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GOVERNMENT OF PAKISTAN

MINISTRY OF FOOD, AGRICULTURE & COOPERATIVES

FOOD SECURITY MANAGEMENT PROJECT

(ECONOMIC & POLICY ANALYSIS)

IMPACT OF MECHANIZATION ON PRODUCTIVITY & EMPLOYMENT BY FARM SIZE AND TENURE FOR DIFFERENT ECOLOGICAL ZONES: ECONOMIC ASSESSMENT OF VARIOUS LEVELS OF MECHANIZATION

SEPTEMBER, 1989

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EXECUTIVE SUMMARY

The study was undertaken with a view to investigate the contributions of farm mechanization to agricultural productivity and employment both within and outside of agriculture. More specifically, the objectives of the study, as defined in the terms of reference prepared by the Directorate of Agricultural Policy, were to examine (1), the impact of mechanization on productivity, farm/off-farm employment and income by farm size and tenure for different ecological zones, (2), constraints in mechanization, (3), economics of small versus medium and large scale machines (tractors, harvester etc.), (4), farm and off-farm use of agricultural mechanical equipment and (5), conclusions and recommendations. These objectives were expanded in the programme of work to include a review of literature and also a review of the historical progress of farm mechanization and development of government policy over the last 25-30 years. In preparation of this report we have taken a full note of these considerations. It encompasses over five chapters, the contents and conclusions of which are summarized below.

Chapter-I is introductory in nature and consists of the background leading to mechanization, a review of major studies in Pakistan contemplating the effects of mechanization on agricultural productivity and employment, objectives and outline of this report, characteristics, sample design and selection of the sample and methodology of the study. The most important conclusion of the chapter was the controversy of the literature regarding the impact of tractors on the productivity of agriculture and employment. If productivity increases were predicted

by some studies, an equal number argued that tractors are unlikely to lead to productivity gains of one kind or another. Similarly large-scale labour displacements were considered to be a necessary concommitant of tractorization by some against little or no displacement of labour of other studies.

Chapter-II provides a comprehensive historical review of the progress of mechanization in Pakistan and the role of government policy to induce mechanization from time to time. Alongside the incentives and disincentives provided by government policy, a discussion of private initiatives is also included. In the final pages of the chapter, current constraints to mechanization are elaborated upon. Three main findings of the chapter may be reiterated. Firstly, mechanization in Pakistan has progressed at an accelerating pace since the decade of the sixties. The numbers have grown from a few hundred tractors per year during the decade of the fifties to few thousands during the sixties and early seventies to many thousands in the late seventies and eighties. In the second half of the eighties annual addition went above 25000 tractors. Although, the large farmers and Punjab had been at the forefront of appropriating mechanical equipment, there are no large-scale differences in the ownership of the tractors per unit of cultivated land. The availability of tractor rental services makes it possible and also profitable for the small farmers to use tractors as frequently as that by large farmers owning the tractors. Secondly, in spite of the problems especially those associated with foreign exchange, the government policy towards mechanization has persistently been favourable and became increasingly so with the passage of time. It originated in the fifties with over-valued exchange rates,

free licensing for tractor imports and low interest rates on loans for tractors. However the pace of mechanization remained slow in the face of falling agricultural incomes as a result of stagnant yields and falling commodity prices. Liberal price support policy for agricultural commodities and subsidized prices of agricultural inputs and private tubewell development coupled with continuation of the policies of the fifties and availability of foreign aid invigorated the pace of tractorization. But the foreign exchange crisis of 1965-66 kept mechanization at a stand still until early 1970s. The early 1970s had also seen a major devaluation of the Rupee, rising oil prices and deteriorating foreign exchange situation, to be overcome only in the late 1970s. Although the government policy in the 1980s has deteriorated, the private initiatives, motivated by rising wages, increasing animal costs and a squeeze on agriculture to reduce cultivation costs, to undertake mechanization remain high and finally, it is this scenario of events that runs us into constraints to mechanization. Five major constraints to mechanization are recognized. They have to do with smallness of agricultural holdings, profitability of mechanization, lack of repair and spare parts services, foreign exchange problems and monopoly of government in the distribution of tractors and loans for them.

In Chapter-III, we deal with the main issue of our report; that is the impact of farm mechanization on productivity of agriculture and employment both within and outside of agriculture. Before going into the main theme, the chapter first discusses the farm and non-farm usage of agricultural machines especially those of tractors. The finding of the section is that only 5 percent of the 1130 annual working hours of the tractor were devoted to

non-farm work. More than 53 percent of total agricultural work hours were rented out to neighbouring farmers. More than 68 percent of the non-farm hours were for the owner himself. While these figures present a Pakistan wide picture, there were considerable variations accross regions and various tenurial and farm size groups. Issues related to operation specific use of tractor users were also discussed at length along with percentage users of various tractor implements by size of holdings and in the various agro-ecological zones as revealed by our survey data.

Contrary to the findings of many studies, our survey results pointed to a positive contribution of tractors to agricultural productivity irrespective of the definition of the productivity. There was considerable variation in productivity across regions. Gross productivity turned out to be the highest in Sahiwal and Faisalabad zone followed closely by Peshawar-Mardan, Pishin-Nisirabad and cotton growing regions of Punjab and Sind. By contrast net productivities defined by gross value of output per crop-acre minus total cost per crop-area turned out to be the lowest in the insecticide intensive cotton and rice growing areas of the Punjab. It is also in these regions that bullock cultivation seems to be more profitable than tractor cultivation for the net incomes of tractor farms fell to abysmally low levels.

The higher gross productivity of tractor farms seems to be the result of their high dependence on modern inputs. Our survey results indicate that tractor farms almost invariably make greater use of all modern inputs than their counter part bullock cultivators. The tractorized cultivation results in farm incomes that are 3-4 times the

bullock cultivators. The principal causes of such large differences are high productivity, greater cropped-area and emphasis of the tractor farms on more valuable cash crops in their cropping pattern. The relative contribution of these three factors was noted respectively to be 20 percent, 187 percent and 37 percent in Peshawar-Mardan region.

Our survey results also indicate that tractorization is unlikely to lead to labour displacement and certainly not to a large-scale labour displacement. The only change that occurs is in the composition of the labour employed on the farm. Tractors seem to be instrumental in reducing peak-season labour bottlenecks by displacement of permanent family and hired labour to the extent of 40 percent. However a 20 percent spontaneous increase occurs in casual hired labour reducing the displacement content to only 20 percent. This decline in labour use is more than off-set by changes in cropping pattern towards more labour intensive crops and the rise in productivity that accompanies tractor cultivation. What is more important to note is that the interactions of forward and backward linkages may be associated with millions of jobs in the non-farm sector. While we have given some estimates of the likely employment creation in the manufacture of tractors, manufacture of tractor implements and repair shops for tractors, it is only a fraction of the total jobs created in transport, distribution network, trade and dealership of tractors and tractor spare-parts.

Chapter IV deals with fitting a linear programming model to our survey data to measure the efficiency of agriculture in terms of their behaviour as profit maximizing agents. The purpose here is to put various

policy issues to more rigorous test if only to reconfirm the findings of Chapter III.

The final chapter V summarises the findings of our study and makes policy recommendations in the light of these findings.

CHAPTER I

INTRODUCTION

1.1 BACKGROUND

Rapid growth and improvement of income distribution are the major goals of economic development the world over. The former is compatible with rising average per capita incomes and the latter with eradication of poverty and hunger of the less fortunate masses. The attainment of the two objectives in the agricultural sector of the developing countries can not be overemphasized as agriculture is a sector of major proportions in these economies.

The two objectives have been an integral part of Pakistan's development strategy though in varying degrees, since independence in 1947. In spite of this commitment, however, one finds considerable variations in Pakistan's growth and income distribution records. For example, the average annual growth rate of agricultural production in Pakistan did not exceed 1.6 percent for the decade of the fifties (1949-50 to 1959-60) and per capita incomes in agriculture, instead of rising, fell at the rate of nearly one percent per annum. Thanks mainly to the 'Green Revolution' technologies, the annual growth rate of agricultural output was well above 5.0 percent for the decade of sixties registering an increase of more than 2.0 percent per year in agricultural incomes. It is worth noting that such annual increases were only short-lived as the growth of agricultural output plummetted to 0.78 per cent per annum in the early seventies with almost a

complete reversal of the growth rates of per capita agricultural incomes. In the subsequent period, the growth of agricultural output has shown signs of improvement. Compared with a 3.9 percent annual growth rate of the late seventies, the agricultural output grew at 3.3 percent in the early eighties and at 4.3 percent per annum during the remaining three years, 1984-85 to 1987-88. Thus the growth rates of agricultural output since 1974-75, given a population growth rate of 3.0 percent, imply that the per capita farm incomes grew at the rate of 0.3 to 1.3 percent per annum depending on the period under consideration.

The fluctuations in growth of agricultural output from time to time can in general be attributed to much publicized technology of Green Revolution which was induced or held in abeyance by government price policy. During the fifties, according to Aresvik (1967) the terms of trade for agriculture were generally unfavorable, leaving no room for profitable investment opportunities and quite naturally stagnant agriculture was the end product. The active price support and input subsidy programme initiated during late fifties, led to rapid growth of agricultural output in accordance with schultzian theme as farmers found it profitable to invest in private tubewells and chemical fertilizers. The tempo of growth was also increased with the adoption of High Yielding Varieties (HYVs) of wheat and rice in the latter half of the sixties. A combination of factors such as political instability, world-wide recession, floods and sharper increases in the price of chemical fertilizers and pesticides relative to agricultural commodities, were the principal causes of stagnation in agriculture during early seventies. The amelioration of these constraints in the

subsequent period, tractorization and evolution of HYVs of cotton restored investment and growth in agriculture.

The empirical studies in Pakistan are in agreement that Green Revolution had been instrumental in motivating agricultural growth. According to a USAID study on Sources of Agricultural Growth in Pakistan, by Elkinton (1965), groundwater development accounted for as much as 43.6 percent and surface water supplies for 14.6 percent of the total agricultural growth that occured from 1960-61 to 1964-65. The contribution of fertilizer was 21.8 percent and that of improved seeds amounted to 3.6 percent. The remaining 16.4 percent occured as a result of use of insecticides, improved cultural practices and interaction of various factors for production. The same study also anticipated somewhat higher contributions for ground water development (46 percent) fertilizer (23 percent) and improved seeds (10 percent) with relatively lower contributions of surface water (10 percent) and plant protection, improved cultural practices and interactions (11 percent) for the period 1965-66 to 1969-70. Although growth accounting studies were not conducted in the following period, the rise in the importance of cultural practices and insecticides in recent years must be evident.

While there is a consensus on contribution of Green Revolution to agricultural growth, skepticism prevails as to its impact on distribution. A large body of literature in the late sixties and early seventies including, [Alavi (1976), Falcon (1970), Gotsch (1973), (1976a), and (1976b), Griffin (1974), Hasan (1976), Khan and Chaudhri (1973), Khan (1975), Nulty (1972) and Pearse (1976)] propagated the argument that the Green Revolution is

likely to lead to magnification of income inequalities in Pakistan's agriculture. Although the neutrality of seed-fertilizer revolution is accepted in most of these studies, the indivisibilities of mechanical technologies such as tubewells and tractors lies at the heart of the arguments leading to accentuation of income inequalities. Given this scenario, the independent mechanization studies especially those dealing with tractorization and related machines have tended to either approve or disapprove the conclusions of the above studies. A review of arguments advanced in favour of or against the conclusions of these studies, therefore seems to be inevitable and is under taken in the following pages.

1.2 AN OVERVIEW OF LITERATURE ON MECHANIZATION

As would be clear, a large number of studies on farm mechanization, with or without inclusion of tubewells, have been undertaken in Pakistan from time to time. Depending on their aims and objectives, they are full of all kinds of findings and conclusions. As one of the purposes of this study is to investigate the impact of tractors on employment and productivity in agriculture , only the studies dealing directly with these two objectives are reviewed here. Furthermore, it is neither possible nor would it be desirable due to repetition to review each and every study. Instead we will concentrate on the conclusions of important studies.

1.2.1 Employment and Tractors : Taking employment first, the impact of tractorization on labour displacement is highly controversial. Alavi (1976), Gotsch (1973), and Khan (1988) have argued that a large-scale tenant displacement is an essential concomitant of the mechanized cultivation

of land in Pakistan as the rising profitability of agriculture is likely to induce large farmers to take up self cultivation and to increase their size of operational holding by renting land from neighboring farmers. Although, no empirical evidence is cited in these studies, McInerney and Donaldson (1975) and Lockwood and Munir (1981) have claimed that the purchase of a tractor results in a significant increase in the size of operational holdings. According to McInerney and Donaldson (1975), this increase may be as pronounced as 142 percent, Lockwood and Munir (1981) estimated the increase amounting to 59 percent. Of the total increases in farm size after the purchase of a tractor, land previously rented-out and newly rented in accounted respectively for 40 percent and 26 percent according to McInerney and Donaldson (1975) and 62 percent and 30 percent according to Lockwood and Munir (1981). The residual increase was attributed to land purchases or new area brought under cultivation. As a result of these changes, McInerney and Donaldson (1975) estimated that tenant displacements could be as large as 1 to 5 tenants per tractor introduced which is on average equivalent to the displacement of 11 full-time workers per tractor..

Apart from these structural shifts in land distribution and associated employment changes, fall in labour input per unit of land was also anticipated by a large number of studies including those by Bose and Clark (1969) Gotsch (1973), McInerney and Donaldson (1975), Khan (1975) and Ahmed (1983). Bose and Clark (1969) suggested that labour requirements of tractorized farms may be only half of those on traditional farms. Gotsche's linear programming exercise shows a decline of 23 percent in per acre labour input with the introduction of a tractor on non-tubewell

farms but an increase of 18 percent on farms served by a tubewell. McInerney and Donaldson estimated a 40 percent decline in per acre labour requirements with the introduction of a tractor. According to Khan (1975) the labour input per unit of land on tractor-operated farms was only 55 percent of that on bullock operated farms. Kadri et al (1982) found that tractors result in reduced use of family labour but leave the use of casual labour unchanged. The result of a study by Ahmad (1983) in one of the Tehsils of Vehari District indicate that total human labour per cropped acre on tractor farms was nearly 20 percent lower compared to bullock farms despite an increase of 80 percent in casual hired labour . The latest study by Khan et al (1986) concluded that the total labour use per cultivated acre fell by 30 percent as a result of introduction of a tractor.

By contrast, an equal number of studies, if not more, has argued for a positive impact of tractors on labour employment. Both Giles (1976) and Lawrence (1970) made the argument that tractors are unlikely to displace labour and could augment labour use in agriculture by promoting intensive land cultivation. In the subsequent period, these, conclusions have by and large,been supported by Ahmed(1972), Naseem(1978) Khan and Ashiq (1981), Chaudhry (1982), WAPDA (1982), and Chaudhry (1986). Ahmed (1972) on the basis of his survey results have indicated that tractors are unlikely to displace labour and suggests that a more complicated process of labour absorption is at work. Both his time series and cross sectional data show that a one-third of the permanently hired labour displaced by a tractor is replaced entirely by a corresponding increase in family labour. Apparently the family labour which was averse to doing ardous farm

work with bullocks found it easy to work on a tractor. In addition he estimated an increase of 35 percent in the employment of casual workers in the wheat-cotton zone and an increase of 5 percent in wheat-rice zone. Only in the wheat-cotton zone underlain with saline groundwater did the casual labour requirements fall by 5 percent. On the basis of his survey data, Naseem(1978) predicted that selective mechanization (prevalent in Pakistan and consisting of tractors, threshers and trailors for off-carting of agricultural commodities) by removing peack-season power-tillage constraint is likely to lead to a 19 percent increase in employment compared with the traditional cultivation with bullocks. In the views of Khan and Ashiq (1981) tractorization has tended to increase per acre input of labour and crop-yields by a significant margin in the surveyed villages of Gujranwala and Okara . Accounting for direct and indirect effects of mechanization and basing his judgements on various assumptions, Chaudhry (1982) and (1986) concludes that labour input per unit area of land may be expected to rise by 4-33 percent with mechanized land cultivation. A study by WAPDA (1982) pointed to an increase of 19 percent in family labour and to 71 and 59 percent in that of permanent hired and casual labour respectively.

1.2.2 <u>Yields, Productivity and Tractorization</u> : Like the employment effects, the productivity effects of tractors, although to a lesser degree, are also controversial. Before embarking upon this controversy, it is important to note that claims to changes in productivity like those in employment can be made on the basis of changes in crop yields, changes in cropping intensities and those in unit costs. The studies discussed below employ one or more of

these tools to measure the effect of tractors on productivity of agriculture.

Changes in productivity of agriculture were largely equated to changes in crop yields in the late sixties to early seventies with a growing emphasis on gross value or net value of agricultural production as a measure of productivity in the ensuing period. Bose and Clark (1969) held the view that the introduction of tractors would add neither to crop yields nor to intensive cultivation of land implying a complete absence of productivity effects of tractors. It was also argued that under Pakistani conditions, cultivation will be far cheaper with bullocks than with tractors. Although Ahmed (1972) predicted a positive intensity effect of tractors, he supported the conclusion of Bose and Clark as far as crop yields were concerned. In the recent years a study by WAPDA (1982) came to the same conclusion, Khan (1975) and Kadri et al (1982) have pointed to the complete absence of productivity effects of tractors as measured by the gross value of agricultural output per cultivated acre.

The conclusions of a large number of studies are in sharp contrast with those of the above studies. On the basis of improvement of cultural practices endorsed by tractors Gile (1967) and Lawrence (1970) predicted a 25 percent increase in crop yields with the introduction of a tractor.

Because of optimal planting dates, quick ploughing and better seed bed preparation, tractors were assumed by Gotsch(1973) to have resulted in significant yield increases. In the the light of data produced by Rana Tractors (1974) and Pakistan Agriculture Research Council under the supervision of Chatta (1987) from experiments on

farmer's field, <Chaudhry (1982) and (1986) point to the potential contribution of deep tillage with tractors amounting to a four-fold increase in crop yields of barani areas and a 50 percent increase in irrigated crop yields. He also points out that a ploughing with tractor costs only one-third as that with bullocks. McInerney and Donaldson (1975) estimated that farm incomes witnessed a 200-percent increase after the introduction of a tractor. Nearly half of this increase was contributed to favourable changes in cropping pattern,14 percent to that of crop yields and 8 percent to a rise in cropping intensity. Khan and Ashiq(1981) and Ahmed and Mustafa (1983) point out that tractor owners reaped substantially higher gross and net incomes per acre than non-tractor farmers. Similar conclusions follow from the investigation undertaken by Khan et al (1986). They found out that gross value of agricultural output per cultivated acre on tractor owning farms was 37 percent higher than bullock operated farms. They have also shown that the only category that had positive net income per acre was that of tractor owners as tractors tended to reduce cultivation costs

1.2.3 A Critical Review : The variation in the conclusions of various studies regarding employment and agricultural productivity springs from the limitations and qualifications of each of these studies. A large number of studies including Giles(1967), Bose and Clark (1969), Lawrence (1970), Alavi (1973) and Chaudhry(1982) undertook no field investigation and instead based their judgements on logical economic arguments or empirical evidence from secondary sources. These studies reflected the perception of the authors regarding the possible impact of tractors on employment and agricultural

productivity. A second set of studies like those by Ahmed (1972), Gotsch (1973), khan (1975), Lockwood and Munir (1981), Khan and Ashiq (1981), Ahmed (1983) and Chaudhry (1986), although involved formal field investigations, were either characterized by smallness of their samples or covered only a specific region resulting in a limited scope for Pakistan wide applications. The comparisons of tractor and non-tractor farmers in almost all the studies ignore the size of holdings. As the tractor ownership is concentrated on large farms and only small farms are operated by bullocks, such comparisons tend to overstate labour displacement and underestimate productivity effect of tractors because both employment and agricultural productivity are inversely related to farm size <Khan (1981), Chaudhry (1982), Chaudhry, Gill and Chaudhry (1985) and Naqvi, Khan and Chaudhry (forthcoming)> in Pakistan. In view of this relationship and diversion of fodder area to cash crops, there is every possibility that the productivity effect of tractors was largely positive and that labour displacements were not phenomenal especially as tractorization was still in its infancy. Large scale tenant or labour displacements are untenable also in view of the growing shortages of labour in agriculture noted in studies on employment of rural labour Guisinger (1978) and Chaudhry (1981). The arguments and empirical evidence pertaining to enlargement of farm size by tractor owners is at best partial as the land concentration ratios in Pakistan between 1972 and 1980 were practically the same Naqvi, Khan and Chaudhry (forthcoming). Although the number of tenants have been on the decline between 1972 and 1980, it seems to be the result of other economic forces rather than that of tractors. This statement can be substantiated by referring to Khan et al (1986) who have particularly noted

that although the tractorization apparently seems to have displaced tenants, the interviews of the displaced tenants indicated that it was primarily the better income opportunity of other jobs that attracted them out of tenancy. Although tractors may lead to some displacement of labour within agriculture, their contributions to employment of labour in the nonagricultural sector may largely be positive. Assembly and progressive manufacture of tractor and tractor implements, supply of spare parts and proper repair services, distribution of diesel and lubricants and off-farm use of tractors for haulage, transport, etc. are some of the ac ivities that are likely to add to employment of labour in the nonagricultural sector. Such effects of the tractors on employment are largely ignored by almost all the studies undertaken in Pakistan.

With the exception of a few studies, the employment and productivity effects of tractors are derived from the comparisons of bullock versus tractor cultivation. This ignores many levels of technology especially those involving HYVs and tubewells. As Gotsch (1973) data shows, this might be a source of underestimation of tractor effects on employment and productivity in agriculture.

1.2.4 <u>Objectives and Outline of the Study</u> : In view of the inherent draw backs of one kind or another of the various studies under taken in Pakistan, the utility of a relatively flawless study in terms its policy implications can hardly be undermined. Aware of the weaknesses inherent in various studies, we made every effort to keep our study free of such draw backs. This was achieved, as will become clear from ensuing pages, by the selection of

a large sample size representing various ecological zones, by ensuring the accuracy of the information gathered in the sample surveys and by the application of most advanced techniques of economic analysis to the data collected from the field. It is our earnest hope that we were successful in achieving this objective of our study. In fact, it may not be unjustified to claim that the achievement of this objectives was geared towards the achievement of specific objectives of this study as described in the terms of reference prepared by Directorate of Agricultural Policy of Ministry of Food and Agriculture. These objectives are:

1. Impact of mechanization on productivity, farm and off-farm employment and income by farm size and tenure for different ecological zones.

2. Constraints in mechanization

3. Economics of small versus medium and large scale machines (tractors and harvestors etc.)

4. Farm and off-farm use of agricultural mechanical equipment.

5. Conclusions and recommendations.

In line with these objectives, the analysis of this study spans over five chapters. The current introductory chapter 1, comprises of back ground, an overview of existing literature, the data sources and methodology employed in this study. In chapter 2 we discuss the current state and progress of farm tractorization from time to time along with an emphasis on factors inducing or inhibiting the progress of farm mechanization. The

chapter also includes a discussion of government policies in this regard. How these factors and policies affect the on-farm and off-farm use of tractors by regions receives special attention. Also included in this chapter is the use of tractors by farm-size and tenurial classes.

The impact of mechanization on employment, productivity and incomes of the farm and non-farm sectors is analysed in chapter 3. The analysis of the chapter runs from Pakistan wide picture to regional variations in the impact of tractor technology on various tenurial and farm size categories. Chapter 4 make use of linear programming to measure the effects of farm mechanization on farm incomes, both gross and net, given the constraints of various inputs and their prices. The purpose of this chapter is to look into the limitations of farm sector to maximize agricultural output under the given constraints. A final chapter 5 provides a summary of the conclusions of the study and make policy recommendations for future course of action regarding farm mechanization.

1.3 THE DATA SOURCES

The successful undertaking of a study of this kind is preconditioned by huge data requirements. As no single source of data, no matter how comprehensive, could meet these requirements, data are to be derived from a varied number of data sources for completion of the study. We, therefore, have no option but to depend on secondary as well as primary sources of data. Among the secondary sources we will concentrate heavily on government documents, reports, and publications, research papers of individual authors and those of the autonomous research organizations. The primary source of data is our field

survey of nearly 500 farmers undertaken in 1988 covering the agricultural year of 1987-88 and 50 firms specializing in the manufacture, supply and repair of tractors and tractor-related equipment. The purpose of the former survey was to investigate the on-farm impact of farm mechanization on productivity and employment and that of the latter to estimate the off-farm employment associated with farm mechanization. While the emphasis of the farmer's survey was Pakistan-wide, survey of the firm was conducted in Khanewal district because of concentration in that district

As productivity and employment are likely to vary with climatic conditions and soil types, our purposive sample of 500 farmers was spread, more or less, equally over seven agro-econogical zones in the irrigated areas of Pakistan. In consultation with the officials of the Department of Agriculture we picked up two irrigated districts (representing the average cropping pattern) of each region for conducting the farmers survey. Similar procedures were used to select two Tehsils in each of the irrigated districts and one village in each of the selected Tehsils . Thus the survey of farmers was spread over 28 villages in the seven agro-ecological zones of Pakistan. A listing of the selected Districts, Tehsils and villages in the various zones appears in the following Table-1.1.

In each of the selected villages, 15 respondent farmers were interviewed on a pretested questionnaire prepared for this purpose. The number of observations in each village were equally divided between seven major categories of technological packages. These technological packages were represented by farms operated with, (1) Bullocks only (2)

Table 1.1
Nos. of Selected Districts Tehsils & Villages
in Different Zones

Zones (1)	Districts (2)	Tehsil (3)	Villages (4)
1	Peshawar	Peshawar	Char Pariza
		Nowshera	Kheshki
	Mardan	Mardan	Shankar
		Swabi	Char Bagh
2	Sahiwal	Sahiwal	58-D.G. (Bahader Shah)
		Chichawatni	Chak 15-11/L
	Faisalabad	Faisalabad	267/RE (Jalander)
		Samundri	493/GB
3	Multan	Multan	Makhdoom Rashid
		Lodhran	Makhdoom Aali (Chak-13)
	R.Y. Khan	Khanpur	5-P
		Sadiqabad	173-P
4	Sheikhupura	Sheikhupura	Mudwala Khurd
		Ferozewala	Khanpur Kalan
	Gunjranwala	Gunjrawala	Chahl Kalan
		Hafizabad	Rasoolpur Tarrar
5.	Jacobabad	Kand Kot	Allah-Jawayo-Bejarani
		Thul	Abdul Majeed Khoso
	Larkana	Larkana	Rato kot
		Rato Dero	Barchound Village
6.	Sanghar	Sinjoro	Zubair Shaheen
		Shahdadpur	Hingoro
	Sukkur	Ghotki	Sarhad
		Mirpur Mathelo	Nawan Kot
7.	Nasirabad	Dera Murad Jamali	Goth Khuda Bakhsh
		Dera Allah Yar	Goth Attaullah Khan
	Pishin	Pishin	Kili Mugton
		Pishin	Sir Khan Zai

Bullocks cum thresher, (3) Bullocks cum thresher cum tractor, (4) Tractor cum thresher and (5) Tractor cum combine harvestor, (6) Crop-specific technology and (7) Farms operated with manual labour alone.

