medium, medium and large holdings combined showed a modest decline in number and area during 10 year period. This suggests that there has been a trend toward more equitable distribution of ownership holdings. This probability is confirmed by the fall in the value of Gini Coefficient from 0.402637 in 1970-71 to 0.380699 in 1981-82. On comparison of the degrees of inequality in distribution of ownership holdings with that of operational holdings as indicated by respective Gini values, it was found that the distribution of operational holdings was much less unequal than ownership holdings distribution in Manipur. This implies that tenancy improves the distribution of land holdings in Manipur. (However, the degree of inequality in operational holdings deteriorated mildly over the years.) Therefore, it can be said that Manipur is still one of those areas of India where "subsistence tenancy" rather than "commercial tenancy" dominates.

3.4.3 Lease Market

Data concerning land leased out was collected from N S S documents covering the period 1970-71 and 1981-82.

The various rounds of the N S S did not provide comparable data on land leasing in for Manipur state.¹⁰ Therefore the analysis could be done for land leased out only. Changes in the leased out market will affect the leased in market directly in that for an economy as a whole, the total area leased out^{is} inevitably equal to the total area leased in. However, the total number of households leasing out land does not necessarily equal the total number of households leasing in land - because, an owner leasing out 5 acres may be leasing to 2 or 3 different tenants. The uncomparability of leased in data in the case of Manipur constitutes a limitation of the analysis in this section.

Table 3.5 shows the details of the land leased out in Manipur. From the table, it is seen that a substantial decline in the number of households and area leased out has been reported over the years. The number of households leasing out in 1981-82 was 6 thousand as against 13 thousand in 1970-71, while the area leased out in 1981-82 was 6044 hectares as against 16490 hectares in 1970-71. In all size categories too, the number of households leasing out land and area

10. For 1981-82 data for leasing in land in urban sector for Manipur is absent in the N S S 37th round, while both for urban and rural sector^{it} was given in the case of 1970-71 in 26th round of N S S. Since the whole analysis in this section is done on the basis of rural and urban combined it is not consistent to do analysis for leased in for rural sector only.

Table 3.5: Distribution of number of households leasing out and area leased out by size class of ownership holdings (1970-71 & 1981-82), Manipur

Size class of ownership holdings	No. of households leasing out ('00s)		Area leased out ('00 hect.)	
	1970-71	1981-82	1970-71	1981-82
Below 1 hect.	37	10	15.73	4.7
1 - 2 hect.	47	39	39.26	24.24
2 - 4 hect.	35	11	65.13	32.03
4 - 10 hect.	10	0	41.87	0
10 & above	1	-	3	-
All sizes	130	60	164.9	60.44

Source: N S S

- (i) 26th Round No. 215, 1970-71
(ii) 37th Round No. 330, 1981-82.

leased out registered a decline. From the table 3.6 too it is seen that the share of landowning households leasing out and corresponding area leased out in the year 1970-71 and 1981-82 were declining for all size classes. In 1970-71, the percentage of landowning households in the marginal category leasing out land was 4.20 per cent which subsequently fell to 0.63 per cent in 1981-82, while the area leased out in the same size class also declined from 4.6 per cent to 0.82 per cent in the same interval. Similarly for the small holdings size class too, the percentage of landowning households leasing out and area leased out also declined (refer table 3.6). For the larger size classes namely semi-medium, medium and large category, the reported decline in households leasing out and area leased out was quite substantial - In 1981-82 medium and large holdings category reported no households leasing out and correspondingly no area leased out. This observed fall in the area leased out as well as landowning households leasing out may be due to either (i) selling out land or (ii) the resumption of land for personal cultivation. In view of the relative stability in the number of landowning households and corresponding area owned in the bottom size category as reported already, it seems that the marginal and small landowner households have sold out their land and earned their livings elsewhere. Alternatively these households leased in additional land and thereby shifted up to upper

Table 3.6: Percentage distribution of households owned area and number leasing out by size class of ownership holdings 1970-71 - 1981-82, Manipur

Size class of ownership holdings	Percentage of land-owning households leased out		Percentage of area leased out	
	1970-71	1981-82	1970-71	1981-82
Below 1 hect.	4.20	0.63	4.6	0.82
1 - 2 hect.	14.20	6.11	9.11	3.16
2 - 4 hect.	36.84	9.02	26.80	10.82
4 - 10 hect.	62.50	0	50.44	0
10 & above	100.00	-	37.50	0
All sizes	9.83	2.54	14.90	3.49

Source: derived from tables 3.3 & 3.5.

size categories. However, the case of selling out land owned over the years is a more plausible explanation. Because of the uneconomic size of their holdings many of these cultivators would have been unable to support themselves without resorting to outside earnings. (The analysis of figures on occupational structures in the table 3.9 supports this interpretation which will be discussed later). On the other hand, the decline in the households leasing out land and area leased out belonging to upper size category may be due to the resumption of land initially leased out. This is also a plausible explanation because as agricultural productivity increases due to application of modern inputs and techniques of production, the large owners of land found it increasingly profitable to engage in self-cultivation. Moreover, the gini co-efficient in operational holdings showed a marginal deterioration of inequality.

In the light of the above proposition it would be meaningful to analyse the shift in occupational structure during the years between 1971 and 1981. For this analysis the source of data is the population census of India 1971 and 1981. Tables 3.7 and 3.8 provide the details of occupational structure in terms of persons, males and females and their respective growth rates pertaining to years 1971 and 1981. From the study of the table 3.7 it is evident that there has been a remarkable increase in the absolute

**Table 3.7: Main workers classified by Industrial category
(1971 & 1981), Manipur**

Types of worker	1971			1981		
	Persons	Male	Female	Persons	Male	Female
1. Cultivators	248480	167038	81442	364621	211862	152759
2. Agricultural labourers	13525	8662	4863	28613	10961	17652
3. Livestock, forestry, fishing, hunting & plan- tations orchard and allied activities	2326	2045	281	5577	5809	768
4. Mining and quarrying	90	79	11	222	124	98
5. Manufacturing, processing, serving & repairs	40734			65787		
a) Household industry	34625	5882	28741	55495	6673	48822
b) Other than household industry	6111	4570	1541	10292	7815	2477
6. Construction	4627	4538	89	10781	10095	686
7. Trade & commerce	13149	7669	5480	19336	10402	8934
8. Transport, storage & commu- nications	4044	3989	55	5148	5076	72
9. Other services	43888	40963	2925	73254	63425	9829
10. Total work force	370863	245435	125428	573339	331242	242097
11. Total population	1072753	541675	531078	1420953	721006	699947

Source: Population Census of India, Manipur
Series, 1971 and 1981.

Table 3.8: Compound annual growth rates of main workers classified by industrial category between 1971 & 1981

Types of worker	Compound annual growth rates (%)		
	Persons	Male	Female
1. Cultivators	3.91	2.41	6.49
2. Agri. labourers	7.78	2.38	13.76
3. Livestock	9.14	8.93	10.58
4. Mining & quarrying	9.45	4.61	24.45
5. Manufacturing, processing, serving & repairs	4.91		
a) Household industry	4.83	1.27	5.44
b) Other than household industry	5.35	5.51	4.86
6. Constructions	8.83	8.32	22.66
7. Trade & commerce	3.93	3.10	5.01
8. Transport, storage & communication	2.44	2.44	2.73
9. Other services	5.26	4.47	12.89
10. Total work force	4.45	3.04	6.80
11. Total population	2.85	2.90	2.80

Source: computed from table 3.7

number of female workers in all types of industrial category of worker. The increase in female workers has been conspicuously high in the case of "household industry", "other services" and agricultural labourers (refer table 3.7). Consequently the annual compound growth rates were far above the population and total work force growth rates. In spite of the outstanding role played by women in the Manipur economy, the reported picture shown by the above seem highly inflated. The exaggeration of the increase in female worker rates appears to be due to the changes in the definition¹¹ of worker adopted by the 1971 and 1981 censuses. In the light of the changes in the census definitions, the data on female workers cannot be compared for the decade 1971 to 1981. However, the change in the census definition of workers does not appear to have affected the intercensal comparability of the data on male workers significantly. Hence, the present analysis of changes in occupational structure is focussed on male workers only.

An important fact which emerges from the table 3.8 showing population and worker growth rates is that the annual compound growth rates of male cultivators (2.41 per cent) and agricultural labourers (2.38 per cent) were

11. For the discussion of the sharp decline in female work participation rates in 1971 (as compared to 1961), see Census of India 1971, Series: India. Miscellaneous Studies, Paper 1 of 1974, Report on Resurvey on Economic Questions - some results.

substantially below the rates of growth of both the total male work force (3.04 per cent) and of total male population (2.90 per cent). This strongly suggests that there must have^{been} a shift from the agricultural sector to non-agricultural occupations, while the annual compound growth rates of male workers belonging to the secondary and tertiary sectors have been much higher than the growth rates of total male work force and total male population. (refer table 3.8).

An attempt was made to estimate the number of male workers who must have shifted out of and into specified occupations. This was done by, first estimating the number of workers there should have been in each industrial category in 1981, had the 1971 numbers increased at (a) the male population growth rate, or (b) the male work force growth rate. This procedure defined a range of estimated 1981 workers in each of the nine main occupational categories. Then the corresponding actual 1981 figures were compared with these estimated values. The figures are shown in table 3.9. The difference between the estimated 1981 values and the actual figures define the magnitude and direction of occupational shifts over the decade, in terms of a range for each occupation. Thus, as can be seen from the table 3.9, the number of male workers who shifted out of the cultivation is likely to have been between 10,461 and 13,530. There is an unambiguous net shift out of agricultural labour as well. Therefore, although individual

Table 3.9: Estimated number of male workers shifted out of and into specified occupations between 1971 and 1981 in Manipur

Types of workers	Estimated total male workers in 1981 if grew at		Estimated change in nos. in absolute terms 1981 over 1971 actual males		Actual change in numbers 1981 over 1971	No. of male workers shifted from each occupation category	
	2.90%	3.04%	Assuming	Assuming		Assuming	Assuming
	(case A)	(case B)	case A	case B		case A	case B
	1	2	3	4	5	6	7
1. Cultivators	222348	225392	55285	58329	44824	-10461	-13530
2. Agri. labourers	11528	11686	2866	3024	2299	-567	-725
3. Livestock, forestry, fishing, hunting, orchard and allied activities	2722	2759	677	714	2764	2087	2050
4. Mining & quarrying	105	107	26	28	45		
5. Manufacturing							
a) Household industry	7829	7936	1947	2054	791	-1156	-1263
b) Other than household industry	6082	6166	1512	1596	3245	1733	1649
6. Constructions	6040	6122	1502	1584	5557	4055	3973
7. Trade & commerce	10207	10347	2538	2678	2733	195	55
8. Transport, storage & communications	5309	5382	1320	1393	1087	-233	-306
9. Other services	54519	55265	13556	14302	22462	8906	8160

Source: Computed from tables 3.7 and 3.8.

cultivators may have become agricultural labourers, (and vice versa), at least 10,500 cultivators appear to have abandoned agriculture altogether. It may be noted that the corresponding net increase in the secondary and tertiary sector occupations combined is greater than that of the estimated number of male workers who shifted out of agriculture. Part of this is apparently due to the absorption of former household industry workers into the non-household industry sub-sector and other non-agricultural occupations, and part of it is due to an increase in the total male workforce at a faster rate than the population growth rate. Most of the new jobs have appeared in the occupational categories 9, 6, 3 and 5 (b) in that order of ranked importance (refer table 3.7).

These results fit in very well with the interpretations placed upon the findings related to the land market. The decline in the incidence of leasing out by small land owners, and the stability in their share of households and area despite population pressure on land, is likely to be the outcome of land sales by the erstwhile owners of uneconomic holdings.

3.5 Summary, Conclusion and policy implications

The study revealed that there has been a predominance of marginal and small land holdings size in both ownership and operational holdings structure in Manipur. It was seen

that more than 90 per cent of the households and area in the case of both ownership and operational holdings were in the marginal size category. The average size of the area operated was about one hectare which is uneconomic. One distinctive feature of ^{the} land holding pattern in Manipur has been the virtual absence of large land owners. Also there has been a remarkable stability of the number of land-owning households as well as area in the marginal and small size category. There has been a drastic fall in the number of landowning households leasing out land and hence in corresponding area leased out. These observations suggest that the landowners belonging to the lower size category sold out their land and sought employment in other sectors. This interpretation has been supported by ^{the observed} shift of a large number of workers from the agricultural sector, together with the corresponding gains in the secondary and tertiary sectors.

The existence of predominantly small size category holdings suggests that the success of any long term policy for the future development of the Manipur economy lies in opening up new avenues in the non-agricultural sector. This will make it possible to shift the redundant labourers from the agricultural sector to the secondary and tertiary sectors, thereby increasing the per worker productivity of the agricultural sector. To quote W.A. Lewis, "If peasant

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agriculture is to be put on its feet, the number of peasants must be reduced drastically in relation to land that they now occupy, so that each family may be able to have a reasonable acreage.¹² However in ^{the} short, intermediate and even in the long run it will be necessary, not only to enhance labour productivity in agriculture, but also land productivity, by stimulating technological change within agriculture, and initiating infrastructural development aimed at the farm sector. In particular, efforts will have to be intensified to make available the yield increasing agricultural inputs like HYV seeds, fertilizer, irrigation and other agricultural equipment suited to small sized holdings as well as provision of credit.

12. Lewis, op. cit.

CHAPTER IV

PRODUCTION PERFORMANCE OF MANIPUR AGRICULTURE

4.0 Introduction

Agriculture occupies a dominant place in the economy of Manipur since there is virtually no medium or large scale industry. The main source of livelihood is naturally agriculture and activities allied to it .