As the above description shows, the sample design of our survey was necessarily purposive as we were guided towards a fair and equal representation of different regions and technological packages, the sources of irrigations, farm size and tenure pattern. The equal representation of all the 7 technological packages, however, proved to be impossible in practice. It was difficult in any of the regions to find respondents using all 7 technological packages. While this resulted in variations in the number of respondents covered in each region, only four of the technological packages, namely; Bullocks only, Bullock cum tractor and Tractor only, with thresher in common use) and tractor + combine were practised in all the regions. Accordingly our survey was redirected to concentrate on these packages. Table 1.2 provides the details of distribution of our sample by regions, land tenure, farm size and by technological package as it appeared in the final stage.

Every effort was made to ensure the accuracy of the survey. For example, the survey was conducted on a questionnaire considerably refined and sharpened in the process of pretesting. The survey was conducted by graduates of economics and statistics with rural background. These investigators were imparted thorough training in interview techniques and administration of the questionnaire and finally, the survey was closely supervised by the senior staff members of the study team on a regular basis and from time to time by the officials

of Federal Ministry of Agriculture and those of United State Agency for International Development.

1.4 RESEARCH METHODOLOGY

1.4.1 Tabular Presentation : As soon as the filled-in questionnaires were received from the field, they were edited, coded and their data fed to the computer for economic analysis. The methodology of the study comprises of the calculation of various micro-and macro-level aggregates by size of holdings, level of technology and by regions. These aggregates involve, cropping intensities, cropping patterns, land use intensities, employment per unit of land and aggregate productivity as depicted by crop yields and gross and net values of farm output. Two alternative definitions of net productivity are used in this study. They are gross productivity minus total cost of all the inputs and gross productivity minus the cost of purchased inputs.

As, however, the higher levels of mechanization might be associated with higher usage of other inputs like fertilizer, pesticides etc. because of complementarity of inputs, the above tabular and description analysis may have its own limitations and needs to be refined using sophisticated techniques of economic analysis. Although such techniques may have their own limitations, such an analysis would be essential to supplement and double check the accuracy of our conclusions following from simple analysis. In view of the growing popularity of the linear programming (LP) models as a more satisfactory approach to tackling day to day policy issues, we planned to employ the technique in this study. To fit the model to our data

we first developed individual crop budgets for the major crops in each agro-ecological zone for each technological package. Revenue and input costs per acre were used to compute net return per crop-acre of different crops for comparing the net profitability of crops under varying conditions of soil and climate.

1.4.2 Linear Programming Approach : Linear Programming models have been widely used for their ability to generate optimal solutions. One of the most productive uses of Linear Programming Models is the simulation of 'with' and 'without' policy alternatives. Most policy alternatives can be simulated within the model through changes in parameters or modifications of equations. The resulting solutions provide a comparable 'with' case. Linear Programming Models are extensively used to study questions relating to mechanization policy because these lead to a more precise problem defination and solutions can be compared for series of mechanization choices. Gotsch, Carl. H (1975) In many cases, the mechanization alternatives can be defined as variable and the Linear Programming Model could be used to select the most feasible package of mechanization.

1.4.3 Application of Linear Programming Model : In the second phase farm budgets were developed to portray the overall financial viability of farms. This was necessary because it was quite possible that the farm as a whole might be making good profit but some of its crop enterprises might be doing rather badly. Total farm budgets point to the relative contribution of various crop-enterprises to farm profits.

The linear programming model is nothing but a standard linear format capturing the relationship between inputs and outputs with given constraints. The standards mathematical form of the model is to maximize:

$$\text{Max (or Min.)} \quad Z = CX$$
$$\text{Subject to} \quad ax \leq b$$
$$\text{and} \quad x_i \geq o$$

Where the objective function (CX) is designed to maximize net returns to management subject to the technical constraints of the production function and the level of resource availability. (b) the typical element a_{ij} of the technology matrix (a) represents the amount of input i required per unit of output j.

The objective function was designed to maximize net return to a particular mechanization package subject to the technical constraints of the production function and the level of resource availability. The model would consider three types of activities; production of crops, sale of outputs and irrigation water etc. Fixed resource constraints would be land, canal water, family labour, and mechanical equipment available to the farm. Detail discussion on fixed resource constraints in Chapter IV of this Report.

Separate model runs were made for each technological package. Each model solution would provide us information about net returns to technological packages, optimal cropping pattern cropping intensity, labour and use of other inputs and shadow prices of resources. The model solution can be compared with the baseline solution to determine the economics of alternative technological packages.

TABLE 1.2

DISTRIBUTION OF THE SAMPLE BY TECHNOLOGY, SIZE, REGION AND TENURE

ZONE	TENURE STATUS	TECHNOLOGY-1 BULLOCK ONLY			TECHNOLOGY-2 BULLOC-CUM-TRACTOR			TECHNOLOGY-3 TRACTOR ONLY			TECHNOLOGY-4 TRACTOR-CUM-COMBINE			TOTAL			
		Small Below 12.5 Acre	Medium 12.5-25 Acre	Large Above 25 Acre	Small Below 12.5 Acre	Medium 12.5-25 Acre	Large Above 25 Acre	Small Below 12.5 Acre	Medium 12.5-25 Acre	Large Above 25 Acre	Small Below 12.5 Acre	Medium 12.5-25 Acre	Large Above 25 Acre	Small Below 12.5 Acre	Medium 12.5-25 Acre	Large Above 25 Acre	Total
Peshawar/ Mardan	Owner	11	2	-	7	7	3	9	-	1	-	-	-	27	9	4	40
	Owner-cum-tenant	-	-	-	2	-	1	-	-	-	-	-	-	2	-	1	3
	Tenant	6	-	-	15	2	-	8	-	-	-	-	-	39	2	-	31
Sahiwal/ Faisalabad	Owner	12	-	-	19	5	3	9	2	3	-	-	-	39	7	6	52
	Owner-cum-tenant	1	1	-	1	1	3	1	-	3	-	-	-	3	2	6	11
	Tenant	2	1	-	6	-	-	5	-	-	-	-	-	13	1	-	14
Multan/ R.Y. Khan	Owner	8	-	1	6	6	4	9	5	8	-	-	-	23	11	13	47
	Owner-cum-tenant	1	-	-	1	2	1	1	1	5	-	-	-	3	3	6	12
	Tenant	-	-	1	2	-	2	1	2	1	-	-	-	3	2	4	9
Sheikhupura/ Gujranwala	Owner	11	-	-	-	1	3	10	5	4	-	-	5	21	6	16	43
	Owner-cum-tenant	3	-	-	-	1	1	3	1	2	-	1	-	6	3	3	12
	Tenant	4	-	1	3	1	-	6	1	2	-	1	2	13	3	5	21
Jacobabad/ Larkana	Owner	3	-	-	1	-	-	3	-	1	-	-	-	7	-	1	8
	Owner-cum-tenant	1	-	-	4	1	-	4	-	-	-	-	-	9	1	-	10
	Tenant	7	4	-	20	2	-	19	-	-	-	-	-	46	6	-	52
Sangar/ Sukkur	Owner	8	-	-	7	4	3	1	1	-	-	-	-	16	5	3	24
	Owner-cum-tenant	1	-	-	5	3	2	-	-	1	-	-	-	6	3	3	12
	Tenant	8	2	-	19	5	3	1	2	1	-	-	-	28	9	2	39
Pishin/ Nasiratad	Owner	10	-	1	8	2	-	11	3	1	-	-	-	29	5	2	36
	Owner-cum-tenant	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Tenant	1	1	-	5	8	2	8	-	-	-	-	-	14	9	2	25
Pakistan	Owner	63	2	2	48	25	16	51	16	16	-	-	9	163	43	45	250
	Owner-cum-tenant	7	1	-	13	8	8	9	2	11	-	1	-	29	12	19	60
	Tenant	28	8	2	70	16	5	48	5	4	-	1	2	146	32	13	191
	TOTAL:	98	11	4	131	51	29	108	23	33	-	2	11	337	87	77	501

Source: United Consultants Ltd. (1988)

CAPTER II

FARM MECHANIZATION; TRENDS, INDUCEMENT, CONSTRAINTS AND PROJECTIONS

2.1. INTRODUCTION

For a proper perspective on implications of farm mechanization for employment and agricultural production, investigation of the nature and speed of adoption of tractors is an important first step. Who are the owners and users of tractors and what is their regional distribution are questions that are crucial for redirections in economic policy. Similarly the unconditional access to tractor market would have widespread ramification for social justice and welfare of the masses. The basic purpose of this chapter is to throw light on some of these and other related questions. Also included in this chapter is a discussion of the factors inducing or constraining the introduction of tractors in Pakistan with a special emphasis on public policy towards farm mechanization from time to time.

2.2 THE NATURE AND TREND OF FARM MECHANIZATION

2.2.1 Historical Trend of Mechanization : Pakistan agriculture at the time of independence in 1947, had all the fervour of a traditional agriculture. It was marked by stagnation and depended primarily, though not exclusively, on traditional sources of power, like animals and manual labour, for cultivation of land. As stagnation of agriculture protracted into the fifties, and food-feed competition, intensified, as a result of growing population, the animal power proved to be an insufficient source of draught

power. Between 1950 and 1960, the number of work animals went down from 10.5 million to 9.4 million. It was this tendency of falling draught power, that forced many policy makers to think seriously of introducing tractors in Pakistan Laird et al (1983).

Despite the lack of clear emphasis, the use of mechanical power in Pakistan's agriculture in the form of tractors is as old as Pakistan herself. Though negligibly small, the population of operational tractors in 1947 in Pakistan was nearly 500 according to unofficial estimates, Laird (1983). With the growing emphasis of policy makers for the clear need of tractors in the fifties, the number of operational tractors had grown to 1300 in 1961 with only 33 combine harvesters, Binswanger (1987). Following the advent of seed-fertilizer revolution and rapid increases of tubewells in the subsequent years, introduction of tractors became inevitable in the mid Sixties due to intensive land cultivation and emerging power constraints, However, the investment in tractors remained low and the number of tractors increased only slowly until the early seventies. It was this availability of tractor power which induced the introduction of tractors, trailers, tractor driven-blades, threshers and corn shellers into Pakistan's agriculture (refer to Table 2.1). Alongside these developments, Pakistan's agriculture also witnessed positive changes in the use of bullock-drawn implements like furrow-turning ploughs, seed drills and hand-operated sprayers. It has been only in the recent years that the tractor-drawn seed drills and power-operated sprayers have become popular.

The growing popularity of these implements and machines has resulted in the regular official censuses of the numbers involved since 1968. The progress of appropriation of

various mechanical machines in Pakistan since 1968 is summarized in the following table 2.1

TABLE 2.1

Number of Machines and Mechanical Equipment since 1968 for selected Years

Equipment	1968	1972	1975	1980	1984
Tractors	18909	31869	35714	96215	157310
Power-drawn Blades	3925	12792	12599	41199	70338
Cultivators	14338	-	31619	-	146864
Furrow-turning-plough	4848	-	6834	-	13375
Harrows	2007	-	2373	-	4140
Tractor-driven Drills	820	-	2334	-	12180
Bullock-driven Drills	10412	96265	-	199195	-
Power-operated Sprayers	-	1412	-	7676	-
Hand-operated Sprayers	-	10720	-	36223	-
Trailors	6962	-	18074	-	98784
Reapers & Bunchers	-	-	-	-	1127
Threshers & Sheller	714	-	3635	35246	78377
Combine Harvestor	84	-	378	-	656

Source; Pakistan, (1970), (1975), (1977), (1983) and (1987)

It is important to note that the data reported in Table 2.1 come from two major sources, agricultural censuses and agricultural machinery censuses. The main emphasis of the agricultural censuses is to report on every kind of machine whether operated by tractors, animals or by manual labour. By contrast agricultural machinery censuses concentrated on power-operated machines. It is for this reason that some types of machines reported by agricultural machinery censuses are not reported by agricultural censuses and vice versa. However, the figures reported in both the sources are, by and large, consistent in depicting the trend of

farm mechanization in Pakistan except for a small conflict between 1972 and 1975 in the case of power-driven blades.

The data in Table 2.1 reveal convincingly that the pace of mechanization in Pakistan has been more rapid in the eighties than in the earlier decades. The number of tractors which had just doubled between 1968 and 1975, witnessed an increase of nearly 170 percent over the five-year period of 1975 to 1980. Taking 1975 and 1984 as the reference period, the number of tractors more than quadrupled. Similar trends are reflected in the data on tractor-related equipment. Power-driven blades for precision land-levelling increased from 4 thousand in 1968 to 70 thousand in 1984. The number of cultivators went up from 14 thousands to 147 thousands reflecting a nine-fold increase between 1968 and 1984. The growth of tractor-trailers and threshers and shellers was even more pronounced. The tractor-trailer multiplied by a factor of 20 and threshers and shellers by a factor of 100 over the period 1968-1984. Although agricultural machinery censuses provide no information on the growth of hand tools and bullock-operated agricultural equipment, agricultural census data point to the rising use of bullock-driven seed drills and hand-operated sprayers.

Despite the impressive growth of mechanical technology, it must be borne in mind that mechanization in Pakistan thus far has, at best, been partial, incomplete or in its infancy for at least two reasons. Firstly, except for the large size of tractors, mechanization in Pakistan is completely devoid of large-scale combine harvesters, reapers and cotton pickers and is restricted to only spcific farm operations of peak-season labour demand period. Secondly, despite the rapid growth of tractors,

only about 15 percent of farms depend solely on tractors. Another 22 percent of the total private farms use both tractors and bullocks for land cultivation. By comparison, a large majority of 63 percent wholly depend on bullocks and manual labour for cultivation, Pakistan (1983). Not only that, the access to other labour saving technologies is even lower; seed drill has ever been used on only 10 percent of the farms and a tractor-driven drill on only 2.0 percent of them. This then implies that a large segment of the farms is still dependent on traditional power sources of land cultivation especially in the case of performance of labour intensive operation like irrigation, hoeing and harvesting of agricultural commodities. Having considered the state and trend of farm mechanization, we proceed to the distribution of tractors and related equipment among the various regions and size groups of farmers. As the ownership and use of tractors are likely to vary, we would also look into the use pattern of tractor technology by regions, tenure and size.

2.2.2 <u>The Distribution of Tractors by region, size & tenure*</u> :

It has been argued in the literature that poorer agricultural regions, the small farmers and tenants are unlikely to benefit from mechanical technologies like tractors as they could not adopt the innovation due to indivisibilities involved vis-a-vis their precarious financial position and lack of collateral for agricultural

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* As our survey data were derived from purposive sampling aimed at equal coverage of various technologies in each region comparisons of survey results with historical data do not seem to be feasible. It is for this reason that we did not include our survey estimates in any of the tables in Chapter 2.

credit, Falcon (1970), Gotsch(1973) and Khan (1985). By contrast large farmers are doubly benefitted; not only do they have access to resources, the purchase of a tractor also enables them to reduce tenants share in produce or to take up self-cultivation. The question of distribution of economic benefits of tractors as explained above hinges on two major variables; the adoption rates of tractors and their effect on productivity and employment per unit of land in respective categories. While we would answer the second question in the next chapter, the situation with respect to the first is as follows.

There is no doubt that the ownership of tractor-related equipment has heavily been concentrated in the Punjab. This is shown by the data presented in the following Table 2.2.

TABLE 2.2

Number of tractors and related equipment in Pakistan for 1968,1975 and 1984 with respective shares of the Punjab.

Equipment	1968		1975		1984	
	1	2	1	2	1	2
Tractors	18909	83.0	35714	80.5	157310	81.1
Cultivators	14338	86.3	31619	84.4	146864	84.3
Mould-Board Ploughs	2335	50.1	2734	44.4	7319	38.0
Harrows	2007	54.3	2373	36.0	4140	33.6
Disk-ploughs	2513	53.4	2938	40.6	6355	17.8
Seed Drills	N.A	N.A	1174	90.0	11251	94.8
Trailers	6962	81.9	18074	81.6	98784	82.8
Threshers	N.A	N.A	3635	84.8	78377	90.8

1. Number of Pakistan. 2. Punjabs' Share Percent

As the data in Table 2.2 show Punjab's share in tractors, cultivators, seed drills, trailers and threshers exceeded 80 percent. This is hardly surprising in view of Punjab's leadership role in major technological innovations of Pakistan's agriculture and because Punjab accounts for two-thirds of Pakistan's crop-land. Had it not been for large area, the concentration of technology in Punjab would be considerably diluted. What is more interesting to note is the technological concentration of productivity-raising mechanical equipment like mould-board ploughs, harrows and disk ploughs in other provinces of Pakistan. Whether this concentration leads to higher productivity or not is a question that will be addressed in Chapter 3 under effect of farm mechanization on productivity in agriculture.

Like that in the Punjab, the ownership of tractors and tractor equipment is concentrated in the hands of large farmers. The data in Table 2.3 refer to ownership pattern of the technology by categories of small (under 12.5 acres), medium (12.5 to under 25.0 acres) and large (25.0 acres and above) farmers.

TABLE 2.3

Percentage Distribution of ownership of Tractors and Tractor Equipment among small, Medium and Large farmers for 1972 and 1980 for Pakistan

Year and Tractor Equipment	Persentage ownership by:		
	Small farmers	Medium farmers	Large farmers
A. 1972			
Tractors	10.0	15.0	75.0
Thresher & Sheller	N.A	N.A	N.A
Power-Driven Blades	7.0	15.0	78.0
Tractor Drills.	8.0	7.0	85.0
B. 1980			
Tractor	18.0	22.0	60.0
Thresher & Shellers	14.0	21.0	65.0
Power Driven Blades	13.0	18.0	69.0
Tractor Drills	15.0	14.0	71.0

Source: Pakistan, (1975) and (1988)

As the Table shows, the percentage of tractor equipment owned by small farmers did not exceed 7-10 percent in 1972 against 75-85 percent share of large farmers. By 1980, the ownership share of small farmers rose to lie between 13 to 18 percent and that of large farmers fell to 60-71 percent. Like that in Punjab, the concentration of tractor technology in the hands of large farmers may in large measure be attributed to their leadership role and to concentration of farm area.

Data regarding the ownership of tractors and tractor equipment by tenure are, at best, scarce. The only source is 1972 agricultural census, Pakistan (1975) which gives distribution of tractor ownership by tenure. As should be expected, the owner farmers accounted for the ownership of more than 59 percent of the total population of tractors in 1972. Owner-cum-tenants held a share of 29 percent. The remaining 12 percent of the tractors were owned by tenants (8 percent) and landless nonfarm households (4 percent). In the agricultural census of 1980, the division of tractors is restricted to farm and nonfarm household. The nonfarm households had ownership of 6 percent of the tractors in 1980 and the remaining 94 percent were owned by farm households including the owner-cum-tenants and tenants.

The concentration of ownership of tractors and tractor equipment will have little, if any, implications for employment and productivity if such a concentration follows the pattern of concentration of agricultural land or if there are considerable variations in the intensity of tractor use or if tractor rental services are available to non-tractor owners. We have shown earlier that concentration of tractors in the hands of large farmers and in the Punjab is largely the result of concentration of agricultural land. Our survey results indicate that intensity of tractor use for agricultural purposes varies inversely with number of tractors per unit of agricultural land. It is universally acknowledged that tractor services could be freely rented in Pakistan making tractors a completely divisible input. Since the purpose of this study is to investigate the productivity and employment impact of tractors, it is pertinent to look into the access of various regions, farm sizes and tenurial classes to

tractors as measured by percentage farms and percentage area benefitting from tractor technology. The data in the following Table 2.4 are designed to serve this purpose.

The data in Table 2.4 challenge the authority of the conclusions following from ownership of tractor and tractor equipment. There is no overwhelming supermacy of Punjab, large farmers or owner operators in tractor use. On all farm basis, Punjab was closely followed by NWFP and Sind in the use of tractors. Against 41 percent of the farms in the Punjab, 40 percent in NWFP and 33 percent in Sind benefitted from tractor services. Tractors served 48 percent of the total farm area of the Punjab in costrast to 37 percent in NWFP and 35 percent in Sind. Like wise the concentration of tractor ownership in the hands of large farmers is considerably reduced. Nearly 36 percent of the small farmers and 34 percent of their area benefitted from tractor use. The respective figures for the large farmers were in the vicinity of 48 and 52 percent. Although these general trends held in the Punjab and Sind, tractor use was inversely related to farm size in the NWFP province. While both in Punjab and Sind owner cultivators made heavier use of tractors than either owner-cum-tenants or tenants, the reverse seems to be the case in NWFP. By way of conclusion of this section, it is worth emphasizing that there are no large-sale differences in the use of tractors across regions, land tenure classes or farm size catagories despite the high degree of concentration in the ownership of tractors and tractor equipment.

TABLE 2.4

Percentage of Farms and Farm area benefitting from tractor services by region, farm size and tenure

	Description, Size & Tenurial Classes	Punjab	Sind	NWFP	Balu-chistan	Pakistan
A.	Percent of farms using Tractors					
	Small Farmers	39	29	41	N.A	36.0
	Medium Farmers	38	31	38	N.A	36.0
	Large Farmers	55	36	30	N.A	48.0
	Owner farmers	43	24	38	N.A	38.0
	Owner-cum-tenants	40	26	44	N.A	38.0
	Tenants	35	34	52	N.A	36.07
	All farmers	41	33	40	N.A	37.0
B.	Percent of area bene-fitting from tractors					
	Small farmers	36	29	41	N.A	34.0
	Medium farmers	40	31	37	N.A	36.0
	Large farmers	63	45	33	N.A	52.0
	Owner farmers	53	34	35	N.A	44.0
	Owner-cum-tenants	48	36	36	N.A	44.0
	Tenants	35	36	43	N.A	36.0
	All farmers	48	35	37	N.A	42.0

Source: Pakistan (1983)

2.3 CONSTRAINTS IN MECHANIZATION

The adoption of a mechanical innovation, like many other innovations, is conditioned by a large set of factors despite rapid progress and comprehensive government policy. As a factor of change, there may be a conflict between the innovation and the norm of the society. The deliberate government policy actions, consciously or unconsciously, may place undue emphasis on some highly inefficient policies and ignore the most relevant issues causing problems of one kind or another. Even the innovation itself, may limit its own scope if its perceived benefits fail to materialize. We will look at some of the major constraints of mechanization in Pakistan ignoring the minor ones.

2.3.1 Nature of Agriculture : One of the major constraints on the use of mechanical equipment is the nature of agriculture in Pakistan. A large majority of agricultural holdings are small. The purchase of a tractor whether large or small, would be beyond their financial reach. Some of them may be unable to purchase even the rental services of a tractor partly because they may not have the financial means to do so and partly because their requests for rental services may be ignored by the tractor operators on grounds of high in transit costs relative to the smallness of small farmer's operation. Many tiny plots of land and terraces in the hill tracts may be altogether inaccessible to tractors. Bullock cultivation being the norm, the tradition bound cultivators may fail to observe high implicit bullock maintenance costs and may be quite adamant to incur out of pocket costs on rental services of a tractor. In spite of the growing shortages of labour, some of the farm households, especially those with small

holdings, may still be characterized by surpluses of labour. To put their labour to effective use, it may not be feasible for them to rent tractor services and instead cultivate their land with manual and animal labour . Finally, freedom of thought and action is the nobility of agricultural profession. It loathes dependence except on its own kith and kin. Rather than depending on hired tractor services, a significant proportion of the farm community may continue to perfer bullock cultivation.

2.3.2 Profitability of Mechanization : Investment in tractors is a highly profitable venture Mclnerney and Donaldson (1975), Gotsch (1973) and WAPDA (1982). The demonstrated high profitability of tractors results almost invariably, from their use in transport and the rental market. It has been argued that tractor cultivation has no demonstrable superiority over bullock cultivations as far as yields are concerned. This tends to limit the use of tractors and promotes the cause of bullock cultivation. Probably the failure of the tractor to raise yields significantly results from dependence of farmers on cultivator plough for primary tillage like a traditional bullock plough and the productivity raising potential of the tractors is precluded by the lack of the use of improved implements like disc plough, disc harrow and furrow-turning mould board plough. Apart from poor technical background and knowledge of the tractor operators, such a state of affairs could also arise out of low profitability of agriculture due largely to unfavourable farm prices especially in the recent years nonavailability of cheap appropriate equipment, absence of propaganda campaigns to popularize the use of improved implements and proper training facilities for tractor operators. It must be noted that these constraints are

likely to be aggravated by the introduction of small tractors for they can not be used for transport purposes, are costly in terms of ploughing costs, Khan et.al (1986), involve high maintenance costs due to lack of spare parts and availability of repair services, (Expert Working Group on Engineering Goods Industry (1987) and above all because no attachments of improved implements for small tractors are locally available. While the problems of one kind or another continue to constrain the shape and trend of farm mechanization, there has been a complete lack of mechanization related research in Pakistan. It remains undefined as to what would be the most appropriate set of technologies under conditions prevailing in Pakistan.