The study of broad trends in foodgrains production over the years is essential to have a broad perspective of growth rates and also will give an insight into the prevailing agricultural conditions of the state. In Manipur the share of foodgrains output in total agricultural production has been nearly cent percent. There has been hardly any cultivation of cash and other commercial crops at a significant scale. Among the foodgrains crops, rice alone accounted for about 90 per cent of foodgrains production and about 80 per cent of the total cropped area (see table 2 on cropping pattern in the appendix). Hence, the performance of ^{the} agricultural sector of the state is reflected in the changes in foodgrains production over the years.

For this study, data regarding area, production and yield of foodgrains and other major crops were collected from "Area and Production of Principal crops in India"¹ for

1. "Area & Production of Principal Crops of India", Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India, New Delhi, various issues .

the period from 1970-71 to 1984-85. The objective of this study is to give an account of the nature of the changes in foodgrains production and also to find out the shares of basic contributing factors.

This chapter is divided into three broad sections. The first section deals with an analysis of trends in foodgrains production. This is followed by an analysis of the relative contributions of area and yield to the changes in total output, and also for rice and maize separately, for Manipur as a whole. In the last section, the relative contributions of area and yield are worked out at the district level for rice and maize revealing the inter-district contrasts in area and yield effects. The results are summed up in the conclusion.

4.1 Growth Performance of Foodgrains Production in Manipur

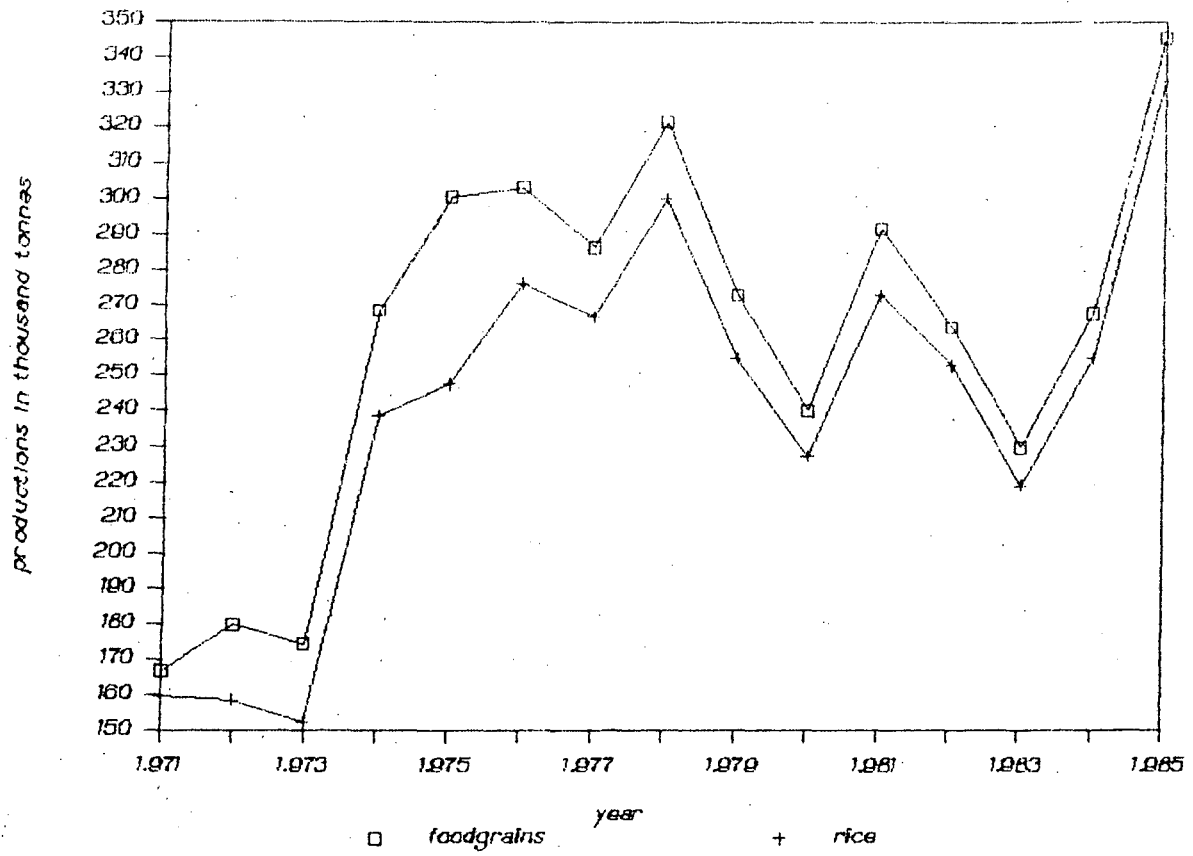
This part of the analysis begins with an examination of time series data on foodgrains production. Table 4.1 shows the information on foodgrains production over the fifteen years ending 1984-85. It will be seen from the table that the data on foodgrains production does not reveal any systematic pattern over the years. There have been marked year to year fluctuations. From the graph 1 showing the trend in foodgrains production, it can be seen that output increased continuously from 1970-71 (116.6 thousand tonnes) until 1975-76 (303.1 thousand tonnes), disregarding the

Table 4.1: Production of Foodgrains, Rice and Maize in Manipur (1970-71 to 1984-85)

Year	Production ('000 tonnes)			Annual Simple growth rates of foodgrains production (%)	Three year moving averages of foodgrains production ('000 tonnes)
	Food-grains	Rice	Maize		
1970-71	166.6	159.8	6.8	-	-
1971-72	179.9	158.6	17.1	7.98	173.6
1972-73	174.4	152.2	22.0	-3.06	207.6
1973-74	268.5	238.6	27.2	53.96	247.8
1974-75	300.5	247.7	22.3	11.92	290.7
1975-76	303.1	276.4	23.6	0.87	296.7
1976-77	286.4	267.0	17.2	-5.51	303.6
1977-78	321.2	300.0	18.9	12.15	293.7
1978-79	273.1	255.2	16.0	-14.98	278.3
1979-80	240.5	227.5	10.6	-11.94	268.5
1980-81	291.9	273.0	17.8	21.37	265.4
1981-82	263.9	253.1	9.2	-9.59	262.0
1982-83	230.1	219.2	9.0	-14.17	254.0
1983-84	268.1	255.1	10.4	17.92	281.1
1984-85	345.2	333.0	12.2	28.75	-

Source: Area and Production of Principal Crops in India (1984-85), Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India, New Delhi.

Graph 1



slight fall in production in 1972-73. In 1975-76, production reached the first of the three major peaks at 303.1 thousand tonnes. Immediately following this peak level, foodgrains production fell to 286.4 thousand tonnes in 1976-77. In the next year a new foodgrains production record was set and subsequently production fluctuated at much lower levels, until 1984-85, when the all-time peak of 345.2 thousand tonnes was recorded. In short, in the year to year figures no consistent trend is apparent.

However, an estimation of the three year moving averages of the foodgrains production data reveals a more systematic pattern of changes in foodgrains output over the years. The triennial averages of foodgrains production (givenⁱⁿ the last column of the table 4.1) show a continuous and substantial increase in foodgrains production from 1970-71 to 1976-77 and a continuous but more gradual decline from 1977-78 to 1982-83. The three year moving average centered on 1983-84 reflects the substantial increase in foodgrains production during the last two years of the series.

A glance at three year moving average data reveals two plateaus in foodgrains production, the first in the sub-period, 1974-75 to 1977-78 and the second covering the years from 1979-80 to 1981-82, in which production centered around 296 thousand tonnes and 265 thousand tonnes respectively. The plateaus constitute phases of almost stagnant production

levels of varying duration. In Manipur, the average level of foodgrains production during the period of ^{the} second plateau was, in fact, below that of the previous plateau. Similar findings² of recurring plateaus have also been reported at the all India level. In India as a whole, the plateaus occurred in the early 1960's, the early 1970's and again in the late 1970's continuing into the early 1980's. In the case of Manipur it is found that large fluctuations in output are not confined to the period between the plateaus but rather are spread throughout the entire time series. Hence, no systematic pattern can be established. However, the identification of plateaus highlights a characteristic feature of the long term growth profile of Manipur foodgrains production.

From the preceding exercise it seems that the production of foodgrains may have started to decline from the mid 1970's. In order to test this, compound annual growth rates were calculated between the successive peak levels of foodgrains production. The results are presented in the table 4.2. What the peak-to-peak growth rates reveal is that while production growth rates remain positive, there has been (on a peak to peak basis), a continuous and

2. See (i) S.D. Sawant, "Investigation of Hypothesis of deceleration in Indian agriculture", IJAE, Oct.-Dec. 1983; (ii) Gunvant M. Desai and N.V. Namboodiri, "The deceleration hypothesis and yield increasing inputs in Indian agriculture", IJAE, Oct.-Dec. 1983.

substantial deceleration in foodgrains growth rates in Manipur.

Table 4.2: Compound Annual growth rates successive peak levels of Foodgrains Production, Manipur

Peak years	Foodgrains Production ('000 tonnes)	Annual Compound growth rate (%)
1971-72	179.9	-
1975-76	303.1	14.0
1977-78	321.2	3.0
1984-85	345.2	1.03

Source: Calculated from table 4.1.

Note: Annual Compound growth rate was calculated as

$$r = \left(\sqrt[n]{\frac{P_n}{P_o}} - 1 \right) \times 100$$

where r = annual compound growth rate

n = number of years in between the terminal and base year

P_n = Foodgrains production in nth year

P_o = Foodgrains production in base year.

However peak-to-peak growth rate computations take into account only two points of time. Obviously such measures are influenced by the choice of initial and terminal years and ignore the data lying between the peaks. In the intervening years for which the growth rate is

calculated, there may have been wide fluctuations, in which case this method does not reflect a realistic picture. However, the method of calculation is suited for those data which were not marked by wide year to year fluctuations but instead maintain a more or less uniform pattern of change. In the Manipur case, it is, therefore, desirable to use that measure which takes into account the entire series of observations. The growth rate based on a log linear function namely $\log Y = a+bt$ where 'Y' is production and 't' represents the time variable and the growth rate is given by $(e^b - 1) \times 100$ takes into account all observations lying between the years. The aim here is to see whether the peak to peak growth rates previously calculated are broadly consistent with trend rates based on log linear function.

Table 4.3: Trend growth rates of Foodgrains production

Period	Growth rates based on	
	Log $Y=a+bt$	t value
1970-71 to 1977-78	10.9*	4.352
1977-78 to 1984-85	0.20	0.088832
1970-71 to 1984-85	2.9**	2.5866

Source: Computed from Table 4.1.

* = 1 per cent level of significance.

** = 5 per cent level of significance.

From table 4.3 it is seen that, for the whole period, that is ^{the} fifteen years from 1970-71 to 1984-85, the trend growth rate worked out to be about 3 per cent. When the function is fitted to each of the two sub-periods that is 1970-71 to 1977-78 and 1977-78 to 1984-85, the resulting trend growth rates were 10.9 per cent and 0.20 per cent respectively, thus indicating a drastic decline in the most recent period.

4.2 The Impact of Area and Yield changes on Foodgrains Production

4.2.1 Area

Given the area under each crop and their respective yields, the production level is determined. At this stage of analysis, therefore it is useful to examine the changes over the years in the area under foodgrains and in yields which have contributed to the production trends discussed above.

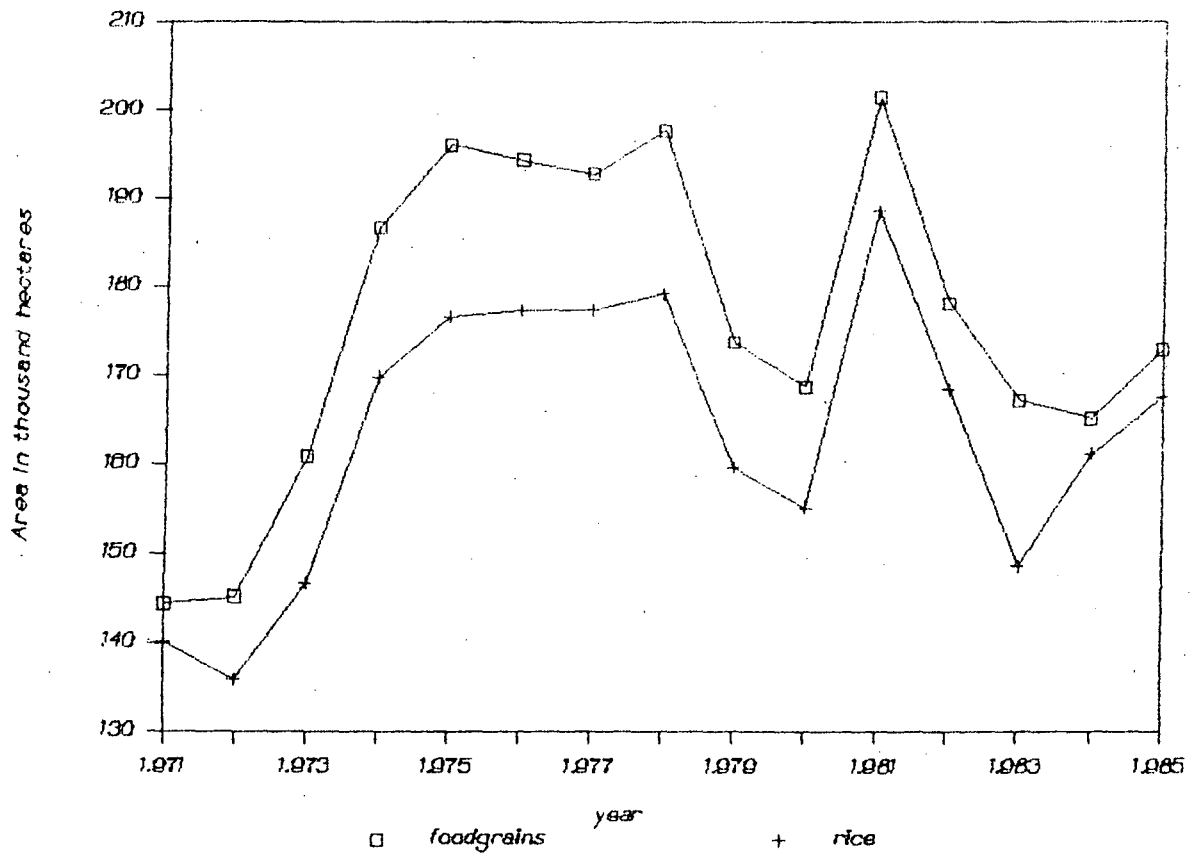
Table 4.4 and graph 2 reveal that the area under foodgrains increased continuously from 1970-71 to 1974-75 and remained almost constant between the years 1974-75 to 1977-78 at around 192 to 197 thousand hectares. Following the year 1977-78 the area under foodgrains declined from the relatively high plateau sustained over the 1974-75 to 1977-78 and subsequently maintained a level of between 165 to 178 thousand hectares except for one peak of 201.4 thousand hectares achieved in 1980-81.

Table 4.4: Area under foodgrains, rice and maize in Manipur (1970-71 to 1984-85)

Year	Area (Food- grains) (⁰ 000 hect.)	Area (Rice) (⁰ 000 hect.)	Area (Maize) (⁰ 000 hect.)
1970-71	144.4	140.2	4.2
1971-72	145.1	135.8	6.6
1972-73	160.9	146.6	14.0
1973-74	186.7	169.8	9.3
1974-75	196.1	176.5	12.6
1975-76	194.3	177.2	10.9
1976-77	192.8	177.2	9.9
1977-78	197.6	179.1	12.7
1978-79	173.6	159.6	8.7
1979-80	168.6	155.1	6.9
1980-81	201.4	188.6	9.9
1981-82	178.0	168.3	5.6
1982-83	167.9	158.5	5.3
1983-84	165.9	161.2	4.7
1984-85	172.8	167.4	5.4

Source: Area and Production of Principal Crops in India, 1981-84; Directorate of Economics & Statistics, Ministry of Agriculture, Govt. of India, New Delhi.

Graph 2



Trend growth rates in area under foodgrains for the entire period 1970-71 to 1984-85 show low growth of 0.5 per cent. For the sub-periods 1970-71 to 1977-78 and 1977-78 to 1984-85 the trend growth rates in area were 5.1 per cent and -1.6 per cent respectively (refer table 4.5). This reflects the decline in the area under foodgrains in the late 1970's and again in the early 1980's.

Table 4.5: Trend Growth rates of Area under Foodgrains

Period	Trend Growth Rates based on	
	Log Y = a+bt	
	%	t value
1970-71 to 1977-78	5.1	5.088 *
1977-78 to 1984-85	-1.6	1.453
1970-71 to 1984-85	0.5	0.78889

* 1 per cent level of significance.

Source: Computed from table 4.4.

A glance at table 4.4 reveals that rice claims almost all the area under foodgrains and the pattern of changes in the area under rice dominates over all changes in area under foodgrains.

4.2.2 Yield

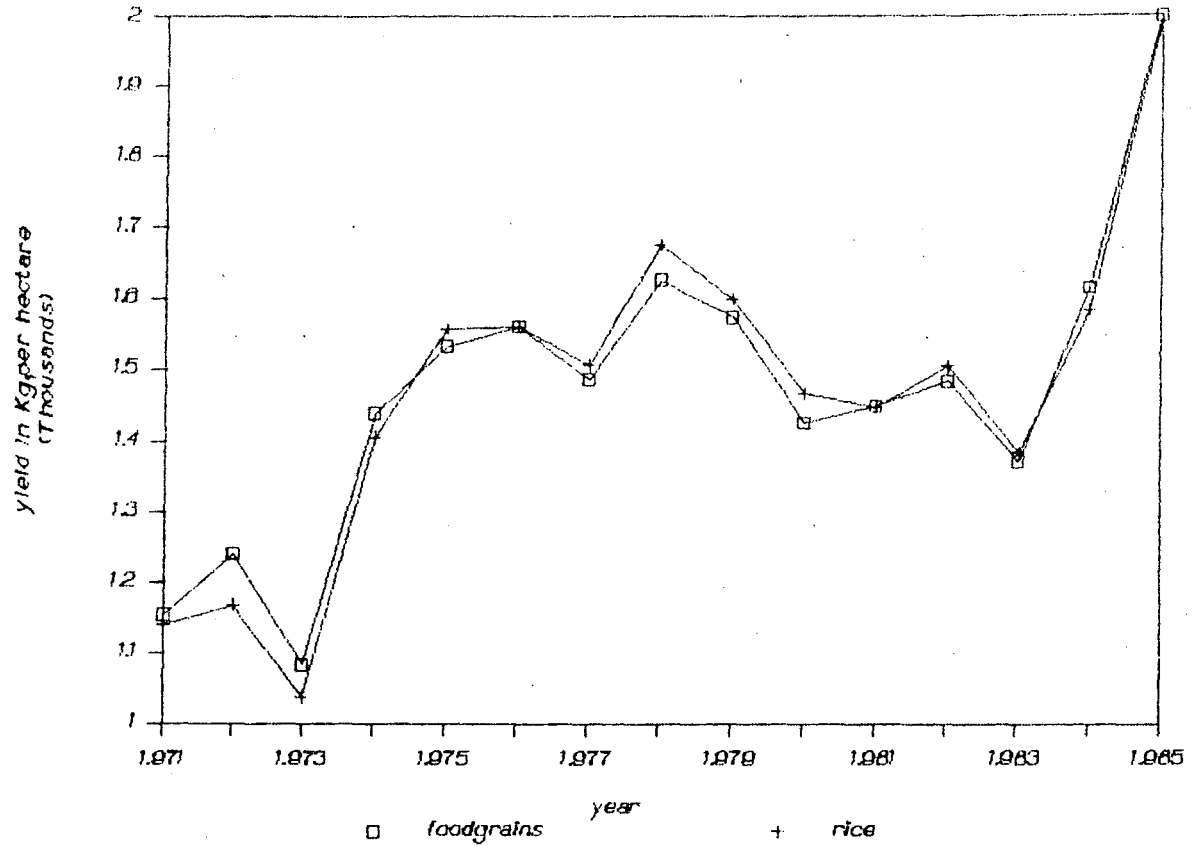
In the absence of significant expansion of area under foodgrains, it is necessary to focus attention on the yield aspect to account for the observed trend in foodgrains production. It is the changes in yield rather than the

Table 4.6: Yields of Foodgrains in total, rice and maize, Manipur (1970-71 to 1984-85)

Year	Yield of Foodgrains (kg/Hect.)	Yield of Rice (kg./Hect.)	Yield of Maize (kg./Hect.)
1970-71	1154	1140	1619
1971-72	1240	1168	2591
1972-73	1084	1038	1571
1973-74	1438	1405	2925
1974-75	1532	1556	1770
1975-76	1560	1560	2165
1976-77	1486	1507	1737
1977-78	1626	1675	1488
1978-79	1573	1599	1839
1979-80	1426	1466	1536
1980-81	1449	1448	1794
1981-82	1483	1504	1643
1982-83	1371	1383	1698
1983-84	1616	1583	2212
1984-85	1998	1989	2140

Source: Area and Food of Principal crops in India, 1981-84; Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India, New Delhi.

Graph 3



changes in the area, which appear to be the important variable in explaining changes in production. Table 4.6 shows the yield of foodgrains in Manipur over the years. This table reveals that there have been fluctuations in yields. However the broad trend is that the yields of foodgrains have been generally on the rise from 1970-71 till 1977-78. Following this year, the yield of foodgrains fell and reached a low of 1371 kg. per hectare in 1982-83. There was a sharp recovery in 1983-84 and 1984-85 witnessed the highest yield of the entire fifteen year period. From the data presented in the table it is difficult to draw any definitive conclusion about the yield trends since the data did not follow any systematic pattern.

Table 4.7 shows that the trend growth rate of yield for the entire period of study is 2.3 per cent per annum while the yield growth rates for the period upto 1977-78 is 5.5 per cent. This declined markedly to only 1.2 per cent in the subsequent period.

Table 4.7: Trend Growth rates of Yield on the basis of $\text{Log } Y = a + bt$

Period	Growth Rate (%)	t value
1970-71 to 1977-78	5.5 *	4.095
1977-78 to 1984-85	1.2	0.6595
1970-71 to 1984-85	2.3 *	3.472

Source: Computed from the table 4.6.

* = 1 per cent level of significance.

4.2.3 Decomposition at State Level

An attempt is made in this sub-section to decompose the changes in the production of foodgrains into a 'yield effect' and an 'area effect', for the state as a whole. The decomposition analysis³ is worked out for (i) foodgrains as a whole and (ii) for rice and maize separately since together these two crops constitutes almost 95 per cent of the entire area under cultivation in the state.

The procedure followed for working out the contribution of expanding area, and of yield improvement (called the 'area effect' and the 'yield effect' respectively) is as follows: Let P_0 , A_0 and Y_0 be the output, area and yield levels respectively in the base year, and P_t , A_t and Y_t be those of the terminal year. If the yield rate of the base year continued to hold in the terminal year, the additional output obtained by area expansion ($A_t - A_0$) alone would be $(A_t - A_0) Y_0$. Obviously $(A_t - A_0) Y_0$ is the share of area expansion in the total change in output $(P_t - P_0)$. The remaining portion of the total increase in output is

3. See (i) G.K. Chadha, The State & Rural Economic transformation, 1986, p.158; or (ii) C.T. Kurien, Dynamics of Rural Transformation: A Case study of Tamil Nadu, 1981, pp.53-54; also see (iii) Dharam Narain, "Growth of Productivity in Indian Agriculture", Occasional Paper No.93, Cornell University, Ithaca, New York, 1976; (iv) B.S. Minhas and A. Vaidyanathan, "Growth of Crop output in India", Journal of the Indian Society of Agricultural Statistics, vol.XVII, No.2, 1965.

$(P_t - P_0) - (A_t - A_0) Y_0$, which is to be attributed to yield improvement. The shares of area expansion and yield improvement separately in the total increase in output, when expressed as percentages, give the 'area effect' and 'yield effect'.⁴

The analysis is conducted in terms of two sub-periods within the fifteen year span ending in 1984-85. The triennium 1970-73 is taken as the base year for the first sub-period, which ends in 1976-79. The second triennium runs from 1976-79 to 1982-85. The entire period is defined in terms of the years 1970-73 and 1982-85.

From the table 4.8 it is seen that the 'yield effect' contributed more than the 'area effect' to the changes in output during the entire period as well as in both sub-periods for foodgrains, rice and maize. For the entire period the 'yield effect' for foodgrains is as high as 79.73 per cent as against the area effect of 20.27 per cent.

4. Quoted from G.K. Chadha, op. cit.

Table 4.8: Relative Contribution of Area and Yield expansion
in the growth of total foodgrains production in
Manipur : Total foodgrains, Rice and Maize output,
1970-73 to 1982-85

Year	Total Foodgrains		Rice		Maize	
	Yield effect	Area effect	Yield effect	Area effect	Yield effect	Area effect
	%	%	%	%	%	%
1970-73 to 1982-85	79.73	20.27	78.5	21.5	228.5	-128.5
1970-72 to 1976-79	63.42	36.58	70.3	29.7	-92.7	192.7
1976-79 to 1982-85	336.7	-236.7	406.0	-306.0	229.7	-129.7

83

Note: For the above calculation, triennia centred on 1971-72, 1977-78 and 1983-84, were taken for Area, Yield and Production.

Source: Computed from the tables 4.1, 4.4 & 4.6

For rice and maize too, the contribution of the yield effect is greater than that of the area effect for the entire period. A glance at table 4.8 clearly reveals that the pattern of 'yield effect' and 'area effect' for total foodgrains and rice are similar for the entire period as well as for the two sub-periods where the 'yield effect' accounted for the major share of output changes. However for maize, the 'yield effect' showed a negative contribution with^a high 'area effect' in the sub-periods 1970-73 to 1976-79. But for the entire period the contribution of the 'yield effect' is quite high more particularly in the late 1970's. From the above analysis, it emerges that it is the 'yield factor' rather than the 'area factor' which plays the key role in the changes in agricultural production in Manipur.

4.4 Decomposition Analysis at the District level

For six districts of Manipur, the 'yield effect' and the 'area effect' have been calculated for the single period from 1978-79 to 1984-85 as data at the district level for earlier years were not available. The crops taken for this exercise are rice and maize as in the state level analysis. The objective here is to bring out the district level contrasts in the relative importance of 'yield effect' and 'area effect' and to compare their relative contributions in each district in the case of rice and maize separately.

Table 4.9: 'Area effect' and 'Yield effect' in Rice and Maize output in Manipur Districts (1978-79 to 1984-85)

Districts	Rice		Maize	
	Area effect (%)	Yield effect (%)	Area effect (%)	Yield effect (%)
Manipur Central	-30.45	130.45	102.8	-2.8
Manipur North	48.83	51.17	36.37	63.63
Manipur West	69.56	30.44	-	-
Manipur South	-69.82	169.82	-27.76	127.76
Manipur East	44.62	55.38	61.89	38.11
Tengnoupal	87.46	12.54	-62.25	162.25

Area : Thousand hectares

Yield : kg./hectares

Prodn : Thousand tonnes

Source: Various issues, Statistical Handbook of Manipur.