2.3.3 Repairs, Spares and Agricultural Implements : For an efficient and expanded use of agricultural machinery, it is hard to underestimate the role of efficacious availability of repair services, spare parts and agricultural implements of varying dimensions and kinds. This would be especially true where the tractor operators are poorly equipped to even properly operate and maintain tractors. Despite its importance, the field has been completely neglected in government policy circles. As a result, whatever developments took place in repairshop business and implements industry were the result solely of private initiatives with little government assistance, technical or otherwise

Despite the mushrooming population of repairshops, their inadequacy to provide effective service may be seen in the light of the conclusions of two studies. Khan et al (1986) concluded that repair and maintenance facilities were not satisfactory in Pakistan as most farmers have to travel more than 5 miles for tractor repairs and more than 10

miles for spares. According to Hussain and Lockwood (1980) the acquisition of skills needed to properly use, maintain and repair farm machinery has lagged behind the acquisition of farm machinery. Hussain and Lockwood noted particularly, that most repairshops were poorly equipped with tools, skills and spare parts resulting in considerable delay in tractor repairs. While almost every tractor on average appeared in the workshop at least once a year for a major repairs, time taken to service the tractor was 14 days. As major breakdown occured during the 4 peak demand months, the inadequacy of repairs tends to reduce effective tractor use by nearly 10-12 percent. It may also be noted that these repairshops charged prices of spare parts that were double of those charged by dealers.

The implement manufacturing industry in Pakistan is in its infancy and totally disorganized. There is total lack of technical know-how and only crude attempts have been made to copy imported implements. Invariably such locally manufactured implements are devoid of accuracy, proper material and heat treatment etc. The end result is inefficient operations and misuse of tractor power. Evidently the large number of small and cottage type industries without much attention of standardization of the output.

2.3.4 <u>Foreign Exchange Availability</u> : In a growing economy like Pakistan, the scarcity of foreign exchange impinges on almost all the development programmes including mechanization with varying degrees of intensity. Pakistan's mechanization programme suffered from most severe foreign exchange crises in 1965-66 and in early 1970s. Although at present, we have moved into domestic production of tractors, foreign exchange needs of the

manufacturing industry are no less important at present than before. Obviously we are still using imported tractor parts to a 40-70 percent degree. The foreign exchange requirements of the manufacturing firms will grow significantly in the future due to growing imports of raw materials and more costly and sophisticated plant equipment for the mass production of gears, engines, heat treatment and foundary operations.

2.3.5 Monopoly in Distribution and Institutional Credit : Supply of credit and distribution of tractors to a large extent is controlled by the Agricultural Development Bank of Pakistan. Very few sales, if any, of new tractors take place in the open market. While open market sales are known for quick disposal and efficiency, the government arrangements may cause unnecessary delays in the delivery of the tractor and the system may be inefficient for well-known reasons. It has been observed that loan sanctioning for tractors takes nearly 2.5 months and involves a transaction cost of nearly Rs, 1900, Khan etal (1986). Not only this, the monopoly of the ADBP in the face of a strong demand has resulted in the existence of the black market for new tractors with substantial margins of price. Thus many farmers who have no access to ADBP end up paying much higher prices in the black market or have to contend with second-hand tractors to be purchased from the second-hand market for tractors. Nearly 23.5 percent of the total sales of tractors originate from the second-hand tractor market. While some of the sales of second-hand tractors take place through repairshops, the second-hand tractor market is scattered all over the rural areas. This points clearly to the hardship to purchase a good second-hand tractor. Nearly 11 percent of the sales of the second-hand tractors end into the hands of scrap dealers.

2.4 GOVERNMENT POLICY TOWARDS MECHANIZATION

It has been shown in an earlier section of this chapter that the progress of mechanization, once initiated, has been quite impressive in Pakistan. This enviable progress may largely be attributed to the general thrust of government policy to promote mechanization and positive responses of farm community to government policy and its ability to overcome emerging constraints resulting from rapid commercialization of agriculture. The purpose of this section is to highlight the contribution of government policy and those of private initiatives to mechanization on a decade by decade basis.

2.4.1 Policies of 1950s : Beginning with 1947, tractors were on free list of imports prior to 1952. Towards the middle of 1952, commercial tractor imports were placed under restricted licensing but individuals were allowed to import tractors under an open general licence Gotsch (1973) Until 1957, there were no restrictions on makes and models of tractors that were imported into the country. Consequently there were, at least, 30 different makes and models of tractors resulting in serious service and spare parts problems. To solve the problem, the government in 1958 restricted the tractor imports to seven makes. It was also decided to set up a network of workshops for prompt repair of agricultural machinery Laird et al (1983). The fixed exchange rate policy of the period continued to underprice tractors in Pakistan relative to international markets. In spite of favourable government policy, however, the pace of mechanization during 1950s remained slow. The underlying reasons have to do with falling agricultural prices, availability of cheap animal and human labour, lack of

spare parts and repair services and limitations of foreign exchange.

2.4.2 Policies of 1960s : While all the policies initiated in the 1950s were allowed to continue into the sixties, the question of desirability of mechanization was reviewed with renewed vigour in the meetings of experts, committees, commissions and above all by the second Five-year Plan. With the growing consensus for mechanization, additional repair workshop facilities with better tools and equipment were set up in the early sixties. To avoid the constraint of foreign exchange tractor imports were increasingly funded from foreign aid loans until 1965-66. The open general licence scheme for individuals, however, had to be halted because of foreign exchange crisis in 1966-67 and completely discontinued in 1969, Gotsch (1973). In spite of this adverse development, tractor population continued to grow on an accelerating pace because the terms of trade were moved in favour of agriculture in the early sixties by instituting a deliberate policy of price supports for agricultural commodities and subsidies on key agricultural inputs. Apart from these changes, the farm incomes also witnessed substantial increases due to onset of green revolution. The policies of low interest loans by Agricultural Development Bank of Pakistan and overvalued exchange rates were instrumental in subsidizing tractor purchases. It has been estimated that the overvalued exchange rate alone was responsible to distort tractor prices by more than 50 percent as the free market price of tractors ranged between Rs,25,000 and 30,000 in contrast to Rs. 16,000-18,000 paid by licence recipients, Gotsch (1973). To the extent that tractor imports were on duty-free list until 1969 in contrast to varying rates of duties and taxes on other imports, tractor-purchases

involved an element of subsidy relative to other durables. However, the price of diesel oils used for tractors reflected a tax component of nearly 60 percent, Khan (1981).

2.4.3 Policies of 1970s : An almost complete reversal of the policies of the sixties took place beginning with the early 1970s. Although tractor imports were not subjected to taxes and duties until 1969, a 5 percent custom duty on the value of the tractor was imposed in the budget of 1969-70. In addition a 15 percent sales tax and a one percent rehabilitation tax on duty-paid value of the tractor was levied. Tractor imports were also subjected to a 25 percent defence surcharge on sales tax. With the steep devaluation of the Rupee in 1972, underpricing of tractors because of over valued exchange rate came to an end. Favourable terms of trade turned abruptly against agriculture. While the prices of agricultural commodities stood at nearly 50 percent of world prices, the subsidized input prices were raised by a factor of three to bring them at par with international prices. Contrary to the claims that prices of most agricultural commodities had recovered to international levels in the subsequent period, the World Bank (1986) figures show that as late as in 1979-80, wheat and rice prices were only 61 and 55 percent of the World prices respectively. In response to rising oil prices, the high speed diesel oil witnessed a series of price hikes during the seventies. In contrast to Rs. 0.53 in 1968, the price of diesel oil per litre went up to Rs. 0.67 in 1972, Rs. 1.10 in 1974, Rs. 1.40 in 1976 and to Rs. 1.56 in 1978. The tax component in the form of custom duties and development surcharge varied between 19.5 to 24.6 percent of the stated prices depending on the period under consideration, Pakistan (1985), Worst still was the

stagnation of agricultural production resulting from bad weather, floods and war with India during the early seventies. All these developments were sufficiently warranted to cause a severe foreign exchange crisis to be resolved only by loans from international lending agencies. Successful efforts at foreign loans and rising remittances of Pakistanis working abroad enabled the government to overcome foreign exchange problems and to import a rising number of tractors during the second half of the seventies. The rising imports of tractors were backed by significant increases (from nearly Rs. 1.0 billion in 1974-75 to Rs. 3.0 billion in 1979-80) in loans for agriculture, Pakistan (1985)

2.4.4 Policies of the 1980s : Four major departures from 1970s mark the agricultural policy of the 1980s. Firstly, under the New Agricultural Policy instituted in 1980, Pakistan committed itself to eliminate subsidies on agricultural inputs. As a result, the prices of most agricultural inputs more than doubled between 1979-80 and 1986-87, Pakistan(1988). This may not have affected mechanization if the prices of agricultural commodities were also allowed to vary accordingly. However, only limited increases were allowed, to protect the interests of consumers, in the case of agricultural commodities. According to the World Bank (1986) none of the major agricultural commodities witnessed a price increase of more than 30 percent except wheat. Secondly, Pakistan adopted a policy of flexible exchange rates instead of fixed exchange rates. As the value of Pakistan Rupee fell consistently over the years relative to foreign currencies, Rupee prices of tractors and components went up considerably with passage of time. All efforts were made to boost up tractor demand by advancing liberal loans to tractor buyers and tractor loans increased

by 80 percent between 1982-83 and 1986-87, Pakistan (1988). Thirdly, steps were taken for progressive manufacturing of tractors locally. Although tractors and tractor parts were subject to a custom duty of 10 percent, a 12.5 percent sales tax and a 5 percent defence surcharge , Choudhry (1988). Completely Knocked Down (CKD) kits of tractors and spare parts imported by the tractor assembling and manufacturing firms were exempted from the above levies for purposes of incentives. In 1988 the raw materials used in the manufacture of tractors were also exempted from custom duty and sales tax. For guidance of manufacturing firms, it was also decided to set up agricultural mechanization institutes to undertake research and development of farm machinery. In order to promote the local manufacture of high speed diesel engines for use in tractors, 1000 diesel engines were imported in CKD condition Finally, thus far the import or manufacture of large tractors had been the focal point of government policy. With the financial assistance of Japan, the government planned to import 2000 small tractors (25-30 H.P) in 1981 with a view to undertake progressive manufacture of small tractors as well.

The incentives provided to the progressive manufacturers seem to have worked satisfactorily. With humble begining in 1982-83 when these firms assembled 2300 tractors with no local component, the number of tractors assembled/manufactured in Pakistan rose to 12000 in 1984-85, Pakistan (1987) and further to 24815 in 1985-86 and 21224 in 1986-87 with a local component of parts varying between 30-60 percent, Pakistan (1988). As a result of these developments, the import of assembled agricultural tractors went down from nearly 25,000 in 1983-84 to 663 in 1986-87, Pakistan (1988).

The persistent upward trend of diesel oil prices continued in the eighties as in the 1970s but this time with greater vigour. Only in 1979-80, the price of high speed diesel oil nearly doubled from Rs. 1.56 to Rs. 3.05 per litre . These prices were raised by 13.0 percent in 1981-82 and by 12.0 percent in 1982-83. Another 6.25 percent increase followed in 1983-84. Thus the price of diesed oil in the eighties went up from Rs. 1.56 to Rs . 4.25 per litre showing an increase of 172 percent over the period. The prices in the eighties had a tax component of nearly 20 percent, Pakistan (1985).

Despite the generally adverse trend of government's agricultural policy throughout the Seventies and Eighties, mechanization continued to proceed us usual due to two major forces. Firstly, agriculture during this period was faced with growing scarcities of various kinds of labour. The rise in income under the Green Revolution led to withdrawal of family female labour from the farm sector except in the case of cotton picking. The availability of child labour from within the family went down as a result of growing emphasis on education. The situation was worsened by outward movement of both family members and members of the landless class to take up more remunerative jobs in the non-farm rural or urban sector or in the Middle East. This resulted, on the one hand, in the increasing dependence of the farm sector on tractors and related equipment for effective and timely performance of agricultural operations and on the other to considerable increases in agricultural wages. Had it not been for the tractors, land cultivation with bullocks would have caused even greater scarcities of labour and non-cultivation of many fields due to time constraint of available labour. Secondly, the mechanization is considered inevitable by

many farmers as a survival strategy. Apart from wages, there have also been phenomenal increases in the prices of draught animal and those of key agricultural inputs like fertilizers and pesticides. A shift to tractors not only permits timely operation but also reduces the costs of ploughing. It is this strategy that farmers have successfully been in business under following commodity prices relative to the prices of most of the inputs used in crop-production.

2.5 PROJECTIONS OF DEMAND FOR AGRICULTURAL EQUIPMENT

The projections of demand for agricultural machinery have been made upto year 2010 and are reported in the following Table 2.5.

TABLE 2.5

Projections of Demand for Agricultural Equipment upto the Year 2010

Equipment	Year				
	1990	1995	2000	2005	2010
Tractor	197217	238105	287469	347068	419023
Power Driven Blades	80859	97623	117862	142297	171799
Cultivator	169607	204770	247223	298478	360360
Furrow-Turning Plough	90720	109528	132236	159651	192751
Horrows	13805	16667	20123	24295	29332
Tractor Driven Drills	11833	14286	17248	20824	25141
Power Operated Sprayer	11833	14286	17248	20824	25141
Trailers	130163	157159	189730	229065	276555
Reapers & Bunchers	1972	2381	2875	3471	4190
Threshers & Sheller	86775	104766	126486	152710	184370
Combine Harvestor	1050	1556	2305	3413	5050

Our results of projections indicate that the number of tractors in Pakistan would increase from nearly 200 thousand in 1990 to 420 thousand in the year 2010. Like tractors, many of tractor-related equipment would also witness a doubling of the numbers between 1990 and 2010. This is to be expected us the use of most of these equipment depends directly on the tractor and without a tractor, nobody would be keen to poss these equipments. However the use and ownership of a combine harvester is not dependent on tractors and our projections likewise show a somewhat rapid growth of combine harvesters. Such a rapid growth of combine harvesters may be anticipated in view of scarcities of harvest labour. The use of combine harvesters is, however, likely to remain confined to large farmers due to economies of scale and loss of wheat straw in the absence of a major break through in the use of the technology. Although an increasing use of cotton pickers and rice transplanters may be anticipated in the near future, our projections failed to include such machinery because of lack of data reflecting past trends.

Like most studies of this kind, our projections are based on certain assumptions which may be of dubious reliability and could be subjected to all kinds of criticism. To be explicit, we have based our projections on the growth rates of tractors in the past years of 1972 and 1984. The use of this growth rate was justified in view of the involvement of a long term period. We also assumed that a tractor has a useful economic life of only 6.7 years giving a depreciation rate of 15 percent. Although, tractors may last in operation for a longer period than that, it could only happen against prohibitive and rising maintenance costs with passage of time. There is also the assumption of steady rate growth of tractors despite much variation in

the growth of tractors from time to time and the possibility of a saturation point for additions to tractors. While such an assumption can be justified in view of the growing labour shortages in the future and consistent increases in the crop-land area, the assumption is fallable if contrary happens.

CHAPTER III

PRODUCTIVITY AND EMPLOYMENT IMPACT OF MECHANIZATION; THE SURVEY RESULTS

3.1 INTRODUCTION

In this chapter we plan to present and discuss the results of our sample survey. Our purpose is to analyse the effect of progressively rising levels of technology on productivity and employment basically in agriculture but to a limited extent also outside agriculture. To a limited extent because it is difficult to quantify the impact of these technologies outside agriculture and we will only be dealing with general direction of change as determined by backward and forward linkages.

For the purpose of this study, four levels of technology, bullock, bullock cum tractor, tractor and tractor cum combine harvester will be considered. Although the survey was directed at seven technological levels, the universal use of threshers forced us to drop technological packages involving threshers in the final analysis. In spite of our failure to include the thresher as a separate technology, we will still be able to measure thresher induced effects on productivity and employment. As thresher technology is confined to wheat alone, changes in employment and productivity of wheat induced by technology may be compared with those of other crops and inferences drawn for thresher induced effects. Likewise there were no observations of crop-specific technologies like rice transplanters, cotton pickers etc. Manual labour technology is practiced only in Baluchistan and would be likewise covered while studying employment in Baluchistan.

Given these levels of technology we would also like to see if the productivity and employment effects vary across various agro-ecological zones by farm size or by land tenure. The plan of the chapter is to first look at Pakistan wide picture and then proceed to disaggregate by regions, by farm size categories of small, medium and large farmers and finally by tenure represented by owners, tenants and owner-cum-tenants.

In order to study the impact of mechanization on productivity, five alternative definitions of productivity may be used. These are, (1) crop yields (2) gross productivity representing the gross value of agricultural crops per unit of land, (3) net productivity equated to gross value of output minus the cost of purchased inputs, (4) net productivity defined by gross value minus total cost of inputs excluding land rent and (5) net productivity as measured by gross value of output minus the total cost of inputs including the imputed costs of unpurchased inputs and land rent. It is important to note that these definitions cover all possible definitions of productivity used in economics literature. In studying the employment effects of mechanization, we will segregate total employment effect into effects on family labour, permanent hired labour and daily-paid labour.

Having described our agenda of work, we proceed to contemplate the task at our hands but with one more major caveat. Before proceeding to the task it is important to know as to what are the patterns of tractor use in the various regions as determined by their farm and non-farm uses. The on-farm use of tractors needs further study as to use by tractor owners and those renting tractor services. Variations in tractor use by technology, farm

size and land tenure also need to be investigated if only to draw inferences for analysis in the coming sections.

3.2 PATTERNS OF FARM AND NON-FARM USES OF TRACTORS

As described above the pattern of farm and non-farm uses of tractors can be studied by reference to five major sub-topics. We will take them one by one in the ensuing pages.

3.2.1 Agricultural and Non-Agricultural Uses: Tractors in Pakistan have performed a multiplicity of jobs. Although their most preferred use is in ploughing, they have become a popular source of power for threshers and shellers. Their sparse use for chaff-cutters, cane crushers and tubewells has also been gaining importance in the recent years. Apart from these on-farm or agriculture uses, tractors coupled with trailors act as an important means of off-carting agricultural commodities, and bringing in input supplies from and to the farm. Most tractor owners at present feel no hesitation in performing the above functions for themselves or for provision of rental services except under prohibiting cost of the transaction. However these uses of tractors on an a priori grounds may be anticipated to vary by the size of operations of a tractor owner and his geographical situation with respects to large centres of human activity. In order to study the impact of these two factors on-farm and off-farm uses of tractors, we present the relative information in Table 3.1 on the next page.

As the data in Table 3.1 show there is considerable variation in the total farm and non-farm uses of tractor across farm size and regions. Although this variation may

Table: 3.1 Total Farm and Non-Farm Uses of Tractors By Tractor Owners by Farm Size For Various Regions During 1987-88

Farm Size Group and Description of Tractor Use	AVERAGE NUMBER OF WORK HOURS PER TRACTOR							
	Peshawar/ Mardan	Sahiwal/ Faisalabad	Multan/ D.I. Khan	Sheikhupura/ Gujranwala	Jacobabad/ Larkana	Sangrar/Sukkur	Nasirabad/ Pishin	Pakistan
A. Small Farmers Owning Tractors								
1. Total Farm and Non-Farm Use	a 660 (137)	a 475 (65	a 454 (73)	a 471 (221)	b 1040 (145)	-	-	a 593 (673)
2. On-farm Use	a 660 (137)	a 475 (65)	a 416 (98)	a 417 (212)	b 1040 (145)	-	-	a 557 (625)
3. On-farm own use	a 48 (20)	b 100 (29)	b 91 (20)	a 51 (26)	c 160 (81)	-	-	b 76 (68)
4. Off-farm use	-	-	a 48 (-)	-	-	-	-	a 36 (77)
5. Off-farm own use	-	-	a 48 (-)	-	-	-	-	a 14 (-)
6. On-farm own use per cultivated area	8	15	11	9	25	-	-	11
B. Medium Farmers Owning Tractors								
1. Total Farm and Non-Farm use	ab 318(92)	ba 433(158)	ba 448(110)	ba 502 (285)	bc 490 (115)	a 756 (385)	c 1070 (1135)	ba 630 (301)
2. On-farm use	a 793 (126)	ba 331(124)	ba 321(119)	ba 535 (295)	bc 490 (115)	a 756 (835)	c 1070 (1135)	ba 612 (306)
3. On-farm own use	a 326 (291)	ab 250(137)	ab 159(133)	ab 201 (73)	ac 120 (73)	a 131 (30)	a 270 (63)	a 212 (138)
4. Off-farm use	a 25 (-)	a 42(10)	a 57(34)	a 17 (-)	-	-	-	a 13 (25)
5. Off-farm own use	a 25 (-)	a 38(21)	a 19(15)	a 17 (-)	-	-	-	a 15 (20)
6. On-farm own use per cultivated area	19	14	9	16	9	8	19	11
C. Large Farmers Owning Tractors								
1. Total farm and non-farm use	ac 2571(3192)	a 1341(1033)	a 1102 (802)	b 1469(1189)	cd 840(113)	d 2670(1355)	e 485(-)	ba 1535(1924)
2. On-farm use	a 2571(3192)	a 1293(1025)	ba 942(585)	a 1160(1226)	b 840(138)	cb 2670 (1355)	a 485 (-)	a 1452 (1931)
3. On-farm own use	a 780(655)	ac 1058(1147)	ac 713 (653)	ac 522(351)	bc 180(52)	ab 613 (358)	a 485 (-)	ab 793 (731)
4. Off-farm use	-	a 48(54)	ab 140 (362)	ab 139(729)	-	-	-	ab 33 (431)
5. Off-farm own use	-	a 40(52)	ab 108 (378)	ba 8(12)				ab 53 (267)
6. On-farm own use per cultivated area	12	17	12	13	8	10	13	12
D. All Farm Sizes Owning Tractors								
1. Total farm and non-farm use	a 1398(1964)	a 1019(929)	a 849(673)	a 1190(1057)	bc 668(131)	cd 2491(1396)	ae 524(1135)	a 1133 (1560)
2. On-farm use	a 1391(1966)	a 977(919)	a 752(504)	a 1110 (1071)	bc 668(137)	cd 2491 (1396)	ae 524(1033)	a 1076 (1552)
3. On-farm own use	a 390(390)	bc 759(995)	ac 477(575)	bc 690 (790)	c 150(76)	ab 453 (373)	a 324(63)	ac 519 (687)
4. Off-farm use	a 7 (-)	a 42 (46)	a 97(306)	b 30 (666)	-	-	-	a 57 (361)
5. Off-farm own use	a 7 (-)	a 36 (45)	a 94 (318)	a 9 (11)	-	-	-	a 36 (223)
6. On-farm use per cultivated area	12	16	12	13	9	9	16	12

Source: United Consultants (1988)

1. Figures in parenthesis are the standard deviations.

2. 1st alphabatic character shows the statistical difference from one region to another region and 2nd alphabatic character shows the statistical difference from one farm size to another farm size at 5% probability level.

result in a large number of conclusions we will restrict ourselves to broad trends taking one variable at a time. Such an approach is preconditioned by the small number of observations underlying the reported averages. Ignoring the farm size and concentrating on the data for all farm size categories, it is clear from the table that the average number of work-hours of a tractor in Pakistan are close to 1130 per year. Tractors, to the extent of 95 percent of their operational hours, were mainly used for farm work and their non-farm use was limited to only 5 percent as against 2.54 percent in 1983-84 according to Khan, et.al (1986). Of the total hours of agricultural work slightly more than 53 percent were rented out to neighbouring farmers. This proportion was estimated to be 44 percent by Khan et. al (1986) for the year 1983-84. The tractor owners utilized 63 percent of the non-farm hours for own purpose and the remaining hours were allocated to commercial operations. Going from here to regional variation but still ignoring the farm size, tractors were used most intensively in Sanghar - Sukkur region and least intensively in Nasirababd-Pishin region followed by Jacobabad-Larkana region. These three regions were also marked by exclusive use of tractors for agricultural purpose with zero percent non-farm use. Against this the non-farm use was at its maximum involving 11 percent of the total tractor time, in Multan-Rahim Yar Khan region. The Sahiwal-Faisalabad region was characterized by the highest own use of tractor hours (75 percent) on the farm against the minimum of 18 percent in Sanghar-Sukkur region. As such, it is difficult to explain each of these variations but they may perhaps be explained by reference to density of tractor population relative to farm area, availability of irrigation water,

prosperity, proximity to an urban centre and cropping patterns of the various regions relative to each other.

Much like the regional variations, tractor use also varies by farm size. Referring to Pakistan, wide data, tractors are put to greater effective use by their large owners as compared to medium and small ones. The conclusion follows uniformly for farm and non-farm uses of tractors and irrespective of use for self or otherwise. The total use of tractors on large farms was more than 2.5 times of that on small and medium farmers owning tractors. While the same applies to on-farm tractor use, the on-farm own use by tractor owners of large size farmers was 10.40 times a much as on small farms and 3.75 times as much as on medium size farms. Similarly, large farmers also made a greater use of tractors in off-farm tractor activities. These conclusions, by and large, are consistent with the conclusion of an earlier study by Mcinerney and Donaldson (1975) but with one exception. Contrary to our conclusion, Mcinerney and Donaldson estimated that small owners of tractors hire out greater hours of tractor services than the large ones. The inconsistency might be resolved by reference to rapid growth of tractor and tractor related equipment and the resulting intensity of competition in the rental services market since 1970s. Furthermore and to our great satisfaction, we feel that our conclusions are quite logical and can be supported by further empirical evidence available from our survey.

It should be understandable that large farmers are in a better financial position to invest in all kinds of agricultural equipment like threshers-shellers, trailers etc. The incentive to investment is the greatest on large farms not only because they have large area of land of

their own to till, but also because they also have greater output to thresh and a greater marketable surplus to market with trailer. By contrast small owners have neither financial means nor the incentives to do so. Rather than keeping these machines idle, they might also find it profitable under the rising demand of these machines to rent out their services to others with the help of a hired driver. All these favourable forces induce the large farmers to invest in these machines and take full advantage of the situation. That large farmers do in fact, exploit this situation is borne out by the heavy ownership concentration of tractor implements in favour of large owners of tractors. This is shown by Table 3.2 on the next page.