Table 4.9 shows the 'yield effect' and 'area effect' at the district level for rice and maize production.

(Absolute figures are given in table 4 in the appendix.)

For rice, the districts where the yield effect accounted for the dominant share of the changes in rice production were the central district (130.45 per cent) and south district (169.82 per cent). However, in the West and Tengnoupal districts, the 'area effect' accounts for a larger share than the 'yield effect' in the changes in rice production. In the North and East districts too, the 'yield effect' contributes more than the 'area effect' but the

disparity is less than in the rest of the districts. Hence, in general, the contribution of the yield factor to the changes in rice production in most districts of Manipur is quite substantial.

For maize also, the 'yield effect' is positive for all districts of Manipur except the Central district where the 'area effect' alone contributed to the changes in output. In the North and South districts (as in the case of rice) both the 'yield effect' and 'area effect' have contributed to output changes. However, in the North district the yield effect (63.63 per cent) is greater than 'area effect' (36.37 per cent); whereas in the East district, it is just the opposite. The districts where the 'yield effect' alone accounted for the changes in maize output are the South district (127.76 per cent) and Tengnoupal district (162.25 per cent).

4.5 Conclusion

The time profile of foodgrains production in Manipur over the fifteen years ending 1984-85 does not exhibit a systematic pattern. The growth path of foodgrains production was characterised by series of plateaus representing phases of stagnation of varying duration. Compound annual growth rates calculated on a peak-to-peak basis suggest a consistent fall in foodgrains growth rates

from one period to the next. The deceleration in successive peak-to-peak growth rates is confirmed by trend growth rates calculated using a log linear function. For the sub-period 1970-71 to the late 1970's the trend growth rate in foodgrains output of 10.9 per cent is highly significant. Subsequently the growth rate declined to an insignificant 0.20 per cent. However the trend growth rate for the fifteen year period as a whole remained positive and significant at 98.5 per cent level. The impressive performance during the 1970's was mainly due to the improvement in yields. The decomposition analysis done at the level of ^{the} state as a whole as well as at ^{the} district level showed this. At the state level it was found for the entire period of study that the yield effect contributed more than the area effect for foodgrains, and for rice and maize separately the contribution of the 'yield effect' was found to be exceedingly high particularly in the late 1970's when it rose to well above 100 per cent. The district level analysis for ^{the} period from 1978-79 to 1984-85, for the crops rice and maize also showed that the share of the 'yield effect' in output changes was substantial in most districts of Manipur. Hence from the analysis it is apparent that in Manipur agriculture, the main determinant of production growth rates has been increasing yields.

CHAPTER V

AGRICULTURAL INPUTS IN THE PRODUCTION PROCESS IN MANIPUR AGRICULTURE

5.0 Introduction & Methodology:

In the preceding chapter, it was established that the main determinant of production growth rates in Manipur agriculture over the post decade and a half has been increased yields. However, yield levels themselves have been influenced by the introduction of new types of inputs and by increases in the quantities used in the production process.

In this chapter changes in the nature and levels of inputs use are first examined. Subsequently the impact on yield of five major inputs is analysed. They are irrigation, HYV seeds, fertilizers and mechanical equipment. Methodologically this chapter is divided into two main sections. In the first, growth rates of the above inputs are sought to be calculated using

$$r = \left(\sqrt[n]{\frac{P_{in}}{P_{io}}} - 1 \right) \times 100$$

where r = compound annual growth rate

P_{in} = the i th input at n th year

P_{io} = the i th input at base year

For the inputs for which time series data exist, the growth rates based on the log linear function $\text{Log } Y = a+bt$ are also estimated,

where Y = Input for which the growth rate is calculated.

a = constant

b = regression co-efficient

t = time

Hence, the growth rate is $r = (e^b - 1)$ which takes into account all observations. However, for irrigation and mechanical equipment (implements and machinery), trend growth rates cannot be estimated due to unmanageable data gaps over the period of study. For irrigation, growth rates are not calculated as the data did not reveal any change.

In the second section, an attempt has been made to explain the yield rates of foodgrains as a whole, using as the explanatory variables changes in irrigation levels, area under HYV seeds and fertilizer consumption. The functional form adopted to estimate the impact of these variables is the linear function given below:

$$Y = a + b_1x_1 + b_2x_2 + b_3x_3 + \dots + b_nx_n$$

where Y = yield

x_i = Inputs $i = 1$ to n

b_i = Regression co-efficients where $i = 1 \dots n$

The above function is tested for foodgrains yield only, since for rice and maize it could not be tested on account of the unavailability of separate data relating to fertilizer consumption on a cropwise basis. In the final analysis the irrigation variable was dropped because no change in

irrigation levels took place during the period. In its place a rainfall variable was introduced.

Section I

5.1 Irrigation:

Assured water supply is an absolute necessity for sustained crop production. It is the most important determinant of agricultural production. Without assured water supply, the application of modern inputs such as HYV seeds, fertilizers etc. will not produce the desired result.

In this part of section I an attempt has been made to highlight the basic nature and status of irrigation prevailing in the state and also the scope for the expansion of it in the future. The sub-topics discussed are: (i) irrigation potential and ongoing irrigation projects in Manipur; (ii) levels of irrigation and inconsistency among various data sources on irrigation; and (iii) sources and types of irrigation in Manipur. For this analysis, the four main sources used for information on various aspects of irrigation in Manipur are:¹

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1. (a) Indian Agricultural Statistics, Directorate of Economics & Statistics, Ministry of Agriculture, Govt. of India, New Delhi. For years 1970-71 to 1984-85.
 - (b) All India report on Agricultural Census, Directorate of Economics & Statistics, Ministry of Agriculture, Govt. of India, New Delhi.
 - (c) National Sample Survey Organisation; for 1970-71 NSS 265/1 26th Round; 1976-77 NSS 31st Round; 1980-81 NSS 37th Round.

- (a) Indian Agricultural Statistics,
- (b) All India report on Agricultural Census,
- (c) National Sample Survey, and
- (d) Manipur State government publications.

The broad period covered in this analysis is the period between 1970-71 and 1984-85 . However, the above sources of data did not all give comparable time series data, but were marked by glaring inconsistencies, which will be discussed later in this section.

5.1.1 Irrigation Potential and On-going Irrigation Projects in Manipur:

The possibilities for the exploitation of ground water and its scope of development in Manipur were studied by the Central Ground Water board . The ground water potential according to the survey taken by ^{the} central ground water board in September 1971 is shown in the table below:

Table 5.1: Ground Water potential in Manipur 1977

Total Area (hect.)	Cover-able Area (hect.)	Area covered by Hydrological Survey (hect.)	Ground water potential (in ml.cubic mts)	Surplus exploitable resources	Additional Tube-wells feasible
1	2	3	4	5	6
2232700	660000	175000	44	44	220

Source: Basic Statistics of North-Eastern States: 1981 North Eastern Council, Shillong, Meghalaya, data in columns 1 to 3 are converted from figures in square kilometres for ready comparability with other data cited in this section.

From table 5.1, it is evident that the estimated coverable area for harnessing ground water potential is 660000 hectares which accounts for about 29.56 per cent of the total area. Besides this ground water potential, the water resources of the Manipur basin according to Pre-budget Economic Review of Manipur 1987-88,² was roughly estimated to be sufficient to cover about 162000 hectares which accounted for about 72 per cent of the total area of the state. Hence, the total irrigation potential of the state both from ground water and surface water together with is about 822000 hectares accounting about 36.82 per cent of the total area of the state. The total estimated irrigation potential is shown in the table 5.2.

Table 5.2: Irrigation Potential from all sources in Manipur

Item	Ultimate Potential area (in hectares)
1. Surface water	16 2000
2. Ground water	660000
Total	822000

Source: For (i) Surface Water (Basin) Pre-budget Economic Review of Manipur 1987-88. Directorate of Economics & Statistics, Govt. of Manipur.
(ii) Ground Water: table 5.1.

2. Pre-budget Economic Review of Manipur, 1987-88, Imphal 3rd March 1988, p. 35.

In spite of the existence of irrigation potential of the magnitude indicated above the state so far has not been able to exploit a sizeable portion of it. There has not been any expansion in net area irrigated (NIA) and gross area irrigated (GIA) over the past decade and a half. Indian Agricultural Statistics reports constant net and gross irrigated area in Manipur at 65.3 thousand hectares and about 75.0 thousand hectares respectively,³ for every year from 1970-71 to 1984-85. In view of the irrigation potential possessed by the state, what emerges from this data is a sorry state of affairs. In terms of percentage share, the NIA and GIA to the total irrigation potential are a mere 8 per cent and 9 per cent respectively. (for figures refer Table 5.5)

The Seventh Five Year Plan of India has placed great emphasis on exploiting the irrigation potential of the country as a whole. However, priority was given to harnessing ground water potential in the eastern and North-Eastern states of India. To quote the Seventh Five Year Plan, "Since about 70 per cent of total geographical area of the country is underlain with hard rock formations, the exploitation of ground water has been concentrated

3. However this data source does not give a picture consistent with others. Inconsistency among various data sources is discussed in a later section of this chapter.

hitherto in the alluvial tracts. Concerted action is proposed to explore and exploit ground water in other tracts, particularly in eastern and north-eastern states.*⁴ The document has proposed to take up and accelerate programmes of systematic hydrological surveys and investigations both at the central and state levels, for systematic ground water exploitation giving special priority to eastern and north-eastern states.

Irrigation Projects:

Recently a number of irrigation projects have been taken up in the state in order to exploit the irrigation potential possessed. However, the state did not have any 'major' and 'medium'^{*} irrigation projects during the first 3 five year plans. It was only from the Fourth Plan period onwards, that major and medium irrigation projects were started. In 1973-74 Loktak Lift Irrigation Project, the first irrigation project of its kind was taken up. To date, the state has taken up seven projects under major and medium irrigation programmes, most of which are now in

4. Seventh Five Year Plan 1985-90 vol.II, p.78.

* At the beginning of First Plan 1950-51, irrigation schemes were classified into three categories:

- (i) Major costing more than Rs.5 crores each;
- (ii) Medium costing between Rs.10 lacs and Rs.5 crores; &
- (iii) Minor costing less than Rs.10 lacs each.

contd...

an advanced stage of construction. Out of the seven projects, three are multipurpose, one is major and the remaining three are medium irrigation projects. These projects on completion will give an ultimate annual irrigation benefit of 101,440 hectares which accounts for 12.34 per cent of the state's total irrigation potential and also will provide drinking water supply and electricity of 19 m.g.d. and 9 M.W. respectively. The details of these projects are given in table 5.3.

As regards the irrigation potential to be created by minor irrigation projects, a feasible area of about 105,000 hectares is estimated⁵, which account for 12.8 per cent of the total irrigation potential of the state. Out of this 100,000 hectares will be created from surface water resources and 5,000 hectares from ground water. So far till 1986-87, 30 minor irrigation schemes have been completed creating a potential of 1530 hectares accounting for about 1.5 per cent of total minor irrigation potential

contd...

the
However, according to revised classification made in April 1978, projects having Cultivable Command Area (CCA) of more than 10 thousand hectares are classified as major projects, those having CCA between 2 thousand hectares and 10 thousand hectares as medium schemes and those having CCA of 2 thousand hectares or less each are classified as minor irrigation schemes. The minor irrigation schemes generally comprised of all ground water schemes such as dug-wells and tube-wells, and surface water flow & lift schemes.

5. Pre-budget Economic Review of Manipur, op. cit., p. 37.

Table 5.3: Details of Irrigation Project in Manipur
Major and Medium

Name of Project	Ultimate irrigation potential (hect.)	Potential created targeted by end (1987-88)	Estimated Cost (Rs. in crores)	Component	
				Water supply (m.g.d.)	Power (M.W.)
1. Loktak Lift Irrigation project (major)	40000	38000	28.21	-	-
2. Singda Dam Project (multipurpose)	4000	Nil	19.89	4	-
3. Thoubal multipurpose project	26540	4000	95.00	10	7.5
4. Imphal Barrage Project (medium)	6400	6400	6.64	-	-
5. Sekmai Barrage Project (medium)	8500	8500	8.78	-	-
6. Khoupum Dam Project (medium)	1000	1000	3.06	-	-
7. Khuga Project (multipurpose)	15000	Nil	34.00	5	1.5
Total	101440	57900	195.58	19	9.0

Source: Pre-budget Economic Review of Manipur 1987-88, p. 36. Directorate of Economics & Statistics, Govt. of Manipur, Imphal.

of the state, and the Central ground water Board has bored exploratory tube-wells at 20 sites in the valley areas, out of which 10 tube-wells became viable with an average yield of 3000 gallons per hour.⁶

As regards the total estimated irrigation potential to be created from all schemes, there exists a disparity between two independent sources, namely (i) the pre-budget economic review of Manipur 1987-88 and (ii) the Ministry of Agriculture data cited in the Seventh Five Year Plan document.⁷ Table 5.4 reveals the extent of disparity.

Table 5.4: Ultimate irrigation potential from all schemes according to Pre-budget Economic Review (1987-88) of Manipur and Seventh Five Year plan

Type of Scheme	(in thousand hect.)		Difference
	Ultimate Irrigation Potential Pre-budget Economic Review	Seventh Five Year Plan	
1. Major+Medium	101.44	135.0	33.56
2. Minor	105.0	105.0	0
Total	206.44	240.0	33.56

From the above table it is seen that there has been a disparity of 33.56 thousand hectares between the two independent

6. Ibid.

7. Seventh Five Year Plan 1985-90, vol.II, for major & medium see p.88, for minor see p.92.

sources for major and medium irrigation potential. However, for minor irrigation schemes the figures are consistent.

If the total irrigation potential from the above projects taken up is realised, then the level of irrigation in the state would be significantly improved and would account for as much as 25 per cent of total irrigable area of the state. The strategy for the expansion of irrigation in ^{the} Seventh Five Year Plan has given top priority to the completion of ongoing major, medium and minor irrigation projects all over the country.

5.1.2 Levels of Irrigation & Inconsistency among various sources of irrigation data:

The comparison of data regarding area currently irrigated amongst the three sources, namely (i) Indian Agricultural Statistics, (ii) All India Report on Agricultural Census and (iii) National Sample Survey, gives an inconsistent picture. Table 5.5 shows gross irrigated area and net irrigated area according to the above sources mentioned. From the table, it is evident that ^{the} Indian Agricultural Census gives time series data whereas the other two sources in contrast give only data relating to selected points of time. More importantly, the Indian Agricultural Statistics data shows virtually stagnant irrigation levels over time. The NIA reportedly has been 65.3 thousand hectares throughout the fifteen year time span and GIA too remained almost unchanged at 75 thousand hectares in the same period. The discrepancy

Table 5.5: Net Irrigated Area (NIA) and Gross Irrigated Area (GIA) given by 3 different sources*

Year	(in thousand hect.)					
	NIA Indian Agri. Stati- stics	GIA Indian Agri. Stati- stics	NIA Natio- nal Sample Survey	GIA Natio- nal Sample Survey	NIA All India Report on Ag- ri. Census	GIA All India Report on Agri. Census
1970-71	65.3	74.8	N.A.	33.64	14.0	N.A.
1971-72	65.3	74.8				
1972-73	65.3	74.8				
1973-74	65.3	74.8				
1974-75	65.3	74.8				
1975-76	65.3	74.8				
1976-77	65.3	74.8	31.5	34.3	N.A.	N.A.
1977-78	65.3	74.8				
1978-79	65.3	74.8				
1979-80	65.3	74.8				
1980-81	65.3	74.8			60.0	N.A.
1981-82	65.3	75.0	26.3**	26.3***		
1982-83	65.3	75.0				
1983-84	65.3	75.0				
1984-85	65.3	75.0				

** Rural only data relating to major crop season NSS 37th Round for irrigated area by size of holdings covers only rural area.

*** According to NSS report (37th Round) area irrigated more than once is not reported hence GIA=NIA see tables 5.10 & 5.11.

*Source: (a) Indian Agricultural Statistics, various issues.
 (b) National Sample Survey
 (i) For 1970-71 26th Round No. 265/1
 (ii) For 1976-77 31st Round, July 1976-77
 (iii) For 1980-81 37th Round No. 330
 (c) All India Report on Agricultural, Census 1970-71 & 1980-81.

between the Indian Agricultural Statistics data and that of NSS is truly remarkable. GIA, according to the NSS is only 33.64 thousand hectares as against the figure of 74.8 thousand hectares given by Indian Agricultural Statistics data in 1970-71. In the year 1976-77, the GIA according to Indian Agricultural Statistics was still unchanged at 74.8 thousand hectares as against 34.3 thousand hectares according to NSS. Furthermore in 1981-82, GIA according to Indian Agricultural Statistics reportedly was 75.0 thousand hectares whereas according to NSS it was 26.3 thousand hectares. The estimates from these two data sources appear to be irreconcilable. However one qualitative similarity between the two sources is that both showed almost stagnant irrigation levels in Manipur. GIA according to NSS recorded a marginal increase from 33.64 thousand hectares (1970-71) to 34.3 thousand hectares (1976-77) and subsequently declined to 26.3 thousand hectares in 1981-82.

In complete contrast to the above two sources, the data given by the All India Report on Agricultural Census, shows an altogether different picture. The NIA in 1970-71 according to this census was reported to be only 14.0 thousand hectares which is very much below the figures given by any other source. However, the Agricultural Census reported a tremendous increase in NIA from 14.0 thousand hectares (1970-71) to 60.00 thousand hectares

(1980-81). The latter figure is broadly at par with the figures given by Indian Agricultural Statistics.

To sum up, it is clear that each of the above three sources of irrigation in Manipur gives ^a picture quite different one from another. The Indian Agricultural Statistics and NSS on ^{the} one hand reported almost stagnant irrigation in Manipur, while the All India Report on Agricultural Census on the other hand reported a tremendous expansion of irrigation. Hence, there exists a serious inconsistency among the various data sources on irrigation in Manipur.

5.1.3 Sources and types of irrigation in Manipur:

Irrigation in the context of modern agriculture has a distinct characteristic, that is, it has to be assured and controlled. The sources and types of irrigation prevailing in a region constitute an index of the quality of irrigation and hence it serves as an important indicator of the level of agricultural development as a whole. For instance, tube-well irrigation or pumpset irrigation unlike canal irrigation, are less subject to fluctuations induced by weather, and therefore, they are more assured and better controlled. Hence, to evaluate the level of irrigation, it is the types of irrigation that would yield meaningful results rather than taking irrigation as a blanket

category. This section will highlight the standard and quality of the existing irrigation network in Manipur through the analysis of the sources and types of irrigation in the state.

Tables 5.6a and 5.6b show the sources and types of irrigation in Manipur. The data is derived from two independent sources, namely (i) NSS and (ii) All India Report on Agricultural Census.⁸ The NSS source gives information on sources and types of irrigated area by size class of operational holdings for the years 1976-77 and 1981-82. On the other hand, the All India Reports on the Agricultural Census for 1970-71 and 1980-81 furnish simply information on area under different sources of irrigation. In regard to sources of irrigation, complete consistency was found between the above two independent sources, in marked contrast to the situation with regard to alternative sources of data about area under irrigation discussed earlier. A glance at the tables reveals that canal irrigation is in effect the only source of irrigation in Manipur. Tank, well and tube-well irrigation are conspicuous by their absence. This clearly reveals the prevailing uncertainty of irrigation in Manipur and its virtual dependence on the vagaries of

8. 1) NSS 31st Round, No. 300/4, for 1976-77 and NSS 37th Round, No. 331 for 1981-82.

ii) All India Report on Agricultural Census, 1970-71 and 1980-81.

Table 5.6 a: Distribution of Area irrigated over the sources of irrigation by size of operational holdings, 1976-77 and 1981-82

(Area in '00 hect.)

Size of Operational Holdings (hect.)	Canal		Tank		Tube-well		Well		Others		NIA	
	1976-77	1981-82	1976-77	1981-82	1976-77	1981-82	1976-77	1981-82	1976-77	1981-82	1976-77	1981-82
Less than 0.5	2	15.7	-	-	-	-	-	-	3	5.3	5	21
0.5 - 1.0	19	18.7	-	-	-	-	-	-	29	19.3	48	38
1.0 - 2.0	71	35.6	-	-	-	-	-	-	116	100.4	187	136
2.0 - 4.0	22	13.7	-	-	-	-	-	-	47	54.3	69	68
4.0 - 10.0	4	-	-	-	-	-	-	-	2	-	6	-
10.0 & above	-	-	-	-	-	-	-	-	-	-	-	-
All sizes	118	83.7	-	-	-	-	-	-	197	179.3	315	263

Source: (i) For 1976-77, NSSO 31st Round No. 300/4 Tables with Notes in Use of irrigation in household holdings. Dept. of Statistics, New Delhi.

(ii) For 1981-82, NSSO 39th Round No. 331. Some aspects of operational holdings.

Table 5.6b: Sources of irrigation in Manipur 1970-71 and 1980-81

Sources/Types	(in '000 hect.)	
	Area	
	1970-71	1980-81
1. Canal	10	59
2. Tanks	-	-
3. Wells	-	-
4. Tube-wells	-	-
5. Other sources	4	1
Total	14	60

Source: All India Report on Agricultural Census 1970-71 & 1980-81. Directorate of Economics & Statistics, Ministry of Agriculture, G.O.I., New Delhi.

rainfall. According to the NSS, in 1976-77, 37.5 per cent of NIA was under canal irrigation as against 31.8 per cent in 1980-81. (Refer table 5.7) This suggests a decline in the share of canal irrigation, and a rise in the percentage share of the "other sources"* over the same period.

As is the case of data on total area under irrigation from different sources, so also in the case of area under canal irrigation specifically, the two main data sources (namely NSS and Agricultural Census) give contrasting results. However, the direction of changes can be compared

* This term "other sources" excludes tanks, wells, tube-wells,

Table 5.7: Percentage distribution of area irrigated over sources of irrigation by size of operational holdings

Size class of operatio- nal holdings (hect.)	Canals		Tank		Tube-well		Well		Others		Total	
	1976-	1981-	1976-	1981-	1976-	1981-	1976-	1981-	1976-	1981-	1976-	1981-
	77	82	77	82	77	82	77	82	77	82	77	82
Less than 0.5	40.0	74.8	-	-	-	-	-	-	60.0	25.2	100	100
0.5 - 1.0	39.6	49.2	-	-	-	-	-	-	60.4	50.8	100	100
1.0 - 2.0	38.0	26.2	-	-	-	-	-	-	62.0	73.8	100	100
2.0 - 4.0	31.9	20.1	-	-	-	-	-	-	68.1	79.9	100	100
4.0 - 10.0	66.7	-	-	-	-	-	-	-	33.3	-	100	-
10.0 & above	-	-	-	-	-	-	-	-	-	-	-	-
All sizes	37.5	31.8	-	-	-	-	-	-	62.5	68.2	100	100

Source: Derived from table 5.6 a.

in spite of differences in time periods used between the two sources. In 1970-71, according to ^{the} Agricultural census, area under canal irrigation was 10 thousand hectares; by 1981 it was reportedly 59 thousand hectares. In terms of its percentage share canal irrigated area in 1970-71 was 71.43 per cent of NIA as against 98.33 per cent in 1980-81. About 30 per cent of NIA in 1970-71 and 2 per cent of NIA in 1980-81 were accounted by "other sources". The agricultural census, hence, reported a tremendous increase in the area under canal irrigation, while ^{the} NSS source shows precisely the opposite.

A glance at NSS ^{data in} table 5.7 reveals the farm size contrast in sources of irrigation. The percentage share of canal irrigated area in most of the size classes of operational holdings was generally less than the percentage share of area irrigated by "other sources" in both 1976-77 and 1981-82. But for the size class (4-10) hectares the share of canal irrigated area in 1976-77 was about two-thirds, more than in any other size class.

5.2 High Yielding Variety Seeds Programme:

5.2.1 The Importance of HYV Seeds for the Prospects of Development of Rabi Crops in Manipur:

The application of HYV seeds and improved varieties in Manipur agriculture occupies a very important place in view of low production and development of rabi crops. Not

only in Manipur but also in the whole North-East region of India, each year millions of hectares of land lie idle for nearly seven months starting from December-January to July-August. The principal kharif crop, paddy, is sown during the months of June-July and harvested during December-January. After the harvest of paddy, the land is kept uncultivated till the new paddy sowing season.

A study conducted by I.K. Barthakur and J.K. Barthakur⁹ explained why paddy lands continue to be idle for about seven months a year and suggested some policy measures and a strategy to develop rabi cropping. They found that the main restraint on rabi cropping was the substantial overlapping of kharif and rabi seasons. The overlapping is caused by the long maturing nature of the local paddy varieties grown. This problem of overlapping discourages cultivation of rabi crop as yield per hectare decreases due to the delay in sowing beyond the optimum sowing time. This inevitably leads to a poor crop. Therefore here, the application of HYV paddy is very important because the cultivation of this variety which is ^{of} short duration and early maturing would not only increase kharif yields but also vacate the land

9. See I.K. Barthakur and J.K. Barthakur, "The Problems of Agricultural Development in North-East Region with specific reference to Development of Rabi crops in flood free lands of Assam. The major constraints & strategy to overcome it", Arunachal News, vol.8, No.5, Directorate of Information and Public Relations, Govt. of Arunachal Pradesh, 1979.

well in advance of the optimum sowing season for rabi crops.

However, the initial reluctance to use HYV paddy by farmers in North-east India including Manipur has been reportedly due to the low yield achieved.¹⁰ The low yields have been attributed to improper and inadequate use of complementary inputs like irrigation, fertilizer, insecticides and pesticides, partly due to inadequate access to credit and also to deficient extension services.¹¹ Nonetheless, there has been a substantial recent spread in the use of HYV seeds as the next subsection demonstrates.

5.2.2 Growth in the Use of HYV Seeds:

The spread of HYV seeds in Manipur agriculture has been impressive over the years. Table 5.8 shows the area under HYV and its percentage share in gross cropped area for the years between 1970-71 and 1984-85. In 1970-71, the total area under HYV was only 8.6 thousand hectares accounting for only 4.6 per cent of gross cropped area in the state. A glance at this table reveals that there has been a gradual rise in the area under HYV so that by 1974-75, it had substantially increased to 30 thousand hectares

10. I.K. Barthakur and J.K. Barthakur, op. cit.

11. Ibid.

Table 5.8: Area under HYV Seeds and its percentage share to GCA. 1970-71 to 1984-85

Year	Area under HYV seeds (in '000 hect.)	Percentage of area under HYV seeds to GCA
1970-71	8.6	4.60
1971-72	12.0	6.42
1972-73	12.3	7.19
1973-74	19.0	9.74
1974-75	30.0	14.28
1975-76	40.0	19.11
1976-77	53.0	25.73
1977-78	52.0	24.41
1978-79	57.0	25.0
1979-80	47.0	20.43
1980-81	59.0	25.10
1981-82	73.0	30.42
1982-83	79.0	42.02
1983-84	88.0	47.82
1984-85	92.0	49.46

Source: (i) For HYV area various issues of Fertilizer Statistics, Fertilizer Association of India, New Delhi.