It is evident from the above table that tractor equipment is heavily concentrated in the hands of large farmers owning tractors. Their ownership share varies from 67 percent to 100 percent depending on the equipment under consideration. By contrast, small farmers owing tractors account for less then 14 percent of the ownership

To sum up, tractors seem to be considerably under utilized by their small owners. Although the same may be true of large farmers considering the total potential of the tractor of more than 2500 hours on the basis of 8 hours a day for 300-325 days a year, their average use of 1535 hours a year seems to be a fairly respectable figure given the seasonal nature of agriculture. In spite of the under utilization, small farmers make almost the same input of tractor hours per cultivated acre as that made by large farmers. It, therefore, can be concluded that had they not been constrained by the smallness of their holdings or were they provided with same tractor equipment as that

Table: 3.2 Percentage Distribution of Ownership of Tractor Implements among tractor owners by Size of their Land holding

Kind of Implement	Percent (Number) of Tractor Equipment Owners out of Total:			
	Small Land Owners	Medium Land Owners	Large Land Owners	Total
Cultivator	14 (12)	19 (17)	67 (60)	100 (89)
Tractor Blade	7 (3)	17 (7)	76 (32)	100 (42)
Disc Plough	7 (1)	7 (1)	86 (12)	100 (14)
Rotavator	- (-)	17 (2)	83 (10)	100 (12)
Seed Drill	3 (1)	21 (6)	76 (22)	100 (29)
Ridger	- (-)	13 (2)	87 (13)	100 (15)
Trailer	13 (8)	18 (11)	69 (43)	100 (62)
Thresher	10 (5)	23 (12)	67 (34)	100 (51)
Combine	- (-)	- (-)	100 (1)	100 (1)
Transplanter	- (-)	- (-)	100 (1)	100 (1)

Source: United Consultants Limited (1988)

owned by large farmers, small farmers would be in a position to use tractors to their full capacity.

The availability of tractor rental services may result in a considerable expanded use of tractor and tractor-related equipment than that reflected by ownership. As a major part of hired-out tractor hours is purchased by other farmers, it is important to study the use pattern of tractor users with an emphasis on operation specific uses of tractors in agriculture.

3.2.2 Operation-Specific Tractor Uses: As the data in tables 3.3 and 3.4 would show, operation-wise use of tractor is heavily concentrated in the operation of ploughing which accounts for more than 65 percent of effective tractor time. The proportion varies directly with farm size in six out of the seven zones under consideration. In contrast to 65 and 70 percent of tractor time devoted to ploughing by small and medium farmers respectively, large farmer's use of tractor for ploughing was as high as 84 percent. However, there was considerable variations among the regions. In both the zones of Sind and in Multan-Rahim Yar Khan zone of the Punjab, the percentage allocation of tractor time to ploughing for the small farmers was low compared to other zones with a maximum of 77 percent in Nasirabad-Pishin zone. Fluctuations in the use of tractor for ploughing for the medium farmers were more marked as ploughing accounted for the minimum of 38 percent in Peshawar-Mardan zone and for the maximum of 80 percent in Multan-Rahim Yar Khan zone. Very much the same story could be repeated for threshing but with inverse relationship with farm size. Small farmers devoted 30 percent of tractor time to threshing as against 7 percent of that of large farmers.

Table 3.3: Operation - specific Uses of Tractor Use by Size and Region

Farm Size and Operation	Percentage Use in							
	Peshawar/ Mardan	Sahiwal/ Faisalabad	Multan/ R.Y. Khan	Sheikhupura/ Gujranwala	Jacobabad/ Larkana	Sanghar/ Sukkur	Nasirabad/ Pishin	Pakistan
1. Small Farmers	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
a. Ploughing	^{a}70.0(241)	^{b}73.0(79)	^{a}65.0(119)	^{a}57.0 (235)	^{a}56.0(109)	^{b}62.0(45)	^{a}73.0(101)	^{c}65.0(353)
b. Threshing	^{a}19.0(48)	^{b}25.0(18)	^{a}18.0(57)	^{c}28.0(79)	^{b}44.0(17)	^{c}38.0(90)	^{c}23.0(71)	^{a}30.0(127)
c. Transport	^{a}11.0(21)	^{a}2.0(-)	^{a}17.0(-)	^{a}15.0(-)	-	-	-	^{a}5.0(55)
2. Medium Farmers	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
a. Ploughing	^{ab}38.0(122)	^{a}72.0(188)	^{a}49.0(145)	^{ab}58.0(93)	^{a}58.0(75)	^{c}72.0(592)	^{a}69.0(81)	^{a}70.0(212)
b. Threshing	^{ab}6.0(95)	^{b}14.0(7)	^{a}25.0(69)	^{b}42.0(10)	^{a}42.0(39)	^{c}24.0(222)	^{a}18.0(33)	^{ab}15.0(193)
c. Transport	^{ab}56.0(270)	^{ba}14.0(-)	^{ba}26.0(-)	-	-	^{cd}4.0(71)	^{de}13.0(41)	^{ab}15.0(221)
3. Large Farmers	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
a. Ploughing	^{ac}64.0(341)	^{bc}82.0(452)	^{b}76.0(413)	^{c}97.0(838)	-	^{d}72.0(282)	^{ea}76.0(89)	^{f}84.0(1347)
b. Threshing	^{a}8.0(44)	^{bc}12.0(73)	^{cd}11.0(104)	^{e}2.0(15)	-	^{f}13.0(171)	- (-)	^{g}7.0 (576)
c. Transport	^{ac}28.0(65)	^{b}6.0(155)	^{b}13.0(193)	1.0(-)	-	^{c}15.0(80)	^{d}24.0(18)	^{bc}9.0 (183)
4. All Zones	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
a. Ploughing	^{ad}78.0(204)	^{bc}85.0(451)	^{c}75.0(335)	^{dc}95.0(738)	^{ea}57.0(49)	^{a}73.0(233)	^{fa}71.0(99)	^{b}78.0(408)
b. Threshing	^{ac}17.0(72)	^{ac}14.0(70)	^{bd}13.0(92)	^{cd}5.0(105)	^{eb}43.0(19)	^{cd}22.0(132)	^{ab}17.0(59)	^{d}12.0(246)
c. Transport	^{ab}5.0(231)	^{b}1.0(112)	^{cb}12.0(187)	^{d}10.0(48)	-	^{d}5.0(69)	^{ed}12.0(24)	^{c}10.0(192)

Source: United Consultants Limited (1988)

1. Figures in parenthesis are the standard deviations.

2. Ist alphabatic character shows the statistical difference from one region to another region and 2nd alphabatic character shows the statistical difference from one farm size to another farm size at 5% probability level.

Table: 3.4 Percentage Allocation of Tractor Time to Various Operations by Tenurial Classes in Various Agro-ecological Zones.

Tenurial Classes and Operations	Percentage Use in the Zone of:							
	Peshawar/ Mardan	Sahiwal/ Faisalabad	Multan/ R.Y. Khan	Sheikhupura/ Gujranwal	Jacobabad/ Larkana	Sanghar/ Sukkur	Nasirabad/ Pishin	Pakistan
1. Owner	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
a. Ploughing	^{a}35.0 (214)	^{b}80.0(511)	^{c}70.0(150)	^{d}97.0(840)	^{a}64.0(242)	^{a}66.0(285)	^{e}64.0(101)	^{d}78.0 (934)
b. Threshing	^{a}8.0 (75)	^{a}13.0(80)	^{b}11.0(114)	^{c}3.0(338)	^{b}36.0(111)	^{d}25.0(147)	^{a}17.0(73)	^{e}9.0 (526)
c. Transport	^{a}57.0 (228)	^{b}7.0(48)	^{a}19.0(205)	^{b}95.0(48)	-	^{c}9.0(76)	^{a}19.0(45)	^{a}13.0 (207)
2. Owner cum Tenants	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
a. Ploughing	^{ab}83.0(94)	^{bc}81.0(312)	^{cd}85.0(629)	^{de}90.0(206)	^{ab}63.0(109)	^{b}81.0(334)	^{ae}65.0(144)	^{e}80.0 (437)
b. Threshing	^{ab}17.0(45)	^{ab}19.0(54)	^{bc}14.0(31)	^{a}9.0(-)	^{c}37.0(58)	^{b}13.0(-)	^{b}35.0(33)	^{a}14.0 (42)
c. Transport	-	- (-)	^{ab}1.0(128)	- - (-)	-	^{bc}6.0(70)	-	^{c}6.0 (96)
3. Tenants	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
a. Ploughing	^{ab}86.0(109)	^{bc}75.0(44)	^{c}81.0(-)	^{cd}93.0(228)	^{ca}53.0(247)	^{b}66.0(-)	^{d}88.0(215)	^{c}78.0(213)
b. Threshing	^{ab}14.0(33)	^{bc}25.0(15)	^{a}19.0(-)	^{b}7.0(-)	^{cb}47.0(99)	^{a}34.0(-)	^{d}12.0(60)	^{ef}22.0(195)
c. Transport	-	-	-	-	-	-	-	- (-)
4. All Tenures	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
a. Ploughing	^{a}78.0(204)	^{b}85.0(451)	^{cd}76.0(355)	^{d}95.0(738)	^{a}56.0(259)	^{a}73.0(233)	^{e}71.0(143)	^{d}78.0(308)
b. Threshing	^{a}17.0(72)	^{a}14.0(70)	^{b}13.0(92)	^{c}5.0(305)	^{b}44.0(101)	^{d}22.0(132)	^{ea}17.0(49)	^{fe}12.0(446)
c. Transport	^{a}5.0(231)	^{bd}1.0(112)	^{ca}11.0(187)	^{db}95.0(48)	-	^{ec}5.0(69)	^{da}12.0(49)	^{cd}10.0(192)

Source: United Consultants Limited (1988)

1. Figures in parenthesis are the standard deviations.

2. Ist alphabatic character shows the statistical difference from one region to another region and 2nd alphabatic character shows the statistical difference from tenure one to another tenure at 5% probability level.

There seemed to be no obvious relationship of percentage tractor use in transportation and farm size. Percentage allocation first rose and then fell as one moved from small to medium and to large farm size categories. All these changes just described can be pursued more closely by looking into the data of table 3.3

The higher use of tractors for ploughing relative to that for threshing results from the fact that while threshing is one time operation and is specific to wheat only, ploughing is repeated a number of times for each acre for all crops. The lower proportionate use of tractors on small farms than the large ones follows from the resource endowment of the two groups. Small farmers are land scarce and labour abundant and follow labour intensive techniques. By contrast, large farmers are relatively labour scarce and make greater use of tractors for ploughing to economize on labour use. Large farmers' lower dependence on threshers relative to small ones is caused by the size of their ploughing operations as also by use of combine harvesters. The only five cases of the use of combine harvester in our sample were confined to large farmers.

In order to have some idea of operation-wise use of tractors by tenure, we present the relevant information in Table 3.4

There is no distinct pattern of operation-wise tractor use among various tenurial classes as revealed by the data in Table 3.4. All tenurial classes seem to have allocated nearly 80 percent of tractor time to ploughing and the rest to threshing and transport. Tenants among the tenurial classes and Jaccobabad-Larkana among the regions

were characterized by the greater allocation of tractor time to threshing. While the reasons for this occurrence on tenant farms are not immediately clear, the latter conclusion perhaps follows from the fact that Jaccobabad-Larkana is basically a wheat-rice (IRRI) zone and that the threshers have been used for both these crops as against for wheat alone in other regions.

It needs to be pointed out that the operation-specific use of tractors implicitly implies use of one or more of agricultural equipment. For example, use of tractor for ploughing, almost invariably, is commensurate with the use of cultivator plough. Other types of tillage equipment as indicated in Chapter II have thus far been used in Pakistan on a limited scale compared to the cultivator. While threshing activity involves the use of thresher and to a limited extent of that of combine harvester, transport of agricultural commodities is bound to result in the use of trailers along with the tractor.

3.2.3 Crop Specific Use of Tractors: To the extent that various machines are used for specific purposes, the crop-specific use may follow the pattern of operation-specific use. However, as tractors have been used indiscriminately for all crops and power requirements of each crop can vary greatly, there is a need to discuss crop-specific use of tractors separately. To accomplish this task, Table 3.5-A presents the relevant information for various regions and major crops.

It is clear from the table 3.5-A that the allocation of tractor time varies considerably across the various regions. Depending on the region under consideration, the use of tractor for wheat ranges from 26 percent in

TABLE 3.5-A

CROP-SPECIFIC USER OF TRACTORS BY REGIONS

Zones	Percentage of Tractor Use for Different Crops						Total
	Cotton	Sugarcane	Rice	Maize	Wheat	Tobacco	
Peshawar/Murdan	-	32	5	21	32	10	100
Sahiwal/Faisalabad	35	6	11	11	33	4	100
Multan/R.Y. Khan	35	14	5	2	26	-	100
Sheikhupura/ Gujranwala	-	11	50	-	38	1	100
Jacobabad/ Larkana	-	22	38	-	40	-	100
Sanghar/Sukkur	44	8	18	-	30	-	100
Nasirabad/ Pishin	-	-	41	-	59	-	100
Pakistan	25	12	25	3	34	1	100

Multan-Rahim Yar Khan Region to 59 percent in Nasirabad-Pishin Region. The allocation of tractor time to cash crops like Sugarcane, Tobacco, Rice and Cotton in the various regions (the only exception is Nasirabad-Pishin Region) is considerably greater than that to wheat. Despite the predominance of wheat in the cropping patterns of the various regions, this can be expected as most of the cash crops are more power intensive than wheat. The point becomes clear if we compare the data of this table with the cropping pattern reported in Table 3.11

3.3 ON-FARM EMPLOYMENT IMPACT OF MECHANIZATION

The impact of mechanization on employment depends on several factors. Theoretically speaking, technological breakthroughs, by definition, either augment output or reduce production costs and hence are most likely to cause reductions in the requirements of some or all of the inputs per unit of output. One of the immediate effects of the introduction of a new machine like a tractor is to displace permanent labour (family, hired or tenant labour) as there is no need of ploughing and for driving the bullocks while at work. However, such a labour displacement effect may be considerably dampened or eliminated altogether if tractors are accompanied by a surge in productivity of agriculture, an increase in casual labour demand, a rise in cropping and land-use intensities and a shift in the cropping pattern towards relatively more labour intensive crops. The purpose of this section is to investigate the impact of tractor vis-a-vis other factors, taking one at a time into account, on labour input per crop-acre in the various regions by farm size and tenure.

3.3.1 Immediate Effects of Mechanization: As pointed out earlier, the immediate effect of tractors is to displace permanent labour. Although it would be ideal to look at labour coefficients of individual crops to explore this effect, it was not possible to undertake this exercise for reasons of space and inability of crop-specific coefficients to predict the labour intensity of various regions. However, we have reported these coefficients in Appendix Table A for the interested readers. Based on the crop specific labour coefficients and weighted by the respective area of each crop, we calculated the labour coefficient for total cropped area which are reported in Table 3.5 and are a subject of discussion in the following pages.

As is clear from the above table, the immediate effect of the tractorization is to reduce the input of family and permanent hired labour to the extent of nearly 40 percent. On the basis of all zones average, the permanent labour goes down from 184 man hours in the case of bullock cultivation to 110 in the case of tractor-operated farms. While this inverse relationship holds true in four of the seven zones under consideration, it was vitiated by the higher use of labour input on bullock cum tractor farms in two zones and only in one zone was this conclusion reversed. The immediate effect of tractor on permanent labour is dampened by the positive relationship between casual labour and progressive levels of tractorization by about 20 percent. This positive relationship holds in six of the seven reported zones. Thus accounting for the casual labour increases, labour displacement induced by tractors may at best be as high as 20 percent.

Table 3.5: Labour Input (Man-Hours) per Crop-Acre by Regions and Technological Packages

Technology and Kind of Labour	LABOUR INPUT (MAN-HOURS PER CROP ACRE IN: Peshawar/ Mardan	Sahiwal/ Faisalabad	Multan R.Y. Khan	Sheikhupura/ Gujranwala	Jacobabad/ Larkana	Sanghar/ Sukkur	Nasirabad/ Pishin	Pakistan
1. Bullock only(t_1)								
a) Family and Permanent Labour	^{a}224(45)	^{b}247 (81)	^{a}112(31)	^{a}198(24)	^{c}139(14)	^{c}97(11)	^{a}369(42)	^{a}184(59)
b) Casual Labour	^{a}17(20)	^{a}14 (11)	^{b}107(69)	^{c}5(-)	^{a}24(22)	^{d}55(37)	-0(-)	^{b}42(67)
2. Bullock Cum Tractor (t_2)								
a) Family and Permanent Labour	^{a}258(55)	^{ab}147(68)	^{a}114(44)	^{ba}176(18)	^{b}122(22)	^{a}110(36)	^{a}141(52)	^{a}141(64)
b) Casual Labour	^{ab}64(45)	^{b}67(20)	^{c}123(101)	^{b}37(10)	^{b}13(9)	^{c}108(73)	^{b}2(-)	^{c}85(110)
3. Tractor Only (t_3)								
a) Family & Permanent Labour	^{ac}155(92)	^{ab}103(75)	^{ba}72(50)	^{ca}109(25)	^{c}111(11)	^{ca}120(39)	^{c}350(14)	^{da}110(69)
b) Casual Labour	^{ac}50(73)	^{b}90(33)	^{cb}123(58)	^{db}21(17)	^{b}6(-)	^{ac}106(81)	^{b}4(-)	^{ba}70(43)
4. Tractor cum Combine (t_4)								
a) Family and Permanent Labour	-	-	-	^{a}129(11)	-	-	-	^{ab}129(11)
b) Casual Labour	-	-	-	^{b}25(21)	-	-	-	^{bd}25(21)

Source: Untied Consultants Limited (1988)

1. Figures in parenthesis are the standard deviations.

2. Ist alphabatic character shows the statistical difference from one region to another region and 2nd alphabatic character shows the statistical difference from technology one to another technology at 5% probability level.

3.3.2 Long Term Effects of Mechanization: Even the 20 percent decrease in permanent labour must further be discounted by positive effects of mechanization on labour input by farm size and tenurial classes. The relevant information is presented in Table 3.6 on the next page.

It is clear from Table 3.6 that the impact of the technology on various farm size categories is by and large, to reduce labour input. Furthermore if tractors are believed to lead to progressive elimination of small farmers, Khan (1985), Alavi (1976) and Gotsch (1973) and that of tenants, Mcinerney and Donaldson (1975) and Lockwood and Munir (1981), deteriorating employment might ensue as a result of tractorization. Our survey does not allow us to investigate the issues as it dealt with cross section data and no attempt was made to collect time-series data. However, as we have argued earlier such a situation would be far removed from facts in the face of improving land distribution, Naqvi, Khan and Chaudhry (forthcoming) sharply rising agricultural wage rates and growing scarcities of agricultural labour, Chaudhry (1981) and Guisinger (1982). Debarring such possibilities, the dynamic situation might result in increases in labour demand despite displacement of permanent labour of tractors.

Our survey results point to only small variations in labour input by farm size or tenure relative to earlier studies, Naqvi, Khan and Chaudhry (forthcoming) and Herring and Chaudhry (1974). If this were true, tractorization seem to have added to the labour intensity of medium and large farmers with or without tractors. It is worth noting that the labour intensity is a function of cropping and land-use intensities. A comparison of the

Table: 3.6 Labour Input (Man-Hours) By Farm Size, Tenure and Technology for All Zones

Farm Size and Tenure	Labour Input (Man-Hours) Per Crop-Acre			
	Bullock Only	Bullock cum Tractor	Tractor Only	Tractor cum Combine
A. Farm Size Categories				
1. Small Farmers	^{a}183 (109)	^{b}156 (93)	^{a}153 (115)	- (-)
2. Medium Farmers	^{ab}161 (211)	^{b}133 (113)	^{ba}137 (99)	^{b}169 (70)
3. Large Farmers	^{ac}193 (149)	^{ab}133 (105)	^{b}97 (58)	^{c}113 (89)
B. Tenurial Classes				
1. Owners	^{ab}196 (173)	^{b}154 (125)	^{cb}113 (77)	^{c}169 (88)
2. Owner cum tenant	^{ab}203 (232)	^{b}140 (73)	^{b}89 (60)	^{b}89 (50)
3. Tenant	^{a}166 (103)	^{bc}123 (169)	^{a}117 (111)	^{ac}128 (93)

1. Figures in parenthesis are the standard deviations.

2. Ist alphabatic character shows the statistical difference from one region to another region and 2nd alphabatic character shows the statistical difference from one farm size to another farm size at 5% probability level.

two variables in our survey and that in the agricultural census of 1980, Pakistan (1983) will be helpful to measure the impact of tractorization on employment via these two factors.

Table 3.7

Cropping and Land-use Intensities in 1987-88 & 1979-80

(Percentages)

	Cropping Intensity		Land use Intensity	
	1979-80	1987-88	1979-80	1987-88
Small Farmers	140	143	96	96
Medium Farmers	120	142	91	93
Large Farmers	111	138	84	91
Owners	120	128	86	92
Owner cum Tenants	120	171	90	91
Tenants	127	153	94	97

Source: Data for 1979-80 are from Pakistan (1983) and those for 1987-88 are from United Consultants Ltd. (1988)

On the basis of the data in Table 3.7, it is not difficult to see that the intensities reported in our survey as compared to census data are sufficiently warranted to reabsorb the displaced permanent labour in agriculture. Against a 20 percent displacement of labour, the reabsorption because of intensive cultivation under tractorization could be as large as 27 percent. Employment also increasing by 7 percent on large tractorized farms due to increase in new land brought under cultivation. These two factors together are sufficiently warranted to more than off set the original displacement of labour caused by farm mechanization. It is this aspect of farm mechanization that leads to greater

employment of labour in agriculture. What form this absorption will take is a question of availability of jobs within and outside agriculture. Before we turn to the question of off-farm employment, it may be of interest that tractorization, to the extent that it raises productivity, as shown in the next section, might also create jobs in agriculture depending on the output employment elasticity. Although no work in this respect has been carried out in Pakistan, a number of studies in India have predicted that a one percent increase in yields is likely to lead to a 0.3-0.6 percent increase in agricultural employment, Mellor (1976) Vyas and Mathai (1978) and Alagh (1979).

3.3.3 Off-Farm Employment Effect of Mechanization: The off-farm employment impact of tractors and tractor related equipment takes the form of backward and forward linkages between agricultural and non-agricultural sectors. To the extent that tractors have been instrumental in raising the incomes of their owners, significant demand increases for the output of industrial goods may be anticipated. The consequent expansion of the industrial sector not only provides more jobs but also increases the demand for agricultural produce. Thus these interactions continue and result in the evolution of a services sector between the two sectors. The backward linkages accrue in the process of choice of techniques as a shift from traditional to mechanized cultivation requires a large supply of tractors, improved implements and machinery. Especially noteworthy in this respect would be the need for the development of a large services sector dealing with supply of tractors and tractor related equipment, spare parts, repair shop business and service for diesel oil and lubricants. The importance of these developments

in Pakistan can hardly be underestimated in view of the ever increasing number of tractors, tractor implements and repair shops.

Due to developments in numerous directions it is difficult to quantify the total impact of forward and backward linkages on employment. However, some idea of the magnitude of employment involved can be had from the following discussion.

As discussed earlier, Pakistan is at the verge of tractor manufacturing. During 1987-88, it assembled/manufactured nearly 25,000 tractors and when in full swing, the tractor manufacturing industry is likely to produce 36,000 tractors annually, Pakistan (1987). Our survey figures collected from Millat Tractors indicate that the assembly/manufacture of a tractor at present needs nearly 900-1000 man-hours of labour input United Consultants Limited (1988). Thus the assembly/manufacture of 25000 tractors would have created between 2.8 to 3.1 million man-days of additional employment per year. These figures perhaps under estimate future potential employment of tractor industry as the local component in tractor manufacturing would rise with passage of time. A closely associated field to tractor manufacturing is that of the firms manufacturing agricultural implements. These units provided employment to 7745 workers on annual basis during 1983-84, Pakistan (1987). Although recent data are not available, the growth of these firms has continued unabated with considerable greater employment. The growing number of tractors has almost invariably been accompanied by the rapid growth of repairshops and spare parts business. Although the precise number of the repairshops are not known, their employment figure could

be estimated by frequency of repairs and the number of tractors involved. It has been estimated that a tractor operating in the field on average has at least one major break down in a year, Hussain and Lockwood (1980). It takes nearly 10 man days of labour to repair the breakdown. As there were 157310 tractors in Pakistan in 1984-85, a total of 1.6 million man days of employment would be associated with repair services per year.

On the basis of the discussion of this section, it can be concluded that tractors are unlikely to displace labour. There certainly is no case for large-scale labour displacement anticipated by many studies. Although the requirements of permanent labour fall, they are partially off set by rising employment of casual labour. The rise in cropping and land-use intensities as a result of introduction of a tractor go a long way in turning the relationship into a positive one. The creation of jobs associated with the growing interactions of forward and backward linkages are likely to add to growing scarcities of labour. All these tendencies seem to have characterized Pakistan's agriculture in the recent years even in the face of rapid tractorization. It remains to be seen as to how the tractors affect land productivity and if tractorization is accompanied by positive productivity changes, substantial employment increases are likely to ensure resulting in the ever lightening labour market.

3.4 MECHANIZATION, FARM PRODUCTIVITY AND INCOMES

As an innovation, mechanized cultivation is expected to have a positive impact on agricultural output in the form of either direct output increases or a saving in

cultivation costs or both. The inducement in agricultural output may be the result of a number of forces. For example, mechanization of agriculture, because of complementarity of inputs, may add to the overall efficiency of resource use in agriculture. The availability of a large power source embodied in machines may be compatible with a greater precision in the performance of agricultural operations. The quick ploughing with tractors allows conservation of soil moisture and proper and timely preparation of seed-beds. Improved implements like seed drills are useful additions to mechanized equipment for ensuring timely sowing and placement of seed and fertilizer at appropriate depths for better germination. The seed drills also allow line sowing and better spacing of plants which promote aeration and access to sun light of the growing crop. The increasing use of threshers reduces dependence on weather, ensures better quality harvests and helps to recover threshing-floor losses.

While the above factors enhance agricultural output through increases in productivity per acre, mechanization may also improve output and farm incomes through enhanced availability of land for cultivation. For example, the additional power obtained from tractors may be utilized to cultivate barren land. The speedy performance of agricultural operations allowed by tractors makes it easier to cultivate land more intensively. The lump sum investment in tractors may promote commercialization of agriculture and encourage farmers to grow more valuable cash crops. This may also happen as tractors would displace bullocks and release area previously devoted to fodder crops.

The purpose of this section is to evaluate the impact of these factors through a study of productivity of agriculture and farm incomes as shaped by tractors and associated mechanical equipment.

3.4.1 Farm Productivity and Tractorization: As indicated earlier, three alternative definitions of productivity will be used to analyse the impact of mechanization on productivity. To refresh our memories, they are; gross productivity representing the value of farm output per acre, net productivity equated to gross productivity minus the cost of purchased inputs per crop acre and net productivity defined by gross productivity minus the total cost per crop acre of all the inputs (purchased as well as domestically produced inputs). The details of the quantities of agricultural outputs produced and inputs used are provided in the Appendix table A on crop budgets and a summarized version of the Appendix is given in the following Table 3.8 for the purpose of our analysis.

Many conclusions follow from the data in Table 3.8. Firstly, on the basis of all zones data it is clear that productivity tends to rise with the level of technology in use whether one considers gross productivity or takes net productivity into account. Gross productivity rises from Rs. 2905 per acre on bullock farms to Rs. 3365 on tractor operated farms with an intermediate value of Rs. 3146 on bullock-cum-tractor operated farms. Similar trends are reflected by net incomes. Second, the progressive levels of tractor utilizations seem to be cost saving. This follows from the comparisons of the differences between gross and net incomes of each level of technology. For example, costs associated with purchased inputs were only Rs. 1000 for tractor-operated farm but went up to Rs. 1400

Table: 3.8 Gross and Net Incomes* per Crop-Acre by Zones and Levels of Mechanizations

Rs. Per Crop-Acre

Technology	Peshawar-Mardan (Zone-1)	Sahiwal-Faisalabad (Zone-2)	Multan-R.Y. Khan (Zone-3)	Sheikhupura-Gujranwala (Zone-4)	Jacobabad-Larkana (Zone-5)	Sanghar-Sukkur (Zone-6)	Pishin-Nasirabad (Zone-7)	All Zones (Pakistan)
A. Bullocks Only								
1. Gross Income	2860	2660	3284	3102	2925	2869	3173	2905
2. Net Income**	1371	1106	1278	1336	1981	1684	1474	1494
3. Net Income***	781	193	546	849	1606	925	237	783
B. Bullock Cum Tractor								
1. Gross Income	4192	4596	2772	2179	2503	3006	2827	3146
2. Net Income**	2359	2607	1420	604	1500	1015	1877	1586
3. Net Income***	1158	1663	20	84	655	743	1526	799
C. Tractor Only								
1. Gross Income	3436	3085	3782	2485	2376	4093	4737	3365
2. Net Income**	1993	1046	1583	1104	1317	2700	2361	2361
3. Net Income***	1064	21	74	78	677	2361	915	1583
D. Tractor-Cum-Combine								
1. Gross Income	-	-	-	2781	-	-	-	-
2. Net Income**	-	-	-	1492	-	-	-	-
3. Net Income***	-	-	-	24	-	-	-	-
E. All Technologies								
1. Gross Income	3549	3609	3225	2661	2629	3257	3412	3122
2. Net Income**	1984	1645	1474	1250	1631	1605	1900	1554
3. Net Income***	1039	643	110	59	1039	1205	1054	565

* Excludes income from tractor rentals

** Gross Income minus cost of purchased inputs.

*** Gross income minus total cost of all the input per crop acre.

Source: United Consultants Limited (1988).

per crop acre in the case of bullock-run-farms. Total costs of inputs for the two respective groups were of the order of nearly Rs. 1600 and Rs. 2200. Bullock cum tractor farms, however, seem to have slightly higher cost than bullock only farms. The reason is simple, apart from incurring costs on bullocks, they also have to pay for tractor services. Finally, productivities vary considerably across the regions. Although bullock-run farms produce a lower gross output than tractor farms in 5 regions, the opposite is true of the rice-regions in both Punjab and the Sind. The gross productivity was higher on bullock cum tractor farms in four regions relative to both tractor only and bullock only farms. Similarly gross productivity net of purchased inputs on tractor farms surpassed that of bullock farms and bullock cum tractor farms in 4 of the 7 regions. In terms of net income defined as gross income per crop-acre minus total cost per crop-acre, bullock farms faired better than tractor farms and bullock cum tractor farms in 4 regions.

In view of the general dearth of regional productivity studies, there is no way of judging the accuracy of our survey results and the variations therein especially those by levels of technology. The only study that looks into regional variations of productivities is that by Ali and Chaudhry (1989). It may be a mere coincidence and perhaps a happy coincidence that our aggregates of productivities (ignoring technology) are quite consistent with their estimates despite variations in the definitions of the regions, time periods covered and prices used. For example, their estimated gross productivity of sugarcane region of Rs. 3489 was compatible with Rs. 3549 estimated by us for the Peshawar-Mardan zone. Their cotton region estimate of Rs. 4200, compares with our survey results of

3200-3600 in the Punjab and Rs. 3257 in Sind and so on. Like wise their finding that the gross income per acre tends to be highest in cotton and mixed zones is supported by the data of our survey. Apart from gross productivity, our estimates of net productivity are also consistent with the data reported in Table 1 of their study.

What explains the variations of productivity among the regions is an important question. Ali and Chaudhry (1989) attributed them to variations in regional input use. We will look at pattern of input use by regions and technological packages if only to explain regional productivity variations. Table 3.9 presents the relevant information.

A cursory look at Table 3.9 indicates that relative to bullock farm, the tractor users with or without bullocks make a more intensive use of almost all the inputs. Taking fertilizer, for example, the input use on tractor farms (with the exception of Pishin-Nisirabad zone) was consistently higher than bullock farms. The expenditure on insecticides was 60 percent higher on tractor farms than those operated by bullocks. Because certain inputs are more intensively used in some of the regions than other inputs and vice versa, the costs tend to vary accordingly with the result of greater variation in regional net incomes. For example, although cotton regions tend to have high gross productivity relative to other regions, their net productivity must largely be explained by their intensive use of pesticides. The same applies to rice regions. High intensity of manurial inputs on tractor farms and its imputed costs further lower the net incomes of this category.

TABLE 3.9: PATTERNS OF PER ACRE INPUT USE BY REGIONS AND TECHNOLOGICAL PACKAGES

		Peshawar/ Mardan	Sahiwal/ Faisalabad	Multan/ R.Y. Khan	Sheikhupura/ Gujranwala	Jacobabad/ Larkana	Sanghar/ Sukkur	Nasirabad/ Pishin	Pakistan
Technology 1 Bullock Only	Bullock (hours)	^{a}29.66 (14.99)	^{b}27.05 (5.33)	^{b}25.82 (7.32)	^{b}24.79 (4.24)	^{a}22.62 (18.00)	^{a}25.02 (12.95)	^{a}11.96 (10.09)	^{a}23.12 (12.53)
	Tractor (hours)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)
	F.Y.M. (Cart Loads)	^{a}8.72 (6.39)	^{b}7.24 (2.29)	^{b}7.69 (2.35)	^{a}7.01 (4.58)	^{c}2.13 (0.39)	^{a}10.56 (3.60)	^{d}2.83 (24.18)	^{e}6.26 (12.35)
	Fertilizer (N.Kgs.)	^{a}76.59 (1.50)	^{b}58.99 (0.47)	^{c}110.05 (2.36)	^{a}90.70 (1.01)	^{b}61.06 (0.90)	^{a}65.55 (1.47)	^{c}67.77 (2.48)	^{c}75.76 (2.30)
	Pesticides (Rs.)	^{a}59.78 (25.20)	^{b}73.50 (62.93)	^{c}55.38 (193.80)	^{a}131.50 (6.04)	^{a}47.18 (28.94)	^{e}164.56 (209.00)	^{e}40.59 (199.40)	^{e}85.59 (368.36)
	Water (Acre Inches)	^{a}32.20 (9.11)	^{a}34.34 (6.87)	^{b}30.18 (3.56)	^{b}35.09 (2.27)	^{a}30.20 (7.40)	^{c}30.68 (0.39)	^{a}33.15 (5.73)	^{d}30.65 (21.30)
Technology 2 Bullock-cum-Tractor	Bullock (hours)	^{a}15.86 (11.36)	^{a}11.19 (13.20)	^{a}8.47 (14.19)	^{b}14.41 (6.39)	^{b}6.92 (5.27)	^{b}8.07 (6.24)	^{ca}3.55 (10.16)	^{ca}9.31 (10.19)
	Tractor (hours)	^{a}2.90 ((1.74)	^{b}4.96 (2.32)	^{a}2.46 (1.49)	^{a}2.80 (1.60)	^{c}2.17 (0.88)	^{c}2.87 (1.20)	^{a}1.66 (1.70)	^{a}2.91 (1.86)
	F.Y.M. (Cart Loads)	^{a}10.81 (4.62)	^{a}6.14 (3.37)	^{a}8.09 (4.73)	^{b}4.78 (1.34)	- (-)	^{a}7.49 (6.31)	^{c}2.45 (2.55)	^{a}5.91 (4.60)
	Fertilizer (N. Kgs.)	^{a}84.61 (1.87)	^{bc}95.17 (2.49)	^{a}95.06 (1.55)	^{b}61.92 (2.03)	^{c}8.43 (0.99)	^{a}96.01 (1.67)	^{ca}39.10 (0.55)	^{a}82.97 (3.19)
	Pesticides (Rs.)	^{ab}109.81 (42.41)	^{bc}215.67 (177.32)	^{ab}106.72 (56.63)	^{ab}101.65 (16.76)	^{ab}112.32 (55.51)	^{a}55.03 (35.79)	^{a}75.01 (81.33)	^{d}107.37 (96.69)
	Water (Acre Inches)	^{a}30.88 (10.61)	^{a}40.19 (7.33)	^{ba}34.51 (19.34)	^{ba}39.36 (13.45)	^{a}38.70 (9.90)	^{ca}39.27 (5.05)	- (-)	^{a}36.21 (8.27)
Technology 3 Tractor only	Bullock (hours)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)	- (-)
	Tractor (hours)	^{a}3.93 (1.48)	^{b}7.41 (3.39)	^{a}5.69 (2.22)	^{c}4.92 (6.15)	^{a}2.41 (1.31)	^{a}4.75 (2.61)	^{c}5.33 (4.44)	^{c}5.45 (4.22)
	F.Y.M. (Cart Loads)	^{a}11.95 (5.70)	^{b}10.60 (1.70)	^{c}10.36 (3.01)	^{a}5.88 (3.54)	- (-)	^{a}2.73 (3.39)	^{d}15.63 (11.24)	^{c}8.73 (7.13)
	Fertilizer (N. Kgs.)	^{a}89.92 (2.54)	^{a}107.94 (2.12)	^{a}95.84 (1.83)	^{a}97.76 (2.92)	^{a}86.52 (1.05)	^{a}81.20 (2.39)	^{a}88.43 (1.30)	^{b}80.86 (3.42)
	Pesticides (Rs.)	^{a}108.33 (65.36)	^{b}137.45 (102.99)	^{b}192.74 (181.54)	^{a}200.00 (47.75)	^{a}66.78 (29.94)	^{b}104.33 (73.98)	^{b}103.88 (159.40)	^{b}144.32 (124.58)
	Water (Acre Inches)	^{a}27.96 (10.54)	^{ab}32.51 (14.73)	^{b}34.06 (6.34)	^{a}43.07 (12.44)	^{b}34.30 (6.39)	^{ba}40.34 (6.07)	^{ab}35.59 (15.50)	^{a}38.20 (13.13)
Technology 4 Tractor-cum-Combine	Bullock (hours)	-	-	-	-	-	-	-	-
	Tractor (hours)	--	-	--	^{a}3.75 (4.02)	-	-	-	^{ac}3.75 (4.02)
	F.Y.M. (Cart Loads)	-	-	-	-	-	-	-	-
	Fertilizer (N. Kgs.)	-	-	-	^{a}80.73 (2.69)	-	-	-	^{ab}80.73 (2.69)
	Pesticides (Rs.)	-	-	-	^{b}234.13 (146.56)	-	-	-	^{b}234.13 (146.56)
	Water (Acre Inches)	-	-	-	^{a}30.29 (14.15)	-	-	-	^{a}30.29 (14.15)
Total	Bullock (hours)	^{a}8.56 (13.10)	^{a}7.41 (10.63)	^{a}6.89 (10.33)	^{b}5.53 (5.92)	^{a}10.89 (13.60)	^{a}9.31 (10.34)	^{b}4.86 (4.54)	^{a}7.08 (10.71)
	Tractor (hours)	^{a}2.91 (1.71)	^{b}5.61 (3.33)	^{b}3.59 (2.99)	^{c}3.36 (5.49)	^{a}1.39 (1.46)	^{b}2.71 (2.29)	^{c}2.28 (4.14)	^{c}3.39 (3.53)
	F.Y.M. (Card Load)	^{a}11.03 (5.00)	^{b}8.51 (2.39)	^{a}9.05 (6.30)	^{a}2.73 (4.80)	^{c}0.86 (0.54)	^{b}6.69 (3.30)	^{d}5.85 (13.04)	^{d}6.05 (6.50)
	Fertilizer (N Kgs.)	^{a}81.35 (2.50)	^{a}97.37 (2.38)	^{a}99.75 (3.11)	^{b}82.90 (5.14)	^{c}74.17 (1.50)	^{a}83.02 (2.75)	^{a}76.12 (2.98)	^{a}89.82 (3.56)
	Pesticides (Rs.)	^{ab}99.85 (48.07)	^{bc}159.68 (157.11)	^{b}138.80 (189.62)	^{c}193.01 (96.32)	^{ab}71.67 (50.62)	^{bd}92.81 (114.02)	^{b}74.59 (167.17)	^{d}132.38 (312.53)
	Water (Acre Inches)	^{a}39.04 (10.62)	^{a}39.44 (10.50)	^{a}33.79 (9.49)	^{a}30.28 (13.99)	^{b}33.14 (4.21)	^{b}35.51 (5.99)	^{c}30.28 (21.61)	^{a}39.41 (12.4)

1. Figures in parenthesis are the standard deviations.

2. Ist alphabatic character shows the statistical difference from one region to another region and 2nd alphabatic character shows the statistical difference from technology one to another technology at 5% probability level.

3.4.2 <u>Farm Incomes and Tractor Use:</u> Farm incomes are a function of the productivity per crop-acre, the cropped area of the farm and the cropping pattern followed on a specific farm. The data in Table 3.10 given on the next page reports on the incomes of the farms using various technologies and lying in various regions.

As can be seen from Table 3.10, incomes of the bullock cum tractor farms and those of tractor only are more than doubled or even more than tripled depending on the region and concept of income under consideration. Apart from productivity per acre, the trends in farm incomes must be explained by changes in cropped area and those in cropping pattern, that is percentage allocation of cropped area to various crop enterprises. It is clear from Table 3.10 that the bullock-operated farms tend to have smaller cropped area than the bullock cum tractor farms or tractor only farms. Although the cropped area varies from region to region, tractor operated farms handle - times as much area as the bullock-operated farm. Very much the same applies to bullock cum tractor farms with slight variations. Depending on the relative size of operations of bullock only, bullock cum tractor and tractor only farms, the cropped area accounts for as much as 100-400 percent variation in the incomes of farmers using various technologies.

The unexplained residual variation in incomes is attributable to changes in cropping pattern accompanying each of the technological packages. The table 3.11 on the next page gives the inherent cropping pattern underlying the various technological packages.

Table: 3.10 Average Farm Income* By Regions and Technology.

(Rupees)

Technology	Peshawar-Mardan (Zone-1)	Sahiwal-Faisalabad (Zone-2)	Multan-R.Y. Khan (Zone-3)	Sheikhupura-Gujranwala (Zone-4)	Jacobabad-Larkana (Zone-5)	Sanghar-Sukkur (Zone-6)	Pishin-Nasirabad (Zone-7)	All Zones (Pakistan)
A. Bullocks Only								
1. Gross Income	31178	38942	54186	80558	71106	60880	67902	61798
2. Net Income** (Rs.)	14930	16191	21087	34695	48158	35734	31543	31400
3. Net Income*** (Rs.)	8505	2825	9009	22048	39041	19628	5071	17199
4. Cropped Area (Acre)	10.89	14.64	16.50	25.97	24.31	21.22	21.90	21.22
B. Bullocks Cum-Tractor								
1. Gross Income (Rs.)	72144	218539	143506	81647	42676	143326	121052	134953
2. Net Income** (Rs.)	40598	123962	73513	22631	25575	48395	80373	67491
3. Net Income*** (Rs.)	19929	79075	1035	(3147)	11167	35426	65343	33336
4. Cropped Area (Acre)	17.21	47.55	54.77	37.47	17.05	47.68	42.82	37.99
C. Tractor Only								
1. Gross Income (Rs.)	107546	194385	219166	100518	47353	99173	99998	146672
2. Net Income** (Rs.)	62380	65908	91734	44656	26247	65421	49840	62457
3. Net Income*** (Rs.)	33303	(1323)	4288	(3155)	13492	57207	19315	12181
4. Cropped Area (Acre)	31.30	63.01	57.95	40.45	19.93	24.23	21.11	39.16
D. Tractor + Combine								
1. Gross Income (Rs.)	-	-	-	320565	-	-	-	320565
2. Net Income** (Rs.)	-	-	-	171982	-	-	-	171982
3. Net Income*** (Rs.)	-	-	-	(2766)	-	-	-	(2766)
4. Cropped Area (Acre)	-	-	-	115.27	-	-	-	115.27

* Excludes income from tractor rentals

** Gross Income minus cost of purchased inputs.

*** Gross Income minus total cost of all the input per crop acre.

Source: United Consultants Limited (1988).

It is revealed from Table 3.11 that bullock operated farms allocated between 9.19 percent of their area to fodder in the various regions except in Pishin-Nasirabad zone where cultivation is done manually. For tractor farm this area was only 6-10 percent again with the exception of Peshawar-Mardan zone, where fodder area of tractor farms went up from 18 percent to 23 percent for unknown reasons. Similarly the area under pulses, oil seeds and to some extent maize has fallen with the introduction of tractors. By contrast, the tractor operated farms relative to bullock farms have tended to devote greater area to cash crops like sugarcane, fruits, vegetables, cotton, rice and also wheat. Since these crops yield greater revenue per crop-area than fodders, oil-seeds, pulses and maize, a net gain in farm incomes may be expected as a result of area reallocation decisions of tractor farms.

To see as to what are the relative contributions of farm productivity, area increases and area reallocation decisions, we can pursue an example of the Peshawar region. A shift from bullock technology to tractor only technology resulted in an increase of 244 percent in farm income. Our Table 3.8 shows that productivity increased only by 20 percent. The data in Table 3.10 point to an increase of 187 percent in cropped area. As these two percentage add up 207 percent, the contribution of the cropping pattern changes would come to (244-207) nearly 37 percent.

Table: 3.11 The Cropping Pattern of the Various Regions by Technological Packages

Zone	Tech-nology	Cotton	Sugar-cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Total
Peshawar/ Mardan	1	-	26	-	-	26	30	-	-	-	-	-	-	9	9	100
	2	-	29	-	6	18	22	7	-	-	3	4	-	8	3	100
	3	-	8	-	-	8	24	4	-	-	1	-	32	12	11	100
Sahiwal/ Faisalabad	1	14	22	-	-	12	33	-	-	-	-	-	-	10	9	100
	2	10	5	-	6	7	18	-	1	8	21	4	16	2	2	100
	3	26	9	3	2	6	22	2	1	16	-	-	8	3	3	100
Multan/ R.Y. Khan	1	39	3	-	-	6	40	-	-	-	-	-	-	6	6	100
	2	29	3	-	9	6	28	-	2	-	-	-	18	2	3	100
	3	37	18	-	-	-	31	-	2	-	2	-	4	3	3	100
Sheikhupura /Gujranwala	1	-	4	15	21	-	19	1	-	-	8	8	8	4	12	100
	2	-	11	7	33	-	32	1	-	-	-	-	-	8	8	100
	3	-	8	5	34	-	23	1	-	-	8	7	3	6	5	100
Jacobabad/ Larkana	1	-	20	32	-	-	32	-	-	-	5	-	2	3	6	100
	2	-	14	42	-	-	38	-	-	-	-	-	6	-	-	100
	3	-	13	29	-	-	33	-	-	-	17	-	-	5	3	100
Sanghar/ Sukkur	1	31	-	-	26	-	30	-	-	-	-	1	-	7	5	100
	2	30	6	-	-	-	27	-	-	11	3	-	16	2	3	100
	3	45	10	-	-	-	35	-	-	-	-	-	-	4	6	100
Nasirabad/ Pishin	1	-	-	21	-	-	37	-	-	-	32	-	10	-	-	100
	2	-	-	25	-	-	19	-	34	-	-	-	21	1	-	100
	3	-	-	-	-	-	21	21	-	-	14	-	44	-	-	100

Source: United Consultants Limited (1988)

CHAPTER IV

LINEAR PROGRAMMING MODEL; APPLICATION TO SURVEY DATA

In order to determine the impact of technology on the farm income, cropping pattern, and labour utilization, a linear programming (LP) approach has been used. Specific LP models have been developed for each agricultural region and farm technology. All the information used in the formulation of these models has been derived from the field survey data.

The data from each region have separately been compiled according to the technology used at various farms (there are 7 regions and 4 technology groups - Bullocks only, bullock cum tractor, tractor only and tractor cum combine harvester). For each region and technology package a separate LP model has been formulated.

4.1 FORMULATION OF LINEAR PROGRAMMING MODEL

The LP model for a specific region and technology has been formulated with the objective of maximizing the net return from a typical farm. The objective function and the constraints have been formed so that not only the maximum return can be determined, but also information about the cropping pattern, the output of various products and the opportunity cost associated with the resources (labour, water etc.) becomes available.

The general structure of the model is :

$$NR = \sum_{i=1}^{n} Y_i A_i - \sum_{i=1}^{m} C_i X_i + \sum_{i=1}^{n} M_i \quad \ldots\ldots\ldots \quad (iv-1)$$

Where:

Y_i = Gross income of ith crop.

A_i = Area (in acre) of ith crop.

C_i = Input cost of (per acre) used for production

M = Income from Machinery rentals

NR = Net revenue (in Rupees)

The objective function was to maximize profit.

Where:

$$\text{Maximum Profit} = NR = \sum_{i=1}^{n} Y_i A_i - \sum_{i=1}^{m} C_i X_i + \sum_{i=1}^{n} M_i \ldots (iv-1)$$

Subject to following constraints:

i) Land $= \sum_{i=1}^{n} \sum_{j=1}^{12} A_{ij} \leqslant L$

ii) Human Labour $= \sum_{i=1}^{n} \sum_{k=1}^{s} (hX)_{ik} \leqslant HL$

iii) Bullock Labour $= \sum_{i=1}^{n} \sum_{k=1}^{s} (bX)_{ik} \leqslant BL$

iv) Machinery Labour $= \sum_{i=1}^{n} \sum_{k=1}^{s} (MX)_{ik} \leqslant ML$

v) Water $= \sum_{i=1}^{n} \sum_{j=1}^{12} (wX)_{ij} \leqslant TW$

$= \sum_{i=1}^{n} \sum_{j=1}^{12} (wX)_{ij} \leqslant CW$

Where:

$(hx)_{ik}$	=	Human labour hours allocated to crop i during season k (Rabi and Kharif)
$(bx)_{ik}$	=	Bullocks labour hours allocated to crop i during season k (Rabi and Kharif)
$(mx)_{ik}$	=	Machinery Labour hours allocated to crop i during season k (Rabi and Kharif)
$(wx)_{ij}$	=	Water allocated to crop i during month j (in acre inches)
L	=	Total availability of land (in acre)
TW	=	Total availability of tubewell water (in acre inches)
CW	=	Total availability of canal water (in acre inches)
HL	=	Total availability of human labour in man hours.
BL	=	Total availability of bullocks labour in hours.

TL	=	Total availability of machinery hours
i	=	1, 2.....n
j	=	1, 2.....12
k	=	Crop season i.e. Rabi and Kharif

4.2 EXPLANATION OF THE MODEL

4.2.1 Objective Function: The objective of the model is to maximise the net revenue of the farm, subject to the technical constraints of production function and the level of resource availability. The net revenue of a farm is obtained by deducting the total variable cost of producing farm output from the gross farm revenue included income from tractor rentals. Calculation of input - output coefficient are shown in Appendix-A of this report.

4.2.2 Activities In Objective Function: A number of activities were defined for each crop zone with different technological packages are given below:

- Output prices (per kg/acre) for each crop (in Rupees)
- Income from tractor rentals (in Rupees)
- Cost of input per acre (including cost of seed, pesticide, water rate etc.) (in Rupees)
- Cost of manual labour per hour (in Rupees)
- Cost of bullock labour per hour (in Rupees)

- Cost of tractor hour per hour (in Rupees)

- Cost of fertilizer (of different type) per bag (in Rupees)

- Cost of tubewell water for each month.

4.2.3 Constraints: The constraints can be divided into two categories, namely:

1. Resources on the farm including land, canal water, tubewell water, family labour, hired labour, bullocks hours and tractor hours.

2. Special constraints that restrict the range of feasible cropping patterns.

Due to the seasonal nature of crop production, not on the total amount of various resources but also their availability during different stages of crop production is important. Thus, the amount of land, canal water and tubewell water, have been expressed as 12 monthly constraints and bullocks labour, human labour and tractor labour have been expressed as season i.e. Rabi and Kharif.

4.3 DETAILED DISCUSSION ON CONSTRAINTS

The detailed discussion of various individual constraints is as follow:

- Water Constraints: The first group of constraints describe the role of irrigation. Without a tubewell, the water availability is limited by canal water supplies by the Government, and this amount

corresponds to the size of farm, the data on the monthly acre inches of canal water available in the study "Indus Basin Irrigation System Historic Rivers and canals discharge data (1987-88)" conducted by Wapda Resource Management Directorate (March 1988).

- Land Constraints: In addition to the water needs, land requirements are estimated for each group. The resulting coefficients are simply a description of the period during which a particular crop occupies the land. Total land availability is assumed by the average farm size determined from the survey for each region and each technological package shown in Table 4.1. The land constraint is expressed as 12 monthly constraints.

- Bullocks Constraints: A third group of constraints describes the animal power needed in the production of an acre of each crop. From several farm management studies it appears that the animals can be worked about six hours a day and 25 days a month. (Gotsch, 1975). This gives a limit of 1800 hours as the appropriate year animal-power constraints.