(ii) For GCA, Indian Agricultural Statistics, various issues.

for accounting [about 14.28 per cent of GCA. In the period between 1975-76 and 1980-81 the area under HYV was more or less stable at 53 thousand hectares, and about 23 per cent, on the average, of GCA, ^{which} however, recorded a general trend of mild increase coupled with marginal fluctuations. From 1981-82 onwards, HYV area increased substantially over the preceding years. It reached 92 thousand hectares in 1984-85, accounting for nearly 50 per cent of the GCA in the state.

Table 5.9: Compound annual growth of total HYV Seeds and HYV paddy and trend growth rates

Period	Compound annual growth rates Total HYV Seeds %	Total growth rate based on log $Y=a+bt$ Total HYV Seeds %
1970-71 to 1977-78	29.31	-
1977-78 to 1984-85	8.49	-
1970-71 to 1984-85	18.44	17.9

Note: Trend growth rates for the two sub-periods need not be calculated since the time intervals are short.

Source: computed from the Table 5.8

Table 5.9 gives compound annual growth rates of area under HYV for the years 1970-71 to 1977-78 and 1977-78 to

1984-85 and also for the entire period from 1970-71 to 1984-85*. The annual compound growth rate for area under HYV in the first sub-period of 1970-71 to 1977-78 was 29.31 per cent per annum as against 8.49 per cent per annum in 1977-78 to 1984-85 thereby, reporting a steep decline. However, the relatively high growth rate in the first sub-period is basically due to the low initial base. For the entire period, the compound annual growth rate and trend growth rate are 18.44 per cent and 17.9 per cent respectively.

5.3 Fertilizer:

The addition of plant nutrients in the form of fertilizer constitutes an essential step in agricultural production. This section will analyse the growth of fertilizer consumption over the years in Manipur agriculture.

By the standard of other parts of India per hectare consumption of fertilizer in the state has been very low. Table 5.10 below shows a comparison of per hectare consumption of fertilizer between Manipur and Punjab.

* The time period for the calculation of the growth rates here is divided in conformity with the periodisation done for similar types of calculation in the previous chapter. In the previous chapter the periodisation is done on the basis of peak to peak level foodgrain production and also relates to 'plateau' periods in the long term trend.

Table 5.10: Per hectare Consumption of total fertilizer in Manipur and Punjab (in kg.)

Year	(in kg.)	
	Manipur	Punjab
1970-71	2.72	40.31
1974-75	10.9	47.3
1979-80	14.6	106.8
1984-85	18.2	151.2

Source: Fertilizer Statistics, Fertilizer Association of India, New Delhi, various issues.

However, there has been an increasing trend in the consumption of fertilizer over the years. In table 5.11 it can be seen that the per hectare consumption of fertilizer in the state since 1970-71 was on the rise; in 1970-71 it was only 2.72 kg. per hectare and by 1973-74, it has increased to 12.9 kg. per hectare. Since 1977-78, the per hectare consumption of fertilizer continued to increase and reached an all time high of 21 kg./hectare in 1983-84.

The compound annual growth rate and trend growth rate of per hectare fertilizer consumption are shown in the table 5.12.

Table 5.11: Total (absolute) and per hectare fertilizer consumption in Manipur 1970-71 to 1984-85

Year	Fertilizer consumption (in '000 tonnes)	Per hectare fertilizer consumption (in kg./hect.)
1970-71	0.51	2.72
1971-72	0.80	4.24
1972-73	1.52	7.83
1973-74	2.00	12.90
1974-75	1.00	10.90
1975-76	1.00	7.4
1976-77	2.40	10.2
1977-78	2.60	11.9
1978-79	2.60	14.0
1979-80	3.01	14.6
1980-81	3.00	14.5
1981-82	3.30	15.4
1982-83	4.20	19.8
1983-84	4.60	21.0
1984-85	3.80	18.2

Source: Various issues of Fertilizer Statistics, Fertilizer Association of India, New Delhi.

Table 5.12: Compound annual and trend growth rates of per hectare fertilizer consumption in Manipur

Period	(%)	
	Compound annual growth rates	Trend growth rates
1970-71 to 1977-78	23.47	-
1977-78 to 1984-85	6.26	-
1970-71 to 1984-85	14.54	11.64

Note: For classification of sub-periods, the same reasoning is adopted as in the case of HYV growth rates. See p.24.

Source: Computed from the table 5.11.

For the entire period the annual compound and the trend growth rates work out to be 14.54 and 11.64 per cent per annum respectively. But a pronounced deceleration is noted when the two main sub-periods are taken separately. The annual compound growth rate of fertilizer consumption per hectare was 23.47 per cent in the first sub-period (1970-71 to 1977-78) as against 6.26 per cent in the second sub-period (1977-78 to 1985-85). As in the case of HYV seeds, the relatively high growth rate observed in the first sub-period is due to the low initial base level of fertilizer consumption. In spite of the high growth rate observed, the per hectare fertilizer consumption in Manipur has continued to be extremely low by the standard of agriculturally developed states like Punjab, ^{and} Haryana. Nonetheless

the fact is that there has been an increasing trend in the application of fertilizer in Manipur agriculture.

5.4 The Use of Farm Implements and Machinery in Manipur Agriculture:

The type of implements and machinery used in farming reflects the level of agricultural development over time and the extent/^{of} technological change. In this part of the section I, the analysis is focussed on whether there has been any substantial achievement in using modern farm implements and machinery in the agricultural production process in Manipur.

The data for this analysis come from two main sources¹² namely (i) Indian Livestock Census and (ii) The Rural Debt and Investment Surveys. The Indian Livestock Census furnishes information about various agricultural implements and machinery in physical units. The analysis from this data source is confined to the years 1972 and 1977-78, in which the livestock census was conducted. The latest available livestock census data relates to 1977-78. Therefore, the analysis has limitations due to lack of more

-
12. (i) Indian Livestock Census 1972 and 1977-78, Directorate of Economics and Statistics, Ministry of Agriculture, Govt. of India, New Delhi.
 (ii) Rural Debt and Investment Surveys - For 1971, RBI: All-India Debt and Investment Survey, 1971-72 - Assets of Rural Households, Bombay, 1976, Table 3; & For 1981 A Note on Assets and Liabilities of Rural and Urban Households (States and All India); National Sample Survey: 37th Round (Jan-Dec 1982), Parts I and II.

recent data. On the other hand, the second data source furnishes information regarding various rural household assets and liabilities in value terms by size class of asset holding groups for the years 1971 and 1981. However, the analysis here focussed on the value of a particular single asset category namely Rural households' implements and machinery. The data for 1971 was collected by RBI in collaboration with NSSO and the State Statistical Bureaux as a part of the subject programme of NSS 26th Round. The sampling design was decided jointly by NSSO and RBI. The methodology adopted in ^{the} 1971 survey, is similar to that of NSSO Survey of 1981 and therefore, can be compared. However, in the 1971 RBI data unlike the 1981 NSS data, there was no further decomposition of implements and machinery into (a) Agricultural implements, (b) Transport equipment and (c) Non-farm business equipment. Instead it was reported in an aggregated form. Therefore, in spite of the longer period covered and also the same methodology, a meaningful comparison of the composition ^{of the} agricultural implements and machinery cannot be done.

Findings:

According to ^{the} data furnished by RBI and NSS in the table 5.13a the total value of implements and machinery owned by rural households in 1971 was reported at 30101.45 thousand rupees as against 53323.94 thousand rupees in 1981, (deflated

to 1971 prices*). The percentage change in the value of implements and machinery over 1971 is 77.15 per cent, showing a tremendous increase over the decade. The compound annual growth rate of the value of implements and machinery between 1971 and 1981 was 5.9 per cent. The figures in the table 5.13b at current prices, show that in 1981 as in 1971 a disproportionately large share of assets was reported by the relatively small number of households in the upper asset groups.

Table 5.13a: Value of Agriculture implements and machinery in Manipur, 1971 and 1981

Value (in thousand rupees)		*Value of 1981 deflated at 1971-72 prices	Change	% change over 1971
1971	1981		(3) - (1)	
(1)	(2)	(3)	(4)	(5)
30101.45	134246.68	53323.94	23222.49	77.15

For this ^{the} Price index chosen is Index for "Machinery and Transport equipment", taken from RBI Bulletin, Oct. 1981.

Index number of wholesale prices - by groups and sub-groups

For 1971-72 index is 105.3
 For 1981-82 index is 265.1 } base year 1970-71 = 100

* For a meaningful comparison, the 1981 value for implements and machinery has been deflated at 1970-71 prices. For this price adjustment, the index chosen is "Index of machinery and transport equipment" published in RBI Bulletin, Oct. 1981. For 1971-72 the index to the base year 1970-71=100 is 105.3 and for 1981-82 the index is 265.1.

Table 5.13b: Percentage distribution of households and value of implements and machinery owned by household asset holding groups, 1971 and 1981

Asset groups in thousand rupees	% of asset owning households		% of the value of implements and machinery	
	1971	1981	1971	1981
Less than 1	6.9	0	0.37	-
1 - 5	44.83	15.87	17.70	2.70
5 - 10	24.83	14.28	21.12	5.36
10 - 20	16.55	21.69	18.21	13.97
20 - 50	6.21	36.51	21.53	48.14
50 & above	0.68	11.65	21.07	29.83
All sizes	100	100	100	100

Source: (i) For 1971, Derived from table 6 in the appendix.

(ii) For 1981, Derived from table 7 in the appendix.

The Gini Co-efficient for 1971 and 1981 however, indicates a decline in asset holding inequality which fell from 0.5182 in 1971 to 0.3805 in 1981. This result was not anticipated, because according to Kuznets¹³, in the initial stages of

13. Kuznets, Economic Growth and Structure, Selected Essays, Harvard University, 1965; Also see J.G. Williamson, "Regional inequality and the process of National Development; A descriptive pattern", Economic Development and Cultural Change, vol.13, 1965.

economic development there is a tendency for the inequality in the asset distribution to increase, associated with the concentration of assets in the upper income groups. The logic of Kuznets' argument runs as follows - In the initial stages of economic development an increasing proportion of savings accrues to the upper income brackets. This inequality in the distribution of savings was found to be greater than that in the distribution of property income. The cumulative effect of such inequality in savings is the concentration of an increasing proportion of income yielding assets in the hands of upper income groups, as the basis of larger income shares for them. However, the relationship in the long run ultimately takes the inverted U shape - As the economy grows initially from a low level of development, inequality at first increases, reaches a peak and subsequently declines. However in the case of Manipur, the declining value of Gini Coefficient shows decreasing inequality at a rather early stage in the development process, thereby contradicting the Kuznets inverted U shape hypothesis. Such a decrease in the inequality of asset distribution may have been closely linked with the changes in land holding structure in Manipur. The analysis of the changes in land holding structure in Manipur found out that inequality in land ownership holdings has declined.¹⁴ The

14. See Chapter III, Section 3.4.2.

reduction in the inequality of distribution of landed property, together with the rapid increase in concentration¹⁵ of irrigated area in the semi-medium size class, may have reduced the inequality of incomes from landed property and hence the inequality in the distribution of savings. This may have checked the deterioration of the distribution of income yielding assets. A related case was described by Soltow (as referred ^{to} in D.P. Chaudhri and A.K. Dasgupta¹⁶), in his study of the impact of the industrial revolution on income inequality in Britain. He found that inequality did not change during ^{the} 18th and 19th century in Britain and attributed this to the decreasing inequality in the distribution of landed property from initially high inequality.

An itemwise analysis of the nature of the changes in agricultural implements and machinery could be done on the basis of information furnished by the Indian Livestock Census. As stated already, this analysis based on livestock census is limited in the sense that the time period covered is relatively short; moreover the two sources, that is RBI and

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15. Concentration of irrigated area in the semi-medium size class was already stated. Refer Section on Irrigation, sources and types; and also see table 5 in the appendix.
16. See D.P. Chaudhri & A.K. Dasgupta, Agriculture and the Development Process, Croomhelm, 1985, p.108.

the
 NSS on L one hand and livestock census on the other hand cannot be compared for two reasons. Firstly, there is no coincidence of time periods of analysis between the two sources. Secondly, the method and mode of collection of data are different (refer to the first part of this section). Hence, the purpose here is to highlight some basic characteristics and facts about agricultural implements and machinery used in Manipur agriculture.

Tables 5.14 and 5.15 show details of items of agricultural implements and machinery used and annual compound growth rates for some selected items of agricultural implements and machinery in Manipur between 1972 and 1977-78. A glance at table 5.14 clearly depicts that the most common agricultural implements and machinery are ploughs, spades, sickles, seed drills and harrows. Ploughs both wooden and iron are the single most widely used item. On the other hand the use of more sophisticated implements and machinery such as tractors, pumpsets and power tillers is limited. The use of tractors has been negligible in Manipur. In 1972 there were only 85 tractors and that also declined to 55 by 1977-78. However the use of implements like oil engines with pumpsets for irrigation, electric pumps for irrigation, persian wheels, power tillers and plant protection equipment is on the rise (in spite of low numbers still) during the same period. Among the irrigation equipment, the most widely used item has been pumpsets run by oil. The number



Table 5.14: Agricultural implements and machinery in Manipur. 1972 * 1977-78

Items	1972	1977-78	Change	% change over 1972
1. Wooden Plough	108407	191859	83452	76.9
Iron Plough	1257	14823	13566	1079.23
Total Plough	109664	206682	97018	88.4
2. Bullock Cart	20758	38947	18189	87.6
3. Sugarcane crusher				
i) W/P	15	12	(-) 3	(-) 20
ii) W/B	673	1932	1259	227.19
Total	688	1944	1256	182.5
4. Oil engine with Pumpset for irrigation	213	399	186	87.3
5. Electric Pump for irrigation	Nil	9	9	-
6. Persian wheels	Nil	69	69	-
7. Tractors (Private)	69	47	(-) 22	
Dept.	16	8	(-) 8	
Total	85	55	(-) 30	(-) 35.2
8. Ghannies				
i) Less than 5 kg.	1689	-	(-) 1689	(-)
ii) More than 5 kg.	Nil	-	-	(-)
9. Earth levellers	67237	126398	59161	87.9
10. Wet land Puddlers	6521	63038	56517	866.6
11. Blade Harrows	3891	1668	(-) 2223	(-)

contd...

contd...