- Human Labour Constraints: Human labour requirements are also calculated per acre by crop. Based on data it appears that a farm of 12.5 acres would have about three man years of adult male equivalent family and permanent hired labour associated with farm. Assuming an eight hours day about 25 work-days per month, a total of about 600 hours of family labour would normally be available each month.

- Special Crop Constraints: Several determining constraints that directly affect the cropping pattern

TABLE 4.1: AVERAGE FARM AREA UNDER ALTERNATIVE TECHNOLOGIES IN THE VARIOUS REGIONS

Region	Technology	Average Farm Area (Acres)
Peshawar/Mardan	Bullocks only	8.29
	Bullocks-cum-Tractor	12.44
	Tractor only	15.65
	All Technology	12.16
Sahiwal/Faisalabad	Bullocks only	8.66
	Bullocks-cum-Tractor	14.73
	Tractor only	18.45
	All Technology	14.46
Rahim Yar Khan/ Multan	Bullocks only	12.00
	Bullocks-cum-Tractor	27.40
	Tractor only	32.22
	All Technology	27.25
Sheikhupura/ Gujranwala	Bullocks only	7.88
	Bullocks-cum-Tractor	20.70
	Tractor only	16.66
	Tractor-cum-Combine	74.28
	All Technology	29.41
Jacobabad/Larkana	Bullocks only	10.47
	Bullocks-cum-Tractor	7.87
	Tractor only	5.71
	All Technology	7.60
Sangar/Sukkur	Bullocks only	6.60
	Bullocks-cum-Tractor	16.29
	Tractor only	15.21
	All Technology	14.39
Pishin/Nasirabad	Bullocks only	8.43
	Bullocks-cum-Tractor	15.40
	Tractor only	9.67
	All Technology	11.57
Pakistan	Bullocks only	8.66
	Bullocks-cum-Tractor	15.59
	Tractor only	17.10
	Tractor-cum-Combine	74.28
	All Technology	16.73

have been introduced into the constraint set. For example, after determining the fodder requirements of a pair of bullocks, minimum constraints on acrage under these crops have been introduced to ensure that the necessary fodder will be forthcoming. For certain high value crops that would other wise dominate the model's cropping pattern i.e. vegetable, fruit - acreage maximum levels are based on d mand and supply.

4.4 CONSISTENCY CHECKS

To check the consistency of the model estimates with survey results we report on cropping patterns and cropping intensities in the following Tables 4.2 and 4.3 respectively. It is evident from these tables that the estimates of the model are quite consistent with survey results. While progressive levels of mechanized cultivation tend to increase the area under more valuable cash crops, these changes are reflected in both the model estimates and the survey results. By contrast change in cropping intensities show a less consistent movement among model estimates and survey results as reflected by the data in Table 4.3.

4.5 RESULTS OF THE MODEL

4.5.1 **Cropping Intensities:** Table 4.4 gives the model's estimates of cropping intensities under different technological packages and varying irrigation systems. It is clear from this table that the availability of tubewell water, by alleviating the constraints of irrigation water, tends to raise the cropping intensities in almost all the cases irrespective of the technological package under consideration. As a general observation cropping

TABLE 4.2: LP SOLUTION AND SURVEY RESULTS OF CROPPING PATTERN IN THE VARIOUS REGIONS

ZONE	TECHNOLOGY	COTTON		SUGER-CANE		RICE IRRI		RICE BASMATI		MAIZE		WHEAT		TOBACCO		OIL-SEAD		PULSES		VEGETABLE RABI		VEGETABLE KHARIF		FRUIT		FODDER RABI		FODDER KHARIF		TOTAL	
		1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2
Peshawar/ Mardan	1	-	-	29	26	-	-	-	-	32	26	32	30	-	-	-	-	-	-	-	-	-	-	-	-	4	9	3	9	100	100
	2	-	-	32	29	-	-	-	6	31	18	38	22	-	7	-	-	-	-	-	3	1	4	-	-	3	8	3	3	100	100
	3	-	-	19	5	-	-	-	-	26	8	23	24	-	4	-	-	-	-	1	1	-	-	25	32	3	12	3	11	100	100
Sahiwal/ Faisalabad	1	32	14	29	22	-	-	-	-	-	12	32	35	-	-	-	-	-	-	-	-	-	-	-	-	4	10	3	9	100	100
	2	29	10	33	5	-	-	-	6	-	7	11	18	20	-	-	1	-	8	-	21	1	4	-	16	3	2	3	2		100
	3	39	26	16	9	-	3	-	2	-	6	21	21	18	2	-	1	-	16	-	-	-	-	-	8	2	3	2	3	100	100
Multan / R.Y. Khan	1	46	39	-	3	-	-	-	-	-	6	49	40	-	-	-	-	-	-	-	-	-	-	-	-	3	6	2	6	100	100
	2	47	29	-	3	-	-	-	9	-	6	47	28	-	-	-	2	-	-	-	-	-	-	-	18	3	2	3	3	100	100
	3	42	37	-	18	-	-	-	-	6	-	41	31	-	-	6	2	-	-	-	2	-	-	-	4	3	3	2	3	100	100
Sheikhupura/ Gujranwala	1	-	-	12	4	-	15	51	21	-	-	28	19	-	1	-	-	-	-	2	8	2	8	-	8	4	4	4	12	100	100
	2	-	-	9	[illegible]	-	7	56	33	-	-	38	32		1	-	-	-	-	-	-	-	-	-	-	4	8	3	8	100	100
	3	-	-	2	8	-	5	46	34	-	-	45	23	-	1	-	-	-	-	1	8	-	7	1	3	3	6	2	5	100	100
	4	-	-	-	-	-	-	46	43	-	-	47	42	-	-	-	-	-	-	-	4	1	7	-	-	3	2	3	2	100	100
Jaccobabad/ Larkana	1	-	-	33	20	31	32	-	-	-	-	28	32	-	-	-	-	-	-	-	5	-	-	1	2	3	3	4	6	100	100
	2	-	-	36	14	32	42	-	-	-	-	32	38	-	-	-	-	-	-	-	-	-	-	-	6	-	-	-	-	100	100
	3	-	-	34	13	31	29	-	-	-	-	28	33	-	-	-	-	-	-	-	17	-	-	-	-	3	5	4	3	100	100
Sangar/ Sukkur	1	22	31	-	-	-		25	26	-	-	47	30	-	-	-	-	-	-	-	-	1	1	-	-	3	7	2	5	100	100
	2	42	30	11	6	-		-	-	-	-	34	27	-	-	-	-	9	11	-	3	-	-	-	16	2	2	2	3	100	100
	3	42	45	12	10	-		-	-	-	-	43	35	-	-	-	-	-	-	-	-	-	-	-	-	2	4	2	6	100	100
Nasirabad/ Pishin	1	-	-	-	-	42	21	-	-	-	-	28	37	-	-	-	-	-	-	14	32	-	-	12	10	2	-	2	-	100	100
	2	-	-	-	-	41	25	-	-	-	-	16	19	-	-	14	34	-	-	-	-	-		24	21	3	2	3	-	100	100
	3	-	-	-	-	-	-	-	-	-	-	17	21	19	21	-	-	-	-	17	14	-	-	41	44	3	-	3	-	100	100

1 = LP Solution
2 = Survey Results

TABLE 4.3 · LP SOLUTION AND SURVEY RESULTS OF CROPPING INTENSITIES IN THE VARIOUS REGIONS

TECHNOLOGY	Peshawer/ Mardan		Sahiwal/ Faisalabad		Multan/ R.Y. Khan		Sheikhupura/ Gujranwala		Jaccobabad/ Larkana		Sangar/Sukkar		Nasirabad/ Pishin	
	1	2	1	2	1	2	1	2	1	2	1	2	1	2
A. Bullocks only	190	166	200	221	193	142	164	231	192	232	200	222	208	260
B. Bullocks Cum Tractor	198	179	198	206	200	205	161	181	200	217	200	293	233	273
C. Tractor only	198	215	200	242	201	212	202	243	194	193	200	176	183	218
D. Tractor Cum Combine	-	-	-		-	-	200	155	-	-	-	-	-	-

1 = LP Solution
2 = Survey Results

TABLE 4.4 OPTIMAL CROPPING INTENSITIES UNDER ALTERNATIVE TECHNOLOGIES IN THE VARIOUS REGIONS

Technology	Peshawar-Mardan	Sahiwal-Faisalabad	Multan-R.Y. Khan	Sheikhupura-Gujranwala	Jaccobad-Larkana	Sangher-Sukkur	Pishin-Nasirabad
A. Bullock Only							
- With Tubewell	190	156	193	164	192	200	208
- Without Tubewell	46	59	59	43	40	69	94
B. Bullock cum Tractor							
- With Tubewell	198	198	200	161	200	200	233
- Without Tubewel	50	29	60	35	29	55	38
C. Tractor Only							
- With Tubewell	198	200	201	202	194	200	183
- Without Tubewell	45	54	51	33	38	63	45
D. Tractor cum Combine							
- With Tubewell	-	-	-	200	-	-	-
- Without Tubewell	-	-	-	34	-	-	-

intensities can be doubled or even tripple with availability of tubewell water than in their absence. In view of the shortage of irrigation water from canals, the result is as expected. However, given the availability of tubewell water, the impact of tractors on cropping intensities varies from region to region. In the relatively well-drained regions underlain with fresh ground water such as Sahiwal-Faisalabad, Multan-Rahim Yar Khan, Sheikhupura-Gujranwala and Jacobabad-Larkana, the progressive improvements in technological packages result in progressive increases in cropping intensities. By contrast, the regions underlain with saline water such as Sukkur-Sanghar and those with deep underground water acquire for such as Nasirabad-Pishin and Peshawar-Mardan, tractors fail to result in higher cropping intensities. Similarly, in the orchard areas of Nasirabad-Pishin, the introduction of tractors is not accompanied by a rise in cropping intensity because of the growing manual constraint needed to attend the increasing area of orchards.

4.5.2 Cropping Pattern: The model estimates given in table 4.5 show that tubewells tend to increase the area of more valuable cash crops like sugarcane, tobacco, cotton, rice wheat and fruits in the various regions. There is some evidence in table 4.5 that tractors with tubewells also lead to similar changes in the cropping patterns of the various regions. For example, in the Peshawar-Mardan region, tractor cultivation tends to increase the area under fruits at the expense of maize, tobacco, wheat and sugarcane in view of the high profitability of the former crop. In Sahiwal-Faisalabad region, the growing emphasis on cotton and sugarcane at the cost of wheat area is placed after the introduction of

TABLE 4.5 OPTIMAL CROPPING PATTERN UNDER ALTERNATIVE TECHNOLOGIES IN THE VARIOUS REGIONS

(Percentage)

	BULLOCK ONLY		BULLOCK CUM TRACTOR		TRACTOR ONLY		TRACTOR CUM COMBINE	
	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell
Cotton	-	-	-	-	-	-	-	-
Sugarcane	29	-	31	10	19	-	-	-
Rice Irri	-	-	-	-	-	-	-	-
Rice Basmati	-	-	-	-	-	-	-	-
Maize	32	38	31	31	26	54	-	-
Wheat	32	-	31	32	23	7	-	-
Tobacco	-	40	-	5	-	9	-	-
Vegetable Rabi	-	-	-	-	1	4	-	-
Vegetable Kharif	-	4	1	4	-	-	-	-
Fruit	-	-	-	-	25	8	-	-
Fodder Rabi	4	9	3	8	3	9	-	-
Fodder Kharif	3	9	3	10	3	9	-	-

Sahiwal - Faisalabad

TABLE 4.5 OPTIMAL CROPPING PATTERN UNDER ALTERNATIVE TECHNOLOGIES IN THE VARIOUS REGIONS

(Percentage)

	BULLOCK ONLY		BULLOCK CUM TRACTOR		TRACTOR ONLY		TRACTOR CUM COMBINE	
	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell
Cotton	33	56	29	44	39	49	-	-
Sugarcane	29	3	33	-	18	29	-	-
Rice Irri	-	-	-	-	-	-	-	-
Rice Basmati	-	-	-	-	-	-	-	-
Maize	-	-	-	-	-	-	-	-
Wheat	32	27	11	34	21	-	-	-
Tobacco	-	-	20	-	18	8	-	-
Vegetable Rabi	-	-	-	-	-	-	-	-
Vegetable Kharif	-	-	1	4	-	-	-	-
Fruit	-	-	-	-	-	-	-	-
Fodder Rabi	4	7	3	9	2	7	-	-
Fodder Kharif	2	7	3	9	2	7	-	-

Multan - R.Y. Khan

TABLE 4.5 OPTIMAL CROPPING PATTERN UNDER ALTERNATIVE TECHNOLOGIES IN THE VARIOUS REGIONS

(Percentage)

	BULLOCK ONLY		BULLOCK CUM TRACTOR		TRACTOR ONLY		TRACTOR CUM COMBINE	
	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell
Cotton	46	53	48	57	42	66	-	-
Sugarcane	-	-	-	-	-	-	-	-
Rice Irri	-	-	-	-	-	-	-	-
Rice Basmati	-	-	-	-	-	-	-	-
Maize	-	-	-	-	6	-	-	-
Wheat	49	30	47	27	41	-	-	-
Tobacco	-	-	-	-	-	-	-	-
Oil Seed	-	-	-	2	6	18	-	-
Vegetable Rabi/Kharif	-	-	-	-	-	-	-	-
Fruit	-	-	-	-	-	-	-	-
Fodder Rabi	3	10	3	7	3	8	-	-
Fodder Kharif	2	7	2	7	2	8	-	-

Sheikhupura - Gujranwala

TABLE 4.5 OPTIMAL CROPPING PATTERN UNDER ALTERNATIVE TECHNOLOGIES IN THE VARIOUS REGIONS

(Percentage)

	BULLOCK ONLY		BULLOCK CUM TRACTOR		TRACTOR ONLY		TRACTOR CUM COMBINE	
	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell
Cotton	-	-	-	-	-	-	-	-
Sugarcane	13	-	9	-	2	-	-	-
Rice Irri	-	-	-	-	-	-	-	-
Rice Basmati	51	15	56	18	47	15	46	18
Maize	-	-	-	-	-	-	-	-
Wheat	26	47	28	48	44	49	47	47
Tobacco	-	-	-	-	-	-	-	-
Vegetable Rabi	-	-	-	-	1	6	-	-
Vegetable Kharif	1	5	-	-	-	-	1	6
Fruit	1	5	-	-	1	6	-	-
Fodder Rabi	4	14	4	17	3	12	3	17
Fodder Kharif	4	14	3	17	2	12	3	12

Jacobabad - Larkana

TABLE 4.5 OPTIMAL CROPPING PATTERN UNDER ALTERNATIVE TECHNOLOGIES IN THE VARIOUS REGIONS

(Percentage)

	BULLOCK ONLY		BULLOCK CUM TRACTOR		TRACTOR ONLY		TRACTOR CUM COMBINE	
	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell
Cotton	-	-	-	-	-	-	-	-
Sugarcane	33	26	36	41	36	28	-	-
Rice Irri	31	4	32	3	30	5	-	-
Rice Basmati	-	-	-	-	-	-	-	-
Maize	-	-	-	-	-	-	-	-
Wheat	28	40	32	56	27	42	-	-
Tobacco	-	-	-	-	-	-	-	-
Vegetable Rabi	-	-	-	-	-	-	-	-
Vegetable Kharif	-	-	-	-	-	-	-	-
Fruit	1	5	-	-	-	-	-	-
Fodder Rabi	3	10	-	-	3	10	-	-
Fodder Kharif	4	15	-	-	4	15	-	-

Sanghar - Sukkur

TABLE 4.5 OPTIMAL CROPPING PATTERN UNDER ALTERNATIVE TECHNOLOGIES IN THE VARIOUS REGIONS

(Percentage)

	BULLOCK ONLY		BULLOCK CUM TRACTOR		TRACTOR ONLY		TRACTOR CUM COMBINE	
	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell
Cotton	22	47	42	22	42	52	-	-
Sugarcane	-	-	11	22	12	-	-	-
Rice Irri	-	-	-	-	-	-	-	-
Rice Basmati	25	-	-	-	-	-	-	-
Maize	-	-	-	-	-	-	-	-
Wheat	47	36	34	35	42	32	-	-
Tobacco	-	-	-	-	-	-	-	-
Pulses	-	-	9	-	-	-	-	-
Vegetable Rabi	-	-	-	3	-	-	-	-
Vegetable Kharif	1	3	-	-	-	-	-	-
Fruit	-	-	-	-	-	-	-	-
Fodder Rabi	3	8	2	11	2	10	-	-
Fodder Kharif	2	6	2	7	2	6	-	-

Pishin - Nasirabad

TABLE 4.5 OPTIMAL CROPPING PATTERN UNDER ALTERNATIVE TECHNOLOGIES IN THE VARIOUS REGIONS

(Percentage)

	BULLOCK ONLY		BULLOCK CUM TRACTOR		TRACTOR ONLY		TRACTOR CUM COMBINE	
	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell	With Tubewell	Without Tubewell
Cotton	-	-	-	-	-	-	-	-
Sugarcane	-	-	-	-	-	-	-	-
Rice Irri	42	24	41	17	-	-	-	-
Rice Basmati	-	-	-	-	-	-	-	-
Maize	-	-	-	-	-	-	-	-
Wheat	28	36	16	42	17	36	-	-
Tobacco	-	-	-	-	19	-	-	-
Oil Seed	-	-	13	-	-	-	-	-
Vegetable Rabi	14	11	-	-	-	-	-	-
Vegetable Kharif	-	-	-	-	17	46	-	-
Fruit	12	11	25	19	41	-	-	-
Fodder Rabi	2	9	3	11	3	9	-	-
Fodder Kharif	2	9	2	11	3	9	-	-

tractors. This helps to alleviate peak-season labour demand constraints. In the absence of any substitutable crop, wheat and cotton continue to dominate the cropping pattern of the Multan-Rahim Yar Khan region even after the tractor cultivation. Perhaps the large farm-size of the area is also instrumental in the continued emphasis on the crops. Wheat and rice (Basmati) seem to be the most profitable crops of the rice-region in the Punjab but sugarcane tends to replace rice (IRRI) in the rice-growing area of Sind (Jaccobabad-Larkana) with the introduction tractors. Area under wheat is replaced by area under cotton and to a certain extent by area under sugarcane in the Sukkur-Sanghar region with mechanized cultivation. In the Nasirabad-Pishin region, tractors lead to the increasing profitability of fruits with falling area under vegetables, rice (IRRI) and wheat crops.

4.5.3 Net Farm Income: The net returns per crop-acre are presented in the following table 4.6. It is evident from this table that net returns tend to be lower with tubewell water availability than without it except in the case of Sahiwal-Faisalabad region and Peshawar-Mardan region. The high dependence of these regions on costly tubewell water, although instrumental in raising cropping intensities, tend to result in low returns per crop-acre. There is also evidence in this table that net income per crop-acre tends to rise with progressive levels of mechanized cultivation. However, the productivity per acre varies from region to region. For example, net incomes per acre were only slightly higher on tractor farms than bullock farms in most regions but were significantly higher than bullock-operated farms in Sukkur-Sanghar, Peshawar-Mardan and Nasirabad-Pishin regions. It is also noticeable from the table that in most cases, the bullock-cum-tractor

TABLE 4.6 NET INCOME PER CROPPED ACRE*

(RUPEES)

Technology	Peshawar-Mardan	Sahiwal-Faisalabad	Multan-R.Y. Khan	Sheikhupura-Gujranwala	Jaccobad-Larkana	Sangher-Sukkur	Pishin-Nasirabad
A. Bullock Only							
- With Tubewell	875	1352	1265	934	1476	1152	936
- Without Tubewell	1095	1130	1807	1454	1997	1865	1105
B. Bullock cum Tractor							
- With Tubewell	1462	1918	1573	1403	1637	2120	2016
- Without Tubewel	1178	1604	1679	1275	1972	1965	1811
C. Tractor Only							
- With Tubewell	1889	1847	1330	1311	1931	2061	3134
- Without Tubewell	1520	1733	1445	1097	1845	2104	3101
D. Tractor cum Combine							
- With Tubewell	-	-	-	1038	-	-	-
- Without Tubewell	-	-	-	1036	-	-	-

* Includes income from tractor rentals.

TABLE 4.7 EMPLOYMENT EFFECT OF MECHANIZATION (PER CULTIVATED ACRE)

(HOURS)

Technology	Peshawar-Mardan	Sahiwal-Faisalabad	Multan-R.Y. Khan	Sheikhupura-Gujranwala	Jaccobad-Larkana	Sangher-Sukkur	Pishin-Nasirabad
A. Bullock Only							
- With Tubewell	353	492	439	328	353	410	460
- Without Tubewell	104	137	44	86	80	174	85
B. Bullock cum Tractor							
- With Tubewell	451	601	400	337	380	394	362
- Without Tubewel	119	132	140	65	75	136	60
C. Tractor Only							
- With Tubewell	306	502	672	309	349	382	397
- Without Tubewell	90	203	152	57	85	126	103
D. Tractor cum Combine							
- With Tubewell	-	-	-	243	-	-	-
- Without Tubewell	-	-	-	57	-	-	-

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 **Findings:** The study was undertaken with a view to investigate the contributions of farm mechanization to agricultural productivity and employment both within and outside of agriculture. More specifically, the objectives of the study, as defined in the terms of reference prepared by the Directorate of Agricultural Policy, were to examine (1), the impact of mechanization on productivity, farm/off-farm employment and income by farm size and tenure for different ecological zones, (2), constraints in mechanization, (3), economics of small versus medium and large scale machines (tractors, harvester etc.), (4), farm and off-farm use of agricultural mechanical equipment and (5), conclusions and recommendations. These objectives were expanded in the programme of work to include a review of literature and also a review of the historical progress of farm mechanization and development of government policy over the last 25-30 years. In preparation of this report we have taken a full note of these considerations. It encompasses over five chapters, the contents and conclusions of which are summarized below.

Chapter-I is introductory in nature and consists of the background leading to mechanization, a review of major studies in Pakistan contemplating the effects of mechanization on agricultural productivity and employment, objectives and outline of this reports, characteristics, sample design and selection of the sample and methodology of the study. The most important conclusion of the chapter was the controversy of the literature regarding

the impact of tractors on the productivity of agriculture and employment. If productivity increases were predicted by some studies, an equal number argued that tractors are unlikely to lead to productivity gains of one kind or another. Similarly large-scale labour displacements were considered to be a necessary concommitant of tractorization by some against little or no displacement of labour of other studies.

Chapter-II provides a comprehensive historical review of the progress of mechanization in Pakistan and the role of government policy to induce mechanization from time to time. Alongside the incentives and disincentives provided by government policy, a discussion of private initiatives is also included. In the final pages of the chapter, current constraints to mechanization are elaborated upon. Three main findings of the chapter may be reiterated. Firstly, mechanization in Pakistan has progressed at an accelerating pace since the decade of the sixties. The numbers have grown from a few hundred tractors per year during the decade of the fifties to few thousands during the sixties and early seventies to many thousands in the late seventies and eighties. In the second half of the eighties annual addition went above 2500 tractors. Although, the large farmers and Punjab had been at the forefront of appropriating mechanical equipment, there are no large-scale differences in the ownership of the tractors per unit of cultivated land. The availability of tractor rental services make it possible and also profitable for the small farmers to use tractors as frequently as that by large farmers owning the tractors. Secondly, in spite of the problems especially those associated with foreign exchange, the government policy towards mechanization has persistently been

favourable and became increasingly so with the passage of time. It originated in the fifties with over-valued exchange rates, free licensing for tractor imports and low interest rates on loans for tractors. However the pace of mechanization remained slow in the face of falling agricultural incomes as a result of stagnant yields and falling commodity prices. Liberal price support policy for agricultural commodities and subsidized prices of agricultural inputs and private tubewell development coupled with continuation of the policies of the fifties and availability of foreign aid invigorated the pace of tractorization. But the foreign exchange crisis of 1965-66 kept mechanization at a stand still until early 1970s. The early 1970s had also seen a major devaluation of the Rupee, rising oil prices and deteriorating foreign exchange situation, to be overcome only in the late 1970s. Although the government policy in the 1980s has deteriorated, the private initiatives, motivated by rising wage, increasing animal costs and a squeeze on agriculture to reduce cultivation costs, to undertake mechanization remain high and finally, it is this scenario of events that runs us into constraints to mechanization. Five major constraints to mechanization are recognized. They have to do with smallness of agricultural holdings, profitability of mechanization, lack of repair and spare parts services, foreign exchange problems and monopoly of government in the distribution of tractors and loans for them.

In Chapter-III, we deal with the main issue of our report; that is the impact of farm mechanization on productivity of agriculture and employment both within and outside of agriculture. Before going into the main theme, the chapter first discusses the farm and non-farm usage

of agricultural machines especially those of tractors. The finding of the section is that only 5 percent of the 1130 annual working hours of the tractor were devoted to non-farm work. More than 53 percent of total agricultural work hours were rented out to neighbouring farmers. More than 68 percent of the non-farm hours were for the owner himself. While these figures present a Pakistan wide picture, there were considerable variations accross regions and various tenurial and farm size groups. Issues related to operation specific use of tractor users were also discussed at length along with percentage users of various tractor implements by size of holdings and in the various agro-ecological zones as revealed by our survey data.

Contrary to the findings of many studies, our survey results pointed a positive contribution of tractors to agricultural productivity irrespective of the definition of the productivity. There was considerable variation in productivity across regions. Gross productivity truned out to be the highest in Sahiwal and Faisalabad zone followed closely by Peshawar-Mardan, Pishin-Nisirabad and cotton growing regions of Punjab and Sind. By contrast net productivities defined by gross value of output per crop-acre minus total cost per crop-area turned out to be the lowest in the insecticide intensive cotton and rice growing areas of the Punjab. It is also in these regions that bullock cultivation seems to be more profitable than tractor cultivation for net incomes of tractor farms fall to abysmally low levels.

The higher gross productivity of tractor farms seems to be the result of their high dependence on modern inputs. Our survey results indicate that tractor farms almost

invariably make greater use of all modern inputs than their counter part bullock cultivators. The tractorized cultivation results in farm incomes that are 3-4 times the bullock cultivators. The principal causes of such large differences are high productivity, greater cropped-area and emphasis of the tractor farms on more valuable cash crops in their cropping pattern. The relative contribution of these three factors was noted respectively to be 20 percent, 187 percent and 37 percent in Peshawar-Mardan region.