Items	1972	1977-78	Change	% change over 1972
12. Seed drills	1163	128	(-)1035	(-)
13. Maize shellers	770	226	(-)544	(-)
14. Power tillers				
i) Dept.	16	60	44	275
ii) Private	10	50	40	400
Total	26	110	84	323.0
15. Plant Protection equipment				
i) Sprayers	123	555	432	351.2
ii) Dusters	103	154	51	49.5
Total	226	709	483	213.7
16. Chatt. culcers (Power)	Nil	2039	2039	-

Source: Indian Livestock Census: 1972 & 1977-78,
Directorate of Economics & Statistics,
Ministry of Agriculture, New Delhi,
Govt. of India.

Table 5.15: Compound annual growth rate (1972 - 1977-78)
of some selected agricultural implements used
in Manipur State

Items	Compound annual growth rate (1972 to 1977-78) %
1. Wooden Plough	9.98
2. Iron Plough	50.86
3. Total Plough	11.14
4. Oil Engine with Pumpset for irrigation	11.02
5. Tractors	
i) Private	(-)6.19
ii) Dept.	(-)10.19
Total	(-)6.99
6. Earth levellers	11.09
7. Power tillers	
i) Dept.	24.64
ii) Private	30.76
Total	27.17
8. Plant protection equipment	
i) Sprayers	28.54
ii) Dusters	6.93
Total	20.90

Source: Computed from table 5.14.

of oil engines with pumpsets for irrigation in 1972 was 213 as against 399 in 1977-78 and the percentage change over 1972 was 87.3 per cent. On the other hand the use of electric pumpsets was reportedly nil in 1972, and by 1977-78 it was only 9 in number. It is worthwhile to make a point here explaining why the use of electric pumpsets for irrigation purpose has been so insignificant in Manipur. Indian Agriculture in Brief¹⁷ gives information about the number of villages electrified in Manipur. According to this source, out of 1949 villages (1971 census) 427 and 532 villages were electrified only in the years 1983 and 1984 respectively. In percentage terms this is 21.9 per cent (1983) and 27.3 per cent (1984). Although the Loktak Hydro electric project was taken up in 1973-74, the consumption of electricity in agriculture in Manipur was not reported at all till 1978-79. However from 1979-80 onwards the consumption of electricity in agriculture has been reported. Even though about more than 20 per cent of all villages were electrified, the use of electricity was largely confined to household purposes. Moreover, the power supply has been extremely unreliable. The percentage

17. Indian Agriculture in Brief, 20th Edition, Directorate of Economics and Statistics, Department of Agriculture and Co-operation, Ministry of Agriculture and Rural Development, New Delhi.

of electricity consumed in the agricultural sector since 1979-80 till 1984-85^{was} reported at 11.12 per cent of the total power generated (refer table at the appendix). Hence the extremely low level use of electric pumpsets and other electric equipment should come as no surprise. The low level of power supply in Manipur acts as a major constraint on the adoption of modern implements and machinery in agriculture.

From table 5.15 showing the compound annual growth rates of selected agricultural implements and machinery, it is evident that the growth rates of all implements and machinery excepting tractors, were positive. The growth of iron ploughs was impressive, reportedly 50.86 per cent over the period. The growth rates of oil engines, earth levellers, power tillers and plant protection equipment are 10.02 per cent, 11.9 per cent and 27.17 per cent and 20.9 per cent respectively. However there is a negative growth rate for tractors in Manipur. In principle, the negative growth of the use of tractors may have been related with the prevalence of wide-spread small size operational holdings in Manipur. (See for details chapter on landholding structure in Manipur). But in practice it is unlikely that the tractors reported in 1972 had been sold outside the state by 1977-78.

Section II5.5 Estimates of the Impact of Inputs on Yields:

The preceding section has briefly discussed the nature and changes in the major yield increasing inputs. It was found that there has been a general increase in all inputs except for stagnant irrigation levels. In spite of these increases in inputs, the production of foodgrains was found to have increased by not more than 3 per cent per annum. The recorded growth rates in key inputs thus seem to be disproportionately great in relation to the resulting increases in yield and production, especially during the period after 1977-78. In this section, therefore an attempt has been made to measure the impact of inputs used on the yield of foodgrains in Manipur. Ideally, cropwise analysis should be done where the impact on yields of variations in input use is measured in relation to each crop separately. For fertilizer, however, there is no crop-wise data available, and in Manipur all irrigated area is under paddy. The solution adopted was to relate specified inputs used to the crop group 'foodgrains' as a whole. This approximation is justified in Manipur on the ground that paddy accounts for about 85 per cent of GCA and maize for another 5 per cent, and that together the output of these two crops is virtually coterminus with foodgrains production and indeed with production of all

crops combined.¹⁸

Thus in order to ascertain whether and to what extent these inputs are responsible for the present growth in the production of foodgrains, a linear multiple regression function of the following form has been fitted to the data relating to the period from 1970-71 to 1984-85:

$$Y = a_1 + b_1 x_1 + b_2 x_2 + b_3 x_3$$

where Y = Yield rate in kg. per hectare of foodgrains.

x = quality of specified input used

i = 1 to 3

Now, the regression equation becomes

$$Y = 0.14129 + 13.165x_1 - 3.864x_2 - 1.121x_3$$

where x_1 = Area under HYV to gross cropped area.

x_2 = per hectare fertilizer consumption.

x_3 = rainfall. The results are summarised below.

<u>Regression co-efficients</u>	b_1	b_2	b_3	\bar{R}^2	F	DF
Standard error	5.28	16.38	1.29	0.4449	4.740	(3, 11)
t	2.49*	0.236	0.869			

* significant at 95%.

18. Paddy and Maize account for 96.52 per cent and 353 per cent of foodgrains production respectively and together account for 99.3 per cent of the output of all crops, as on 1984-85. See chapter iv.

The results indicate that only the changes in HYV area have made a significant contribution towards the growth in yield of foodgrains. Fertilizer consumption and rainfall have had no impact.

CHAPTER VI

SUMMARY AND CONCLUSION

Historically, the contribution of agriculture to economic growth has been one of the most important aspects judging from the experience of economically advanced countries of the world. For sustained economic growth, a balance between the agricultural and industrial sectors is a necessary condition. An appropriate strategy for agricultural development may be constituted of favourable institutional reforms, investment in the provision of 'leading inputs' and technological change. This has been highlighted in chapter I of this study.

In the review of the historical development of land systems in Manipur, it was found that all land virtually belonged to the raja prior to and during the early British period. A remarkable and distinctive feature of this period has been the non-existence of a clear-cut demarcation between rent and taxes. A tax-cum-rent in the form of forced labour or 'lalup' was levied along with a tax-cum-rent on produce. The labour tax seemed to have dominated the prevailing tax-regime in Manipur. Another distinctive feature found in Manipur during the period was that the gradual transformation of primitive forms of rent into capitalist ground rent appears to have been quickened by the British administration to serve their interests of

collecting land revenue. After independence land reforms measures were adopted in 1960 and extended to hill areas by 1967. Although there has been no acute land concentration in few hands as in other parts of India, the land reforms legislation was needed in the interests of the tillers of the soil. However, the land reforms so legislated were not implemented in letter and spirit. A cadastral survey of land in Manipur, which is a necessary precondition for effective implementation of land reforms, has yet to be completed.

One of the most remarkable features of land holding structure in Manipur has been the predominance of marginal and small holdings in both ownership and operational holdings structures and also the virtual absence of holdings, which would be called large by the standards of other regions of India. Another important feature is that there has been a remarkable stability of the number of households as well as of area in the marginal and small size classes. A drastic reduction in the landowning households leasing out land and corresponding area leased out has been recorded over the period between 1970-71 and 1981-82. These observations suggest that the land owners belonging to the lower size category sold out their land and sought employment in other sectors. This view has been supported by the shift of a large number of workers from the agricultural

sector, together with the corresponding gains in the secondary and tertiary sectors, observed in occupational structure data for 1971 and 1981.

Another feature of Manipur's land holding structure is that the degree of inequality in the land distribution as given by the Gini Co-efficient is low. The distinctive feature is that the inequality in the distribution of operational holdings is found to be lower than that of ownership holdings. This implies that tenancy improves land distribution in Manipur. Manipur is, therefore, one of these areas of India where 'subsistence tenancy' rather than 'commercial tenancy' dominates.

In view of the predominance of marginal and small holdings in the land holding structure in Manipur, it was concluded that the long term policy strategy for economic development depends on the opening up of alternative occupations in the non-agricultural sectors. But in the short and intermediate run, the standard of living of people can be improved by increasing agricultural productivity through the use of modern agricultural inputs and better farming methods.

It was found that the time profile of foodgrains production over the period 1970-71 to 1981-82, did not exhibit any systematic pattern (see Chapter IV). There have been fluctuations over the years in foodgrains

production characterised by the formation of plateaus signifying phases of stagnation. The growth rates calculated over these periods showed that there has been a general deceleration of growth in foodgrains production over the years. The growth rate of foodgrains for the entire period, however, was positive. The increases in foodgrains production over the years was found to be mainly due to the improvement in yields rather than to area expansion. This was the case both for the state as a whole and for most districts taken separately.

In chapter V, it was found that the area under irrigation continued to be stagnant in spite of the substantial irrigation potential in Manipur. The net irrigated area as well as the gross irrigated area, (as given by Indian Agricultural Statistics) showed stability. However, since the fourth five year plan, a number of major, medium and minor irrigation projects have been taken up. It is expected that on completion of these projects, there would be a substantial improvement in irrigation. However, the existing irrigation infrastructure is poor. Canal irrigation is the only major source of irrigation. The other sources, viz. tube well, pumpset, tank etc. are virtually non-existent. Water supply for irrigation remains to a high degree dependent on the vagaries of rainfall.

The HYV seeds in Manipur has been steadily expanding over the years. The total area under HYV seeds which was

only 4.6 per cent of the GCA in 1970-71 has increased to 50 per cent of the GCA by 1984-85. This trend is a very encouraging sign for the development of rabi crops in Manipur which had traditionally not been sown. It was also found that the per hectare consumption of fertilizer (although quite low by the standard of agriculturally developed states of India) has been increasing over the years.

The value of agricultural implements and machinery used in Manipur over the period between 1971 and 1981 recorded a tremendous increase. The concentration of these assets has been reported in the upper asset holding brackets. However, the degree of concentration has declined during the period. The itemwise analysis of the farm implements and machinery reveals the traditional nature of these implements and the machinery used. Modern farm implements and machinery such as pumpsets, oil engines, tractors, and so on, are not widely used. Nevertheless there has been an overall increase in the use of all agricultural inputs except irrigation in Manipur.

It has already been noted that the changes in the yields accounts for most of the changes in the foodgrains production in Manipur. In spite of the increase in agricultural inputs used in Manipur (other than irrigation), it was found that the changes in yield have been mostly

accounted for by the adoption of HYV seeds. The expansion of area under HYV seeds was found to be only significant factor contributing to the growth in yields of foodgrains in Manipur.

Lastly, this study has revealed the existence of gross inconsistencies amongst the various data sources for the same variables in the case of Manipur. This constitutes limitation of this study along with the constraints imposed by the scantiness of secondary data. In Chapter III, the gross inconsistency between NSS and Agricultural Census data was discussed in relation to the distribution of operational holdings. Similarly in the case of data on GIA and NIA, there exist irreconcilable differences among the three sources namely, Indian Agricultural Statistics, All India Report on Agricultural Census and NSS. This provides strong grounds for skepticism about the reliability of these data sources in the case of Manipur.

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APPENDIX

Appendix : Shifting Cultivation: A Note

The study of agriculture in Manipur is not complete without discussing the aspects of 'shifting cultivation'. 'Shifting cultivation' locally known as 'Jhum' is practiced in Manipur hills (and also other parts of India especially in North-Eastern Indian States). This type of cultivation seems to have originated around 7000 B.C. through the urge of small human societies to supplement their hunting and food-gathering in the forest by the then newly discovered technique of raising food crops by planting.¹ It then represented a new revolutionary and efficient technology - the use of fire to clear the land of trees and under-growth, to let in the sun, and enrich the acidic soil with alkaline ash for its cultivation.² When the rainy season started and heavy rainfall proceeds, the patches of land thus cleared were sown normally with maize or hill millets or various types of vegetables. Initially the yield of crops on this land was high.

After the harvest, land where 'Jhuming' is practiced is no longer cultivated but left free and the next cultivation

1. I.K. Barathakur, Advisor (State Plans), "A Strategy to reduce and control Jhum cultivation" (mimeo.), Planning Commission, Govt. of India, sept. 1986.

2. Ibid.

is done on other patches of land on the slopes of the hill. In ancient times while the man-land ratio was low, the shifting cultivation cycle was sufficiently long and yielded rich harvests. In recent years, however, as a result of population pressure on land, the hills are not able to recoup and regenerate. The ultimate and well known effect of this reduction in the 'jhum cycle' is a rapid decline in soil fertility which leads to a further reduction in the 'jhum cycle', leaching, erosion and loss of fertility and subsequent decreasing productivity of 'jhum' land. In short, the overall effect is pauperisation of 'jhum' cultivators and environmental disaster.

As stated before, 'shifting cultivation' is widely practiced in Manipur hills while settled cultivation is practiced in the valley areas. Since the hill areas occupy about two-thirds of Manipur's total geographical area and the remaining one-third is valley area³, the place of 'shifting cultivation' in Manipur agriculture in terms of area should not be underestimated. However, the

3. Here, the 'valley area' means not only the three valley districts of Manipur but also patches of plain in the hill districts where well-settled cultivation is practiced. However, the limitation here is that no firm data are not available. The present assertion is based on "Geography of Manipur", National Book Trust, India, New Delhi by Ravindra Pratap Singh, 1982.

estimation here is that no firm data on 'shifting cultivation' are available. However, some empirical survey work was done on 'Jhum' cultivation by NSS 31st round, 1976-77⁴, in Manipur hill districts. According to this survey, the average duration of the 'Jhum' cycle in Manipur is 5.6 years and the average area of land under 'Jhum' cultivation is 0.99 hectare. The list of major crops raised in 'Jhum' plots in Manipur includes paddy, maize and chillies.

The remedy for 'shifting cultivation' in these areas is multi-dimensional. The changes required are not only economic but also sociological, scientific, education and administrative in nature. Some suggestions for an alternative to 'shifting cultivation' have been made by individuals and governmental research institutions. They are short term as well as long term in nature. Since the people engaged in this type of cultivation cannot be shifted very quickly, the immediate task is to improve living standards of people dependent on 'Jhum' cultivation. In the short run, it is necessary to enhance the productivity of existing 'Jhum' field with a view to lengthening the 'Jhum cycle'. This can be done through the application of modern inputs and the gradual introduction of new farming techniques including terracing of hill sides, bunding and

4. NSS 31st round, 1976-77, Report No. 215.

small scale water storage and erosion preventive works. The long term remedy appears to lie in educating the people about the destructive effects of 'Jhuming', changes in the present system of 'community ownership' of land which involves short term allotment of land to individual households by the village chief⁵, the creation of alternative occupations in horticulture, suitable small scale industry and dairying, the plantation of cash crops like tea, coffee etc. and the development of infrastructure including roads, communication and power which constitute the backbone of any modern economy.

5. The present form of land tenure practiced under the system of allotment of households by the village chief is a transitional form which suffers from most of the drawbacks of short term tenancy without having the advantages of genuine community ownership.

Appendix Table 1: Population and per capita Agricultural Land in Manipur

Year	Total Popu- lation in '000	Percentage growth	Per capita availability of agricultu- ral land (in hect.)
1901	284	-	0.62
1911	346	21.7	0.51
1921	384	10.9	0.46
1931	446	16.0	0.39
1941	512	14.9	0.34
1951	578	12.8	0.30
1961	780	35.0	0.22
1971	1073	37.5	0.16
1981	1420	32.3	0.09*

* Estimated

Source: Statistical
Handbook of Manipur, 1980.

Appendix Table 2: Cropping Pattern in Manipur

(area in '000 hect.)

Year/Crop	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87
1	2	3	4	5	6	7	8
1. Cereals*	198.46 (83.75)	173.89 (84.08)	163.77 (78.30)	165.30 (82.68)	172.85 (82.68)	170.34 (82.46)	172.66 (82.88)
2. Pulses	3.33 (1.41)	3.96 (1.91)	1.80 (0.86)	2.52 (1.26)	2.50 (1.20)	2.36 (1.14)	0.51 (0.25)
3. Oilseeds	8.80 (3.71)	1.96 (0.95)	4.13 (1.97)	3.51 (1.75)	5.95 (2.85)	4.38 (2.12)	2.43 (1.17)
4. Sugarcane	0.34 (0.14)	0.46 (0.22)	1.69 (0.81)	0.54 (0.27)	0.51 (0.24)	0.70 (0.34)	2.55 (1.22)
5. Cotton	3.13 (0.05)	0.59 (0.29)	1.97 (0.94)	0.54 (0.27)	0.07 (0.03)	0.10 (0.05)	0.07 (0.03)
6. Other Misc. Crops	25.92 (10.94)	25.96 (12.55)	35.80 (17.12)	27.63 (13.77)	26.69 (12.80)	28.69 (13.89)	30.10 (14.45)

Note: Figures in brackets denote the percentage area under the crop to total cropped area of the respective years.

* Cereals: Rice accounts almost all the area under cereals. For details, refer tables given in area & production of principal crops in India. Series. Directorate of Economic & Statistics, Ministry of Agriculture, Govt. of India, New Delhi.

Source: Pre-budget Economic Review of Manipur, 1987-88.

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Source: Pre-budget Economic Review of Manipur, 1987-88.

Appendix Table 3: Distribution of NSA and GSA, 1970-71
to 1984-85

Year	(in thousand hect.)	
	NSA	GSA
1970-71	178.50	186.80
1971-72	178.50	186.00
1972-73	140.00	171.17
1973-74	140.00	195.00
1974-75	140.00	210.00
1975-76	140.00	209.30
1976-77	140.00	205.80
1977-78	140.00	213.00
1978-79	140.00	228.00
1979-80	140.00	230.00
1980-81	140.00	235.00
1981-82	140.00	240.00
1982-83	140.00	188.00
1983-84	140.00	184.00
1984-85	140.00	186.00

Source: Indian Agricultural Statistics, various issues, NSA and GSA .

Appendix Table 4: Area, Production and Yield in the districts of Manipur (1978-79 & 1984-85)

Districts	Rice						Maize					
	Area		Production		Yield		Area		Production		Yield	
	'78-79	'84-85	'78-79	'84-85	'78-79	'84-85	'78-79	'84-85	'78-79	'84-85	'78-79	'84-85
Manipur Central	115.53	106.09	188.07	228.56	1657	2154	0.01	0.74	0.02	1.44	2000	1946
Manipur North	10.79	22.94	11.36	37.56	1053	1637	1.28	1.79	2.09	4.38	1633	2447
Manipur West	5.96	9.14	6.82	12.05	1144	1318	-	-	-	-	-	-
Manipur South	14.46	9.26	20.06	9.73	1378	1051	1.23	1.12	2.39	1.62	1943	1446
Manipur East	10.42	12.82	22.53	34.16	2162	2665	0.50	1.60	1.01	4.60	2020	2875
Tengnoupal	4.40	7.16	6.37	10.92	1448	1526	0.38	0.19	0.75	0.15	1974	789

Note: For calculation 3 years moving average for the relevant variables are not taken because of the lack of data. Manipur Central district comprises of Thoubal, Imphal and Bisteupur district.

Area - Thousand hectares
Yield - kg./hect.
Production - Thousand tonnes.

Source: Various issues, Statistical Handbook of Manipur.

Appendix Table 5 : Distribution of Gross area irrigated and number of holdings by size class of holdings, 1970-71 and 1976-77

Size class of operational Holdings, (in hect.)	% of Gross area irrigated by size class		% of estimated num- ber of holdings	
	1970-71	1976-77	1970-71	1976-77
Less than 0.5	3.56	1.75	6.38	12.67
0.5 - 1.0	18.19	15.45	25.23	30.14
1.0 - 2.0	48.87	58.60	55.60	43.66
2.0 - 4.0	23.78	21.57	11.82	11.83
4.0 - 10.0	5.35	2.62	0.90	1.69
10.0 & above	-	-	-	-
All classes	100.00	100.00	100.00	100.00

Source: For 1970-71 - NSS 26th Round
on 265/1;
For 1976-77 - NSS 31st Round.

Appendix Table 6: Distribution of Total value of specified items of productive assets by Household assets holding groups, 1971

Household Asset holdings (Rs.)	(in '000 rupees)					
	Land	Vacant house-holds	Buildings	Live-stock	Implementments & machinery	No. of house-holds (in '000)
Upto 500	-	0.058	300.93	21.89	10.89	4
500 - 1,000	579.89	8.56	1673.22	213.26	98.27	6
1,000 - 2,500	15818.75	168.33	16466.56	4704.06	1566.38	31
2,500 - 5,000	44698.92	335.40	41204.23	10741.39	3771.02	34
5,000 - 10,000	130291.3	690.83	68563.0	18997.29	6355.91	36
10,000 - 15,000	114806.27	923.88	47417.76	10531.62	3223.23	16
15,000 - 20,000	78254.57	733.11	34358.8	7072.18	2257.41	8
20,000 - 30,000	99588.84	314.58	28966.74	4960.32	2650.74	6
30,000 - 50,000	74990.97	247.46	21743.37	3194.85	3824.44	3
50,000 - 100,000	43364.02	19.38	13475.71	1378.24	6343.16	1
100,000 & above	-	-	-	-	-	-
All sizes	602393.53	3441.59	274170.32	61815.1	30101.45	145

Source: RBI, "All-India Debt and Investment Survey, 1971-72 - Asset of Rural Households", Bombay, 1976, Table 3.

Appendix Table 7 : Distribution of Total Value of Specified
items of Productive assets by Households
asset holding groups 1981

Asset Groups (in '000 Rs.)	Number of Households (in '000)	(in thousand rupees)					
		Land	Buildings	Livesto- ck	Agri. Machinery	Non-farm business equipment	Transport equipment
Less than 1	-	-	-	-	-	-	-
1 - 5	30	21474.9	21285	19097	2599	324.87	695.61
5 - 10	27	69321.6	47534.2	30278.4	3081	535.5	3585.6
10 - 20	41	235134.1	139810	77256	8322.6	1363.2	9074.0
20 - 50	69	1197441	519080.4	137765	15723.5	14156.1	34748
50 - 100	19	798551	260186	72400	5557.8	7772.4	20989.8
100 - 500	3	255153	72480	10442	614.1	500.4	4603.2
500 & above	-	-	-	-	-	-	-
All sizes	189	2577075.6	1060375.6	347238.4	35898	24652.47	73696.21

Source: Derived from data in "A note on Assets and Liabilities
of Rural and Urban Households (States and All India):
National Sample Survey: 37th Round (January-December
1982), Part I and II".

Appendix Table 8 : Electricity Supply in Manipur
(1970-71 - 1984-85)

Item/ Year	Installed Capacity (K.W.)	Electri- city gene- rated (in lakh KWh)	Electricity consumed (in lakh KWh)					Public Water work & sewage pumping	Total co- nsumed in lakh KWh (4+5...9)
			Domestic	Commercial & small power	Industrial	Street lighting	Irrigation & Agricul- ture		
1	2	3	4	5	6	7	8	9	10
1970-71	6,510	89.88	54.62	1.14	15.82	2.48	-	0.23	64.29
1971-72	6,510	110.00	63.83	1.10	11.80	0.83	-	0.12	77.68
1972-73	7,600	128.83	74.63	0.50	12.50	15.70	-	0.03	89.23
1973-74	7,340	125.00	89.30	-	14.50	1.80	-	1.30	106.90
1974-75	7,340	147.00	96.10	-	16.50	4.10	-	1.50	178.20
1975-76	9,390	148.50	89.50	-	15.50	4.50	-	1.50	111.00
1976-77	10,330	172.20	76.80	-	17.50	4.50	-	2.50	101.30
1977-78	10,410	165.10	47.71	1.40	8.19	1.72	-	0.37	59.39
1978-79	14,837	206.15	47.68	5.73	6.97	0.72	-	0.24	61.34
1979-80	19,372	311.40	88.92	7.07	10.35	4.53	10.35	0.60	121.82
1980-81	20,779	253.85	79.50	6.32	9.26	4.03	9.26	0.54	108.91
1981-82	22,630	182.38	89.26	3.65	10.12	2.99	27.00	27.00	133.02
1982-83	22,787	119.53	132.35	5.42	14.99	4.44	25.64	14.40	197.24
1983-84	22,770	96.12	129.16	5.20	14.46	4.43	25.24	14.27	192.76
1984-85	24,270	63.77	266.97	9.37	36.62	5.39	32.11	8.45	358.73

Source: Economic Review 1984-85, Appendix 5.1, p.13.
Directorate of Economics & Statistics,
Govt. of Manipur, Imphal.

Appendix Table 9 : Improved varieties: Recommended Varieties of Different Crop Suitable for Cultivation in various States/Union Territories of North-Eastern Hill region

Crop	State	Altitude above MSL	Name of the varieties	Yield Q/ha	Duration (days)	Remarks	
Rice	Manipur	Low (less than 800m) and Medium (800-1300m) altitude	DR 92	50	115	Transplanted for main 'Kharif'	
			CR 210-1009	50	150		
			Prasad	40	145		
			Punsi	45	145		
			RX T 42	47	120		
			P33-C-33	46	130		
			K 336-a	46	130		
Maize	Manipur	800 m	Ganga 5	27	100		
			Kisan	25	100		
			Safaida	25	100-110		
		800 to 1300m	NLD Crop	44	150-170		
			Ganga 9	40	-do-		
			Crop A-53-54	44	-do-		
			Ganga 5	37	-do-		
			1300-2000m	NLD Crop	37	150-160	
				Ganga 9	39	-do-	
				V L 43	44	-do-	
		Local Yellow	36	-do-			

Source: Technological Bulletin of ICAR Research Complex for NEH Region during the decade (1975-1984), vol.1, Crop. Science.

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