Our survey results also indicate that tractorization is unlikely to lead to labour displacement and certainly not to a large-scale labour displacement. The only change that occurs is in the composition of the labour employed on the farm. Tractors seem to be instrumental in reducing peak-season labour bottlenecks by displacement of permanent family and hired labour to the extent of 40 percent. However a 20 percent spontaneous increase occurs in casual hired labour reducing the displacement content to only 20 percent. This decline in labour use is more than off-set by changes in cropping pattern towards more labour intensive crops and the rise in productivity that accompanies tractor cultivation. What is more important to note is that the interactions of forward and backward linkages may be associated with millions of jobs in the non-farm sector. While we have given some estimates of the likely employment creation in the manufacture of tractors, manufacture of tractor implements and repair shops for tractors, it is only a fraction of the total jobs created in transport, distribution network, trade and dealership of tractors and tractor spare-parts.

Chapter IV deals with fitting a linear programming model to our survey data to measure the efficiency of agriculture in terms of their behaviour as profit maximizing agents. The purpose here is to put various policy issues to more rigorous test if only to reconfirm the findings of Chapter III.

The final chapter V summarises the findings of our study and makes policy recommendations in the light of these findings.

5.2 Policy Recommendations: A number of recommendations automatically follow from a study of this size. Many of these recommendations are implicit in the discussions of various chapters but need to be explicitly stated. An explicit statement, therefore follows in the following pages.

Firstly, the mechanization of agriculture in Pakistan thus far seems to be laudable because of its favourable impact on Pakistan's agricultural development. As the results of our survey indicate, it contributes significantly to productivity of agriculture, has propagated the use of modern inputs and has been instrumental in raising the farm incomes in significant ways. Apart from being employment creating, mechanization has gone a long way in alleviating the labour and tillage-power constraints especially during the peak-demand period. It would, therefore, seem wise to encourage mechanization in the future as in the past. The major emphasis of the policy should continuously be on the promotion of locally-made equipment rather than on combine harvester imported from abroad.

Secondly, mechanization has gone a long way in reducing tillage costs and has relieved many a small farmer of oppressive maintenance costs of bullocks. The availability of rental services of tractors and tractor equipment has been instrumental in this respect. However, the fact remains that a large number of small farmers do not use tractors for the services may not be available to them at the appropriate time. To provide greater relief to this class of farmers, there is a need for expansion of custom/hire services of tractors, threshers and shellers. This can best be done by setting up corporations, either public or private, to provide such services at pre-specified service rates. One of the alternatives to the above proposal could be a development of small-sized tractors for purchase by the small farmers. Apart from being costly in terms of operational costs, the fractional technology will still be large compared to the size of many small farmers and is likely to remain beyond the purchasing power of a large majority of small farmers. It should also be noted that owners of small tractors face formidable problems of non-availability of repair services and spare parts. We understand that the government is already planning to undertake the production of small tractors. Apart from floating too many makes into the market, such a decision would be a drain on country's foreign exchange resources. For these reasons it seems prudent that the government concentrates on the production of 3 or 4 models of tractors that are already assembled/manufactured in Pakistan and should abandon the idea of starting the production of small tractors.

Thirdly, tractors have thus far been used in Pakistan as a substitute for a desi plough with very little emphasis on productivity-raising equipment. Although the use of

this equipment has been rising into the recent years, the full potential of tractor power to raise yields cannot be realized without renewed emphasis on the use of such equipment. In order to promote the use of productivity-raising equipment, we recommend that the purchase of tractor should be tied to purchase of either a chisel plough, or a furrow turning plough or a desi plough in addition to the cultivator. In order to make the purchase of such equipment easier, credit approved for tractor purchase should also include the cost of purchase of the relevant equipment.

Fourthly, in spite of rapid development of repair shops and implement manufacturing industry, these unit remain totally disorganized. They lack precision, technical know-how and equipment to carry out their functions appropriately especially in an environment when tractor-operators are also untrained drivers. This unnecessarily undermines the effective use of tractors. Organized and concerted efforts on part of the government are needed for organizing training courses for tractor drivers, repair shops owners and manufacturers of agricultural implements. It would be highly desirable if the small implements manufacturers are induced to undertake a cooperative venture to set up large plants for manufacture of standard equipment along with economies of scale to be reaped in the process.

Finally, to curb the black market, the government monopoly over tractor sales needs to be diluted with sales in the open market. The government should ensure that a certain percentage of tractors is sold against cash in the open market at government fixed prices. This will relieve many farmers of the exactions of government petty officials,

promote sales and at the same time cause considerable saving in government exchequer that result from defaults in repayment of loans on tractor purchases.

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APPENDIX-A

(C R O P B U D G E T)

TABLE 1.1.1 (a)

Physical Input-Output Relationship (per Acre)

ZONE 1 TECNOLOGY 1

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR CASUAL	HRS	0.00	460.91	0.00	0.00	150.28	88.66	0.00	0.00	0.00	0.00	0.00	0.00	231.30	100.86	0.00
HIRED LABOUR	HRS	0.00	26.66	0.00	0.00	3.55	4.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	0.00	33.00	0.00	0.00	29.83	28.55	0.00	0.00	0.00	0.00	0.00	0.00	27.38	23.76	0.00
TRACTORS	HRS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHERS	HRS	0.00	0.00	0.00	0.00	1.43	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	0.00	1195.11	0.00	0.00	10.72	40.00	0.00	0.00	0.00	0.00	0.00	0.00	7.83	27.60	0.00
F. Y. M	B.C	0.00	10.00	0.00	0.00	10.00	11.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00	0.00	0.00
FERTILIZER																
1	BAGS	0.00	1.06	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00
2	BAGS	0.00	1.05	0.00	0.00	1.05	1.05	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00
3	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	BAGS	0.00	0.00	0.00	0.00	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
SUPPLEMENTARY WATER	HRS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PESTICIDES	RS	0.00	230.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIXED COSTS																
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTESIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	0.00	19114.58	0.00	0.00	633.33	920.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BYE PRODUCTS	KG	0.00	5812.50	0.00	0.00	0.00	920.83	0.00	0.00	0.00	0.00	0.00	0.00	1.00*	1.00*	0.00

* 1.00 = Acre

TABLE 1.1.1 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 1 TECNOLOGY 1

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	0.0	3.1	0.0	0.0	3.1	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	170.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	0.0	0.4	0.0	0.0	2.8	2.4	0.0	0.0	0.0	0.0	0.0	0.0	25.7	3.0	0.0
F. Y. M	33.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	129.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	138.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	135.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHNICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	0.0	0.3	0.0	0.0	2.5	2.2	0.0	0.0	0.0	0.0	0.0	0.0	2520.0	1440.0	0.0
BYE PRODUCTS	0.0	0.0	0.1	0.0	0.0	5.3	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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TABLE 1.1.1 (c)

ZONE 1 TECNOLOGY 1

C. Financial costs and Returns Crops (Rs. Per Acre)

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERAMENNT LABOUR	RS	0	1060	0	0	346	204	0	0	0	0	0	0	532	232	0
CASUAL HIRED LABOUR	RS	0	82	0	0	11	13	0	0	0	0	0	0	0	0	0
FARM POWER BULLOCKS	RS	0	330	0	0	298	285	0	0	0	0	0	0	273	237	0
TRACTORS	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHERS	RS	0	0	0	0	243	340	0	0	0	0	0	0	0	0	0
SEED	RS	0	478	0	0	30	96	0	0	0	0	0	0	201	82	0
F. Y. M	RS	0	330	0	0	330	363	0	0	0	0	0	0	264	0	0
FERTILIZER 1	RS	0	137	0	0	129	129	0	0	0	0	0	0	129	129	0
2	RS	0	145	0	0	145	145	0	0	0	0	0	0	138	138	0
3	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	RS	0	0	0	0	270	270	0	0	0	0	0	0	135	0	0
SUPPLEMENTARY WATER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PESTICIDES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FIXED COSTS																
MECHNICAL POWER	RS															
INTREST RATE	RS	0	63	0	0	62	74	0	0	0	0	0	0	45	26	0
PAYMENT TO	RS	0	75	0	0	84	85	0	0	0	0	0	0	28	28	0
WATER RATE	RS	0	53	0	0	26	26	0	0	0	0	0	0	21	20	0
LAND REVENUE	RS	0	7	0	0	8	6	0	0	0	0	0	0	2	0	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	0	2780	0	0	1982	2036	0	0	0	0	0	0	1768	892	0
OUTPUTS																
MAIN PRODUCT	RS	0	5734	0	0	1583	2025	0	0	0	0	0	0	2520	1440	0
BYE PRODUCTS	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	0	5734	0	0	1583	2025	0	0	0	0	0	0	2520	1440	0
NET INCOME	RS	0	2974	0	0	- 399	- 11	0	0	0	0	0	0	752	548	0

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TABLE 1.1.2 (a)

Physical Input-Output Relationship (per Acre) ZONE 1 TECNOLOGY 2

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR	HRS	0.00	424.75	0.00	311.50	163.46	76.21	324.26	0.00	0.00	360.12	145.00	0.00	309.56	122.50	0.00
CASUAL HIRED LABOUR	HRS	0.00	193.88	0.00	0.00	32.92	20.91	13.33	0.00	0.00	32.00	96.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	0.00	18.12	0.00	14.00	13.53	14.72	11.90	0.00	0.00	32.00	20.00	0.00	11.53	13.33	0.00
TRACTORS	HRS	0.00	3.09	0.00	2.00	2.80	2.80	3.02	0.00	0.00	2.33	2.00	0.00	2.30	1.85	0.00
OTHERS	HRS	0.00	0.00	0.00	0.00	0.64	1.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	0.00	1784.02	0.00	20.00	18.19	41.25	0.12	0.00	0.00	5.33	1.00	0.00	8.91	23.50	0.00
F. Y. M	B.C	0.00	10.57	0.00	12.00	10.68	9.85	12.61	0.00	0.00	12.00	10.00	0.00	9.69	10.60	0.00
FERTILIZER																
1	BAGS	0.00	1.28	0.00	0.00	1.00	1.00	2.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00
2	BAGS	0.00	2.34	0.00	2.00	1.76	1.90	2.00	0.00	0.00	2.33	2.00	0.00	1.44	1.42	0.00
3	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	BAGS	0.00	2.15	0.00	0.00	1.66	1.84	2.43	0.00	0.00	2.00	0.00	0.00	1.71	1.00	0.00
SUPPLEMENTARY WATER	HRS	0.00	31.92	0.00	0.00	8.00	14.76	0.00	0.00	0.00	15.25	13.00	0.00	17.22	15.83	0.00
PESTICIDES	RS	0.00	148.33	0.00	0.00	100.00	180.00	118.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIXED COSTS																
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	0.00	17535.00	0.00	562.50	800.00	806.81	629.16	0.00	0.00	1.00*	3750.00	0.00	1.00*	1.00*	0.00
BYE PRODUCTS	KG	0.00	0.00	0.00	562.50	750.00	802.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

TABLE 1.1.2 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 1 TECHNOLOGY 2

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	0.0	3.5	0.0	0.0	3.1	4.0	3.1	0.0	3.7	3.1	3.1	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	48.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	165.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	0.0	0.4	0.0	5.0	3.3	2.9	12.0	0.0	0.0	133.3	200.0	0.0	30.8	4.6	0.0
F. Y. M	33.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	153.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	131.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	106.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHANICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	0.0	0.3	0.0	4.2	2.8	3.3	9.9	0.0	0.0	6000.0	3.2	0.0	2179.3	1714.2	0.0
BYE PRODUCTS	0.0	0.0	0.0	0.0	0.1	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 1.1.: (c)

C. Financial costs and Returns Crops (Rs. Per Acre) ZONE 1 TECHNOLOGY 2

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERMANENT LABOUR	RS	0	891	0	654	343	160	680	0	0	756	304	0	650	257	0
CASUAL																
HIRED LABOUR	RS	0	678	0	0	102	83	41	0	0	99	298	0	0	0	0
FARM POWER																
BULLOCKS	RS	0	181	0	140	135	147	119	0	0	320	200	0	115	133	0
TRACTORS	RS	0	145	0	97	135	135	146	0	0	113	97	0	111	89	0
OTHERS	RS	0	0	0	0	106	265	0	0	0	0	0	0	0	0	0
SEED	RS	0	713	0	100	60	119	1	0	0	710	200	0	274	108	0
F. Y. M	RS	0	349	0	397	353	326	417	0	0	397	331	0	320	350	0
FERTILIZER																
1	RS	0	196	0	0	153	153	307	0	0	0	0	0	153	153	0
2	RS	0	307	0	262	231	249	262	0	0	305	262	0	189	186	0
3	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	RS	0	228	0	0	176	195	258	0	0	213	0	0	182	106	0
SUPPLEMENTARY WATER	RS	0	296	0	0	74	137	0	0	0	141	121	0	160	147	0
PESTICIDES	RS	0	148	0	0	100	180	118	0	0	0	0	0	0	0	0
FIXED COSTS																
MECHANICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	0	406	0	34	85	114	85	0	0	118	83	0	80	59	0
PAYMENT TO	RS	0	175	0	20	108	117	33	0	0	11	24	0	32	75	0
WATER RATE	RS	0	82	0	0	49	54	53	0	0	0	50	0	41	40	0
LAND REVENUE	RS	0	14	0	2	9	12	3	0	0	1	2	0	3	7	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	0	4809	0	1706	2219	2446	2523	0	0	3184	1972	0	2310	1710	0
OUTPUTS																
MAIN PRODUCT	RS	0	5260	0	2362	2240	2662	6228	0	0	6000	12000	0	2179	1714	0
BYE PRODUCTS	RS	0	0	0	56	375	401	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	0	5260	0	2418	2615	3063	6228	0	0	6000	12000	0	2179	1714	0
NET INCOME	RS	0	451	0	712	396	617	3705	0	0	2816	10028	0	-131	4	0

TABLE 1.1.C (a)

Physical Input-Output Relationship (per Acre) ZONE 1 TECHNOLOGY 3

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR	HRS	0.00	430.83	0.00	0.00	139.69	64.53	358.38	0.00	0.00	359.00	0.00	179.00	341.98	115.83	0.00
CASUAL HIRED LABOUR	HRS	0.00	226.00	0.00	0.00	43.63	24.82	0.00	0.00	0.00	0.00	0.00	21.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	0.00	8.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTORS	HRS	0.00	4.04	0.00	0.00	3.54	3.35	3.66	0.00	0.00	3.00	3.00	5.25	2.00	3.00	0.00
OTHERS	HRS	0.00	0.00	0.00	0.00	0.60	1.73	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	0.00	1591.25	0.00	0.00	17.45	40.35	0.16	0.00	0.00	10.00	0.00	0.00	7.93	16.66	0.00
F. Y. M	B.C	0.00	11.56	0.00	0.00	12.87	10.97	12.75	0.00	0.00	10.00	0.00	15.00	7.73	8.66	0.00
FERTILIZER 1	BAGS	0.00	1.50	0.00	0.00	1.00	1.33	0.00	0.00	0.00	0.00	0.00	2.00	1.00	1.00	0.00
2	BAGS	0.00	2.00	0.00	0.00	1.80	1.40	0.00	0.00	0.00	0.00	0.00	0.00	6.50	1.00	0.00
3	BAGS	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
4	BAGS	0.00	2.20	0.00	0.00	1.75	1.68	3.66	0.00	0.00	0.00	0.00	0.00	1.00	5.00	0.00
SUPPLEMENTARY WATER	HRS	0.00	37.00	0.00	0.00	12.00	11.00	0.00	0.00	0.00	0.00	0.00	0.00	12.00	11.50	0.00
PESTICIDES	RS	0.00	165.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	300.00	0.00	0.00	0.00
~~FIXED COSTS~~ MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	0.00	18437.50	0.00	0.00	743.18	802.94	650.00	0.00	0.00	1.00*	0.00	1.00*	1.00*	1.00*	0.00
BYE PRODUCTS	KG	0.00	0.00	0.00	0.00	0.00	802.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

TABLE 1.1.3 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 1 TECNOLOGY 3

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL HIRED LABOUR	0.0	0.0	2.7	0.0	0.0	3.1	4.2	0.0	0.0	0.0	0.0	3.1	3.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	49.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	150.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	0.0	0.5	0.0	0.0	3.9	2.9	12.0	0.0	0.0	12.0	0.0	0.0	34.6	3.8	0.0
F. Y. M	33.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	161.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	132.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	99.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	9.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHNICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	0.0	0.3	0.0	0.0	2.6	2.6	9.1	0.0	0.0	8000.0	0.0	5000.0	2187.5	933.3	0.0
BYE PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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TABLE 1.1.3 (c)

ZONE 1 TECHNOLOGY 3

C. Financial costs and Returns Crops (Rs. Per Acre)

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERAMENNT LABOUR	RS	0	1077	0	0	349	161	895	0	0	897	0	447	854	289	0
CASUAL HIRED LABOUR	RS	0	610	0	0	135	104	0	0	0	0	0	63	0	0	0
FARM POWER																
BULLOCKS	RS	0	80	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACTORS	RS	0	200	0	0	175	166	181	0	0	148	0	260	99	148	0
OTHERS	RS	0	0	0	0	90	260	0	0	0	0	0	0	0	0	0
SEED	RS	0	795	0	0	68	117	1	0	0	120	0	0	274	63	0
F. Y. M	RS	0	390	0	0	435	370	430	0	0	338	0	507	261	292	0
FERTILIZER																
1	RS	0	242	0	0	161	215	0	0	0	0	0	323	161	161	0
2	RS	0	264	0	0	237	185	0	0	0	0	0	0	859	132	0
3	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	RS	0	217	0	0	173	166	362	0	0	0	0	0	99	495	0
SUPPLEMENTARY WATER	RS	0	355	0	0	115	105	0	0	0	0	0	0	115	110	0
PESTICIDES	RS	0	165	0	0	0	0	0	0	0	0	0	0	300	0	0
FIXED COSTS																
MECHNICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	0	427	0	0	86	99	40	0	0	20	0	96	143	83	0
PAYMENT TO	RS	0	105	0	0	59	107	27	0	0	5	5	737	73	39	0
WATER RATE	RS	0	83	0	0	47	54	47	0	0	60	0	100	35	40	0
LAND REVENUE	RS	0	7	0	0	6	20	1	0	0	0	0	203	15	3	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	0	5017	0	0	2136	2129	1983	0	0	1588	0	2736	3288	1855	0
OUTPUTS																
MAIN PRODUCT	RS	0	5531	0	0	1932	2087	5915	0	0	8000	0	5000	2187	933	0
BYE PRODUCTS	RS	0	0	0	0	0	401	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	0	5531	0	0	1932	2488	5915	0	0	8000	0	5000	2187	933	0
NET INCOME	RS	0	514	0	0	-204	359	3932	0	0	6412	0	2264	-1101	-922	0

TABLE 1.1.1 (a)

Physical Input-Output Relationship (per Acre) ZONE 1 ALL TECHNOLOGY

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR CASUAL	HRS	0.00	435.72	0.00	311.50	154.40	76.58	332.79	0.00	0.00	359.90	92.33	184.33	290.40	108.72	0.00
HIRED LABOUR	HRS	0.00	154.12	0.00	0.00	25.45	17.51	10.00	0.00	0.00	25.60	58.66	14.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	0.00	23.07	0.00	14.00	22.70	21.63	11.90	0.00	0.00	32.00	20.00	0.00	20.51	22.02	0.00
TRACTORS	HRS	0.00	3.35	0.00	2.00	3.04	2.99	3.18	0.00	0.00	2.50	2.50	5.16	2.24	2.20	0.00
OTHERS	HRS	0.00	0.00	0.00	0.00	0.94	1.74	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	0.00	1588.36	0.00	20.00	15.60	40.71	0.13	0.00	0.00	6.50	1.00	0.00	8.45	25.20	0.00
F. Y. M	B.C	0.00	10.75	0.00	12.00	11.14	10.26	12.65	0.00	0.00	11.50	10.00	13.33	9.12	9.87	0.00
FERTILIZER																
1	BAGS	0.00	1.20	0.00	0.00	1.00	1.07	2.00	0.00	0.00	0.00	0.00	2.00	1.00	1.00	0.00
2	BAGS	0.00	1.92	0.00	2.00	1.47	1.55	2.00	0.00	0.00	2.33	2.00	0.00	2.15	1.30	0.00
3	BAGS	0.00	0.00	0.00	0.00	0.00	2.00	3.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00
4	BAGS	0.00	2.16	0.00	0.00	1.71	1.80	2.77	0.00	0.00	2.00	0.00	0.00	1.50	3.00	0.00
SUPPLEMENTARY WATER	HRS	0.00	32.87	0.00	0.00	11.63	13.72	0.00	0.00	0.00	15.25	13.00	0.00	15.72	14.75	0.00
PESTICIDES	RS	0.00	157.91	0.00	0.00	100.00	180.00	118.33	0.00	0.00	0.00	0.00	300.00	0.00	0.00	0.00
FIXED COSTS																
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	0.00	18139.03	0.00	562.50	731.60	836.02	634.37	0.00	0.00	1.00*	375.00	1.00*	1.00*	1.00*	0.00
BYE PRODUCTS	KG	0.00	5812.50	0.00	562.50	750.00	834.51	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

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TABLE 1.1.8 (a)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 1 [illegible] TECHNOLOGY

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HIRED LABOUR	0.0	0.0	3.3	0.0	0.0	3.1	4.0	3.1	0.0	3.7	3.1	3.1	3.0	0.0	0.0	0.0
CASUAL	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HIRED LABOUR	48.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM POWER	161.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BULLOCKS	0.0	0.0	0.4	0.0	5.0	3.3	2.8	12.0	0.0	0.0	103.0	200.0	0.0	29.8	3.4	0.0
TRACTORS	33.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	143.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	133.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. Y. M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER 1	104.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	9.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MECHNICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	0.0	0.3	0.0	4.2	2.7	2.9	9.7	0.0	0.0	6500.0	3.2	5000.0	2286.2	1456.0	0.0
BYE PRODUCTS	0.0	0.0	0.1	0.0	0.1	0.5	0.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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TABLE 1.1.1 (c)

C. Financial costs and Returns Crops (Rs. Per Acre) ZONE 1 VLC TECHNOLOGY

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERAMENST LABOUR	RS	0	1002	0	716	355	176	765	0	0	827	212	423	667	250	0
CASUAL HIRED LABOUR	RS	0	508	0	0	78	70	31	0	0	79	181	42	0	0	0
FARM POWER BULLOCKS	RS	0	230	0	140	227	216	119	0	0	320	200	0	205	220	0
TRACTORS	RS	0	163	0	97	148	146	155	0	0	122	122	252	109	107	0
OTHERS	RS	0	0	0	0	151	280	0	0	0	0	0	0	0	0	0
SEED	RS	0	635	0	100	51	113	1	0	0	669	200	0	251	85	0
F. Y. M	RS	0	357	0	399	370	341	421	0	0	362	333	443	303	323	0
FERTILIZER 1	RS	0	172	0	0	143	153	286	0	0	0	0	286	143	143	0
2	RS	0	256	0	267	196	207	267	0	0	311	267	0	267	173	0
3	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	RS	0	226	0	0	179	188	290	0	0	239	0	0	157	314	0
SUPPLEMENTARY WATER	RS	0	305	0	0	99	127	0	0	0	141	121	0	146	157	0
PESTICIDES	RS	0	157	0	0	100	180	118	0	0	0	0	0	300	0	0
FIXED COSTS MECHANICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	0	363	0	35	85	110	86	0	0	115	67	88	104	72	0
PAYMENT TO	RS	0	135	0	20	90	107	31	0	0	9	14	496	36	43	0
WATER RATE	RS	0	72	0	0	40	44	51	0	0	60	50	100	32	27	0
LAND REVENUE	RS	0	12	0	2	8	15	2	0	0	0	1	135	5	6	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	0	4593	0	1776	2320	2473	2623	0	0	3244	1768	2265	2745	1905	0
OUTPUTS MAIN PRODUCT	RS	0	5441	0	2362	1975	2424	6153	0	0	6500	12000	5000	2286	1456	0
BYE PRODUCTS	RS	0	581	0	56	375	417	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	0	6022	0	2418	2350	2841	6153	0	0	6500	12000	5000	2286	1456	0
NET INCOME	RS	0	1429	0	642	30	368	3530	0	0	3256	10232	2735	-459	-449	0

TABLE 1.2.1 (a)

Physical Input-Output Relationship (per Acre) ZONE 2 TECHNOLOGY 1

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR	HRS	338.50	499.36	0.00	0.00	105.55	75.60	0.00	0.00	0.00	0.00	0.00	0.00	320.08	125.14	0.0
CASUAL																
HIRED LABOUR	HRS	48.00	0.00	0.00	0.00	0.00	18.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
FARM POWER																
BULLOCKS	HRS	23.00	31.23	0.00	0.00	26.70	24.14	0.00	0.00	0.00	0.00	0.00	0.00	34.82	23.59	0.0
TRACTORS	HRS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
OTHERS	HRS	0.00	0.00	0.00	0.00	16.00	2.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
SEED	K.Gs	6.00	1325.88	0.00	0.00	9.50	40.00	0.00	0.00	0.00	0.00	0.00	0.00	8.47	19.00	0.0
F. Y. M	B.C	8.00	8.08	0.00	0.00	7.25	8.00	0.00	0.00	0.00	0.00	0.00	0.00	8.00	0.00	0.0
FERTILIZER																
1	BAGS	0.00	1.00	0.00	0.00	1.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.33	0.00	0.0
2	BAGS	1.00	1.00	0.00	0.00	1.00	1.07	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.0
3	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
SUPPLEMENTARY WATER	HRS	21.00	36.00	0.00	0.00	20.00	16.00	0.00	0.00	0.00	0.00	0.00	0.00	18.00	12.00	0.0
PESTICIDES	RS	125..0	185.00	0.00	0.00	20.00	40.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
FIXED COSTS																
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
OUTPUTS																
MAIN PRODUCT	KG	487.50	19074.26	0.00	0.00	604.16	1012.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BYE PRODUCTS	KG	0.00	8115.38	0.00	0.00	0.00	1031.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

TABLE 1.2.1 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 2 TECNOLOGY 1

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	3.2	0.0	0.0	0.0	0.0	6.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	81.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	5.0	0.6	0.0	0.0	4.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. Y. M	36.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.9	3.6	0.0
FERTILIZER																
1	134.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	120.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	17.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHANICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	5.3	0.2	0.0	0.0	2.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BYE PRODUCTS	0.0	0.0	0.1	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	3058.8	1027.5	0.0

TABLE 1.2.1 (c)

C. Financial costs and Returns Crops (Rs. Per Acre) ZONE 2 TECNOLOGY 1

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERAMENNT LABOUR	RS	846	1248	0	0	263	189	0	0	0	0	0	0	800	312	0
CASUAL HIRED LABOUR	RS	0	153	0	0	0	125	0	0	0	0	0	0	0	0	0
FARM POWER BULLOCKS	RS	230	312	0	0	267	241	0	0	0	0	0	0	348	235	0
TRACTORS	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHERS	RS	0	0	0	0	1296	187	0	0	0	0	0	0	0	0	0
SEED	RS	30	795	0	0	38	84	0	0	0	0	0	0	151	68	0
F. Y. M	RS	289	292	0	0	262	289	0	0	0	0	0	0	289	0	0
FERTILIZER 1	RS	0	134	0	0	134	134	0	0	0	0	0	0	178	0	0
2	RS	120	120	0	0	120	129	0	0	0	0	0	0	120	120	0
3	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUPPLEMENTARY WATER	RS	367	630	0	0	350	280	0	0	0	0	0	0	315	210	0
PESTICIDES	RS	125	185	0	0	20	40	0	0	0	0	0	0	0	0	0
FIXED COSTS MECHNICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	48	302	0	0	147	73	0	0	0	0	0	0	57	30	0
PAYMENT TO	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WATER RATE	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LAND REVENUE	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	2055	4171	0	0	2897	1771	0	0	0	0	0	0	2258	975	0
OUTPUTS MAIN PRODUCT	RS	2583	3814	0	0	1208	2126	0	0	0	0	0	0	3058	1027	0
BYE PRODUCTS	RS	0	611	0	0	0	206	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	2583	4425	0	0	1208	2332	0	0	0	0	0	0	3058	1027	0
NET INCOME	RS	528	254	0	0	-1689	561	0	0	0	0	0	0	800	52	0

TABLE 1.2.2 (a)

Physical Input-Output Relationship (per Acre) ZONE 2 TECHNOLOGY 2

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR	HRS	188.03	410.02	0.00	224.37	116.56	53.83	542.25	58.80	65.39	505.92	125.75	160.07	422.77	117.00	0.0
CASUAL																
HIRED LABOUR	HRS	182.15	69.46	0.00	0.00	8.51	30.08	0.00	0.00	25.00	26.00	1.50	0.00	0.00	0.00	0.0
FARM POWER																
BULLOCKS	HRS	14.92	20.84	0.00	0.00	15.68	17.00	34.00	32.00	8.00	0.00	0.00	18.00	19.26	13.28	0.0
TRACTORS	HRS	4.50	3.49	0.00	5.37	3.26	3.41	0.00	2.72	2.19	8.72	8.25	3.78	2.59	2.11	0.0
OTHERS	HRS	0.00	0.00	0.00	0.00	3.40	2.49	0.00	3.00	1.83	0.00	0.00	0.00	0.00	0.00	0.0
SEED	K.Gs	6.54	1442.30	0.00	3.50	15.62	43.51	0.12	3.25	10.00	2.00	1200.0	0.00	8.77	23.22	0.0
F. Y. M	B.C	11.09	11.40	0.00	0.00	11.57	7.50	4.00	0.00	0.00	0.00	0.00	12.00	8.88	10.57	0.0
FERTILIZER																
1	BAGS	1.04	1.12	0.00	1.00	1.03	1.09	0.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	0.0
2	BAGS	1.59	1.59	0.00	1.00	1.35	1.56	0.50	1.33	1.00	0.00	2.00	5.00	0.95	1.07	0.0
3	BAGS	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
4	BAGS	1.64	2.00	0.00	0.00	1.50	2.25	0.00	2.00	0.00	0.00	0.00	0.00	2.33	2.66	0.0
SUPPLEMENTARY WATER	HRS	14.77	34.37	0.00	54.00	15.52	13.69	18.00	13.50	13.16	36.50	24.00	37.50	23.16	11.85	0.0
PESTICIDES	RS	309.36	154.58	0.00	200.00	182.50	224.37	150.00	0.00	0.00	250.00	90.00	337.50	0.00	0.00	0.0
FIXED COSTS																
MECHNICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.0
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	655.07	16673.07	0.00	750.00	695.19	992.22	750.00	412.50	175.00	1.00*	1.00*	1.00*	1.00*	1.00*	0.00
BYE PRODUCTS	KG	912.50	3937.50	0.00	0.00	750.00	1020.65	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

TABLE 1.2.2 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 2 TECNOLOGY 2

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	2.4	4.2	0.0	0.0	3.6	6.6	0.0	0.0	4.1	2.0	4.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	58.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	95.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	7.0	0.5	0.0	4.2	3.5	2.4	7.0	5.5	8.6	70.0	0.2	0.0	37.1	8.1	0.0
F. Y. M	24.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	161.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	132.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	95.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	18.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHNICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	5.7	0.2	0.0	3.2	2.3	2.0	10.6	4.6	6.7	12000.0	9750.0	1504.2	3731.4	1474.1	0.0
BYE PRODUCTS	0.0	0.1	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 1.2.2 (c) TABLE 1.2.2 (c)

ZONE 2 TECNOLOGY 2

C. Financial costs and Returns Crops (Rs. Per Acre)

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERAMENNT LABOUR	RS	451	984	0	538	279	129	1301	141	156	1214	301	384	1014	280	0
CASUAL																
HIRED LABOUR	RS	437	291	0	0	30	198	0	0	102	52	6	0	0	0	0
FARM POWER																
BULLOCKS	RS	149	208	0	0	156	170	340	320	80	0	0	180	192	132	0
TRACTORS	RS	261	202	0	311	189	197	0	157	127	505	478	219	150	122	0
OTHERS	RS	0	0	0	0	323	237	0	285	174	0	0	0	0	0	0
SEED	RS	45	721	0	14	54	104	0	17	86	140	240	0	325	188	0
F. Y. M	RS	275	282	0	0	286	186	99	0	0	0	0	297	220	262	0
FERTILIZER																
1	RS	167	180	0	161	166	175	0	0	161	161	161	0	161	161	0
2	RS	209	209	0	132	176	205	66	175	132	0	264	650	125	141	0
3	RS	0	45	0	0	0	45	0	0	0	0	0	0	0	0	0
4	RS	148	180	0	0	135	203	0	150	0	0	0	0	210	240	0
SUPPLEMENTARY WATER	RS	274	639	0	1004	285	254	334	251	244	679	446	697	430	220	0
PESTICIDES	RS	309	154	0	200	182	224	150	0	0	250	90	337	0	0	0
FIXED COSTS																
MECHNICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	139	393	0	137	116	138	41	80	77	134	126	287	196	80	0
PAYMENT TO	RS	147	71	0	144	102	268	7	21	60	207	168	161	71	72	0
WATER RATE	RS	36	51	0	38	23	37	28	36	24	0	60	46	23	21	0
LAND REVENUE	RS	13	8	0	6	10	23	0	1	7	25	4	14	4	4	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	3060	4618	0	2685	2517	2793	2366	1664	1430	3367	2344	3282	3121	1923	0
OUTPUTS																
MAIN PRODUCT	RS	3733	3334	0	2400	1598	1984	7950	1897	1172	12000	9750	1504	3731	1474	0
BYE PRODUCTS	RS	[illegible]	0	0	0	75	204	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	3824	3334	0	2400	1673	2188	7950	1897	1172	12000	9750	1504	3731	1474	0
NET INCOME	RS	764	-1284	0	-285	-844	-605	5584	233	-258	8633	7406	-1778	610	-449	0

TABLE 1.2.3 (a)

Physical Input-Output Relationship (per Acre)

ZONE 2 TECNOLOGY 3

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi.	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER. HIRED LABOUR	HRS	128.43	368.90	292.87	188.02	81.83	54.64	213.61	140.78	69.28	0.00	0.00	133.30	426.94	89.73	0.00
CASUAL HIRED LABOUR	HRS	240.00	117.33	0.00	41.09	6.40	20.76	0.00	40.00	0.00	0.00	0.00	24.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTORS	HRS	11.00	9.00	3.37	4.11	6.22	4.60	5.44	5.94	5.46	0.00	0.00	11.50	2.61	2.57	0.00
OTHERS	HRS	0.00	0.00	0.00	0.00	1.00	1.73	0.00	1.00	1.50	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	7.77	1416.66	6.50	5.09	15.00	40.71	0.06	3.00	10.00	0.00	0.00	0.00	8.50	27.55	0.00
F. Y. M	B.C	11.00	11.33	14.00	11.16	12.00	18.00	0.00	0.00	0.00	0.00	0.00	12.00	11.00	10.00	0.00
FERTILIZER 1	BAGS	1.12	1.66	1.00	1.00	1.00	1.06	1.00	1.00	1.00	0.00	0.00	1.00	1.91	0.90	0.00
2	BAGS	2.11	2.00	1.00	1.45	1.50	1.55	0.00	1.00	1.00	0.00	0.00	2.00	1.25	1.10	0.00
3	BAGS	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	BAGS	1.50	1.00	0.00	2.00	0.00	1.66	0.00	0.00	0.00	0.00	0.00	2.00	1.00	1.00	0.00
SUPPLEMENTARY WATER	HRS	17.27	41.01	33.50	33.57	14.70	14.24	22.00	28.00	18.00	0.00	0.00	27.00	26.67	10.91	0.00
PESTICIDES	RS	303.43	190.00	26.00	64.20	0.00	113.19	0.00	0.00	0.00	0.00	0.00	200.00	0.00	0.00	0.00
FIXED COSTS																
MECHNICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	579.16	28375.00	843.75	651.13	690.00	826.78	562.50	450.00	187.50	0.00	0.00	1.00 *	1.00 *	1.00 *	0.00
BYE PRODUCTS	KG	750.00	5625.00	0.00	0.00	750.00	904.16	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

TABLE 1.2.3 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 2 TECNOLOGY 3

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HIRED LABOUR	0.0	4.9	1.7	0.0	2.6	3.7	6.3	0.0	2.5	0.0	0.0	0.0	5.3	0.0	0.0	0.0
CASUAL	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HIRED LABOUR	60.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM POWER	80.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BULLOCKS	0.0	6.5	0.5	4.5	4.8	4.2	2.4	0.0	65.0	25.0	0.0	0.0	0.0	41.2	5.4	0.0
TRACTORS	30.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	171.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	131.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. Y. M	132.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER 1	72.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	16.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
MECHANICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	6.2	0.3	1.7	3.2	3.0	2.1	10.6	4.5	7.2	0.0	0.0	3000.0	2688.8	1228.8	0.0
BYE PRODUCTS	0.0	0.1	0.1	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 1.2.3 (c)

C. Financial costs and Returns Crops (Rs. Per Acre) ZONE 2 TECNOLOGY 3

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERMANENT LABOUR	RS	308	885	702	451	196	131	512	337	166	0	0	319	1024	215	0
CASUAL HIRED LABOUR	RS	1176	199	0	106	23	130	0	100	0	0	0	124	0	0	0
FARM POWER BULLOCKS	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACTORS	RS	663	542	203	247	375	277	328	358	329	0	0	693	157	154	0
OTHERS	RS	0	0	0	0	80	139	0	80	120	0	0	0	0	0	0
SEED	RS	50	708	29	24	63	97	0	195	250	0	0	0	350	148	0
F. Y. M	RS	333	343	424	338	363	545	0	0	0	0	0	363	333	303	0
FERTILIZER 1	RS	192	285	171	171	171	182	171	171	171	0	0	171	328	154	0
2	RS	277	263	131	190	197	204	0	131	131	0	0	263	164	144	0
3	RS	0	0	0	0	0	264	0	0	0	0	0	0	0	0	0
4	RS	108	72	0	144	0	119	0	0	0	0	0	144	72	72	0
SUPPLEMENTARY WATER	RS	264	676	552	544	242	234	363	462	297	0	0	445	443	180	0
PESTICIDES	RS	303	190	26	64	0	113	0	0	0	0	0	0	200	0	0
FIXED COSTS MECHANICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	229	440	83	112	86	132	65	99	97	0	0	276	128	64	0
PAYMENT TO	RS	333	99	83	110	64	407	26	313	115	0	0	240	64	56	0
WATER RATE	RS	38	23	38	39	23	31	75	0	28	0	0	150	21	20	0
LAND REVENUE	RS	72	11	4	10	8	56	6	72	19	0	0	116	7	5	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	4366	4736	2446	2560	1891	3061	1546	2318	1723	0	0	3304	3288	1515	0
OUTPUTS MAIN PRODUCT	RS	3590	8512	1434	2083	2070	1736	5962	2025	1350	0	0	3000	2888	1228	0
BYE PRODUCTS	RS	75	562	0	0	75	90	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	3665	9074	1434	2083	2145	1826	5962	2025	1350	0	0	3000	2888	1228	0
NET INCOME	RS	-701	4338	-1012	-477	254	-1235	4416	-293	-373	0	0	-304	-400	287	0

TABLE 1.2.4 (a)

Physical Input-Output Relationship (per Acre)

ZONE 2 ALL TECHNOLOGY

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR	HRS	178.84	440.35	292.87	193.61	109.80	58.77	377.93	75.20	66.17	505.92	125.75	154.71	398.90	111.45	0.00
CASUAL																
HIRED LABOUR	HRS	191.35	46.91	0.00	34.76	6.23	24.98	0.00	8.00	20.00	26.00	1.50	4.80	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	15.20	25.04	0.00	0.00	18.92	19.96	34.00	32.00	8.00	0.00	0.00	18.00	27.04	18.78	0.00
TRACTORS	HRS	6.00	4.13	3.37	4.31	3.79	3.87	5.44	3.36	3.00	8.72	8.25	7.64	2.60	2.32	0.00
OTHERS	HRS	0.00	0.00	0.00	0.00	4.08	2.24	0.00	2.00	1.75	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	6.79	1397.60	6.50	4.84	14.09	41.93	0.09	3.20	10.00	2.00	1200.0	0.00	8.62	23.38	0.00
F. Y. M	B.C	10.86	10.32	14.00	11.16	10.35	8.87	4.00	0.00	0.00	0.00	0.00	12.00	9.17	10.44	0.00
FERTILIZER 1	BAGS	1.06	1.11	1.00	1.00	1.01	1.06	1.00	1.00	1.00	1.00	1.00	1.00	1.50	0.93	0.00
2	BAGS	1.69	1.43	1.00	1.38	1.33	1.46	0.50	1.25	1.00	0.00	2.00	4.00	1.04	1.08	0.00
3	BAGS	0.00	1.00	0.00	0.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	BAGS	1.61	1.72	0.00	2.00	1.50	2.09	0.00	2.00	0.00	0.00	0.00	2.00	2.14	2.25	0.00
SUPPLEMENTARY WATER	HRS	15.61	35.38	33.50	35.18	15.54	14.01	20.00	18.33	14.37	36.50	24.00	34.00	24.31	11.45	0.00
PESTICIDES	RS	335.63	167.75	26.00	86.83	166.25	177.68	150.00	0.00	0.00	250.00	90.00	291.66	0.00	0.00	0.00
FIXED COSTS																
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	634.82	18323.64	843.75	666.34	674.06	950.50	656.25	420.00	178.12	1.00*	1.00*	1.00*	1.00*	1.00*	0.00
BYE PRODUCTS	KG	871.87	5604.16	0.00	0.00	750.00	1002.34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

TABLE 1.2.4 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 2 ALL TECHNOLOGY

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	3.2	3.8	0.0	2.6	3.6	6.9	0.0	2.5	4.1	2.0	4.0	5.3	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	58.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	58.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	6.8	0.6	4.5	4.7	3.7	2.3	7.0	17.4	12.7	70.0	0.2	0.0	33.4	6.3	0.0
F. Y. M	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	157.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	129.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	68.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	88.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	17.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHNICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	5.8	0.2	1.7	3.2	2.3	2.0	10.6	4.6	6.8	12000.0	9750.0	1803.4	3351.4	1296.3	0.0
BYE PRODUCTS	0.0	0.1	0.1	0.0	0.0	0.1	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 1.2.4 (c)
ZONE 2 ALL TECHNOLOGY

C. Financial costs and Returns Crops (Rs. Per Acre)

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERMANENT LABOUR	RS	429	1056	702	464	263	141	907	180	158	1214	301	371	957	267	0
CASUAL HIRED LABOUR	RS	612	178	0	90	22	172	0	20	82	52	6	25	0	0	0
FARM POWER BULLOCKS	RS	152	250	0	0	189	199	340	320	80	0	0	180	270	187	0
TRACTORS	RS	353	243	198	253	223	227	320	197	176	513	485	449	153	136	0
OTHERS	RS	0	0	0	0	366	201	0	179	157	0	0	0	0	0	0
SEED	RS	46	338	29	22	52	96	1	55	127	140	240	0	287	147	0
F. Y. M	RS	313	298	404	322	299	256	115	0	0	0	0	245	265	301	0
FERTILIZER 1	RS	166	174	157	157	158	166	157	157	157	157	157	157	235	146	0
2	RS	218	185	129	178	172	189	64	161	123	0	258	518	134	139	0
3	RS	0	88	0	0	0	132	0	0	0	0	0	0	0	0	0
4	RS	141	151	0	176	132	193	0	176	0	0	0	176	188	198	0
SUPPLEMENTARY WATER	RS	276	626	592	623	275	248	354	324	254	646	424	601	430	202	0
PESTICIDES	RS	335	167	26	86	166	177	150	0	0	250	90	291	0	0	0
FIXED COSTS MECHNICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	161	398	85	143	117	134	78	95	81	132	124	332	107	73	0
PAYMENT TO	RS	36	51	0	36	27	37	29	36	27	0	60	46	23	21	0
WATER RATE	RS	13	8	0	6	10	23	0	1	7	25	4	14	4	1	0
LAND REVENUE	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	3251	4711	2322	2558	2467	2581	2514	1901	1435	3129	2149	3506	3053	1818	0
OUTPUTS MAIN PRODUCT	RS	3681	3664	1434	2132	1550	1901	6956	1932	1211	12000	9750	1803	3351	1296	0
BYE PRODUCTS	RS	87	560	0	0	75	200	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	3768	4224	1434	2132	1625	2101	6956	1932	1211	12000	9750	1803	3351	1296	0
NET INCOME	RS	517	-487	-888	-426	-842	-480	4442	31	-224	8871	7601	-1703	298	-522	0

TABLE 1.3.1 (a)

Physical Input-Output Relationship (per Acre) ZONE 3 TECNOLOGY 1

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR	HRS	140.78	432.50	0.00	0.00	103.50	55.54	0.00	0.00	0.00	0.00	0.00	0.00	304.83	109.21	0.00
CASUAL																
HIRED LABOUR	HRS	224.20	62.50	0.00	0.00	0.00	34.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	31.25	23.50	0.00	0.00	20.00	23.12	0.00	0.00	0.00	0.00	0.00	0.00	22.55	17.62	0.00
TRACTORS	HRS	15.55	3.00	0.00	0.00	0.00	2.50	0.00	0.00	0.00	0.00	0.00	0.00	2.00	2.00	0.00
OTHERS	HRS	0.00	0.00	0.00	0.00	0.00	2.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Ge	6.63	1437.50	0.00	0.00	32.00	45.90	0.00	0.00	0.00	0.00	0.00	0.00	10.20	37.27	0.00
F. Y. M	B.C	8.00	18.00	0.00	0.00	8.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	7.44	5.12	0.00
FERTILIZER																
1	BAGS	1.00	1.00	0.00	0.00	0.00	1.10	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.87	0.00
2	BAGS	1.43	1.75	0.00	0.00	1.00	1.30	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00
3	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	BAGS	2.00	2.00	0.00	0.00	2.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUPPLEMENTARY WATER	HRS	19.00	35.50	0.00	0.00	0.00	15.00	0.00	0.00	0.00	0.00	0.00	0.00	21.00	16.00	0.00
PESTICIDES	RS	145..3	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIXED COSTS																
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	804.54	19687.50	0.00	0.00	937.50	1036.36	0.00	0.00	0.00	0.00	0.00	0.00	1.00*	1.00*	0.00
BYE PRODUCTS	KG	868.75	0.00	0.00	0.00	0.00	990.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

TABLE 1.3.1 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 3 TECNOLOGY 1

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR	3.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	2.1	3.6	4.1	0.0	0.0	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	44.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	109.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	7.0	0.5	0.0	0.0	3.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0	26.9	4.2	0.0
F. Y. M	34.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	140.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	138.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	120.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY																
WATER	21.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHRICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO																
ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	5.9	0.2	0.0	0.0	2.4	2.0	0.0	0.0	0.0	0.0	0.0	0.0	3980.0	2081.8	0.0
BYE PRODUCTS	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 1.3.1 (c)

ZONE 3 TECHNOLOGY 1

C. Financial costs and Returns Crops (Rs. Per Acre)

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERMANENT LABOUR	RS	422	1297	0	0	310	166	0	0	0	0	0	0	914	327	0
CASUAL HIRED LABOUR	RS	471	225	0	0	0	122	0	0	0	0	0	0	0	0	0
FARM POWER BULLOCKS	RS	312	235	0	0	200	231	0	0	0	0	0	0	225	176	0
TRACTORS	RS	690	133	0	0	0	133	0	0	0	0	0	0	88	88	0
OTHERS	RS	0	0	0	0	0	243	0	0	0	0	0	0	0	0	0
SEED	RS	46	719	0	0	96	101	0	0	0	0	0	0	274	157	0
F. Y. M	RS	279	628	0	0	279	244	0	0	0	0	0	0	260	179	0
FERTILIZER 1	RS	140	140	0	0	0	154	0	0	0	0	0	0	140	122	0
2	RS	197	242	0	0	138	180	0	0	0	0	0	0	138	138	0
3	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	RS	241	241	0	0	241	241	0	0	0	0	0	0	0	0	0
SUPPLEMENTARY WATER	RS	399	745	0	0	0	315	0	0	0	0	0	0	441	336	0
PESTICIDES	RS	145	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FIXED COSTS MECHANICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTEREST RATE	RS	157	367	0	0	36	112	0	0	0	0	0	0	81	63	0
PAYMENT TO	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WATER RATE	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LAND REVENUE	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	3517	4972	0	0	1300	2242	0	0	0	0	0	0	2561	1586	0
OUTPUTS MAIN PRODUCT	RS	4747	3937	0	0	2250	2073	0	0	0	0	0	0	3980	2081	0
BYE PRODUCTS	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	4747	3937	0	0	2250	2073	0	0	0	0	0	0	3980	2081	0
NET INCOME	RS	1230	-1035	0	0	950	-169	0	0	0	0	0	0	1419	495	0

TABLE 1.3.2 (a)

Physical Input-Output Relationship (per Acre) ZONE 3 TECHNOLOGY 2

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR CASUAL	HRS	68.62	406.39	0.00	150.50	10.95	45.74	0.00	61.57	0.00	0.00	0.00	0.00	336.55	85.70	0.00
HIRED LABOUR	HRS	254.43	54.40	0.00	0.00	21.00	24.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	13.18	11.91	0.00	0.00	2.00	12.91	0.00	0.00	0.00	0.00	0.00	0.00	13.51	7.07	0.00
TRACTORS	HRS	3.91	3.50	0.00	2.00	3.45	2.34	0.00	1.74	0.00	0.00	0.00	0.00	1.86	2.02	0.00
OTHERS	HRS	0.00	0.00	0.00	0.00	3.00	1.67	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	7.37	1476.66	0.00	8.00	13.00	45.20	0.00	4.00	0.00	0.00	0.00	0.00	6.95	37.25	0.00
F. Y. M	B.C	13.07	13.40	0.00	0.00	0.00	11.50	0.00	0.00	0.00	0.00	0.00	0.00	11.22	12.00	0.00
FERTILIZER																
1	BAGS	1.10	1.33	0.00	0.00	1.50	1.05	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00
2	BAGS	2.20	2.96	0.00	1.00	3.00	2.22	0.00	0.00	0.00	0.00	0.00	0.00	1.22	1.17	0.00
3	BAGS	0.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	BAGS	1.50	2.00	0.00	0.00	0.00	1.42	0.00	0.00	0.00	0.00	0.00	0.00	1.25	0.00	0.00
SUPPLEMENTARY WATER	HRS	18.00	0.00	0.00	0.00	15.00	16.50	0.00	0.00	0.00	0.00	0.00	0.00	14.35	12.00	0.00
PESTICIDES	RS	205.25	75.00	0.00	0.00	14.00	156.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIXED COSTS																
MECHNICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	851.56	18900.00	0.00	975.00	562.50	951.56	0.00	450.00	0.00	0.00	0.00	0.00	1.00*	1.00*	0.00
BYE PRODUCTS	KG	750.00	0.00	0.00	0.00	0.00	721.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

TABLE 1.3.2 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 3 TECNOLOGY 2

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	1.2	3.4	0.0	0.0	1.4	5.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	55.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	112.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	6.6	0.5	0.0	3.0	4.0	2.4	0.0	9.0	0.0	0.0	0.0	0.0	36.0	5.4	0.0
F. Y. M	93.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	160.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	131.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	130.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	109.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	18.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHNICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	6.2	0.2	0.0	3.2	2.6	2.1	0.0	5.3	0.0	0.0	0.0	0.0	3247.6	1605.0	0.0
BYE PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 1.3.2 (c) TABLE 1.3.2 (c)

ZONE 3 TECNOLOGY 2

C. Financial costs and Returns Crops (Rs. Per Acre)

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERMANENT LABOUR	RS	274	1625	0	602	43	162	0	246	0	0	0	0	1346	342	0
CASUAL																
HIRED LABOUR	RS	305	164	0	0	29	127	0	0	0	0	0	0	0	0	0
FARM POWER																
BULLOCKS	RS	131	119	0	0	20	129	0	0	0	0	0	0	135	70	0
TRACTORS	RS	218	195	0	111	192	130	0	97	0	0	0	0	103	112	0
OTHERS	RS	0	0	0	0	336	187	0	224	0	0	0	0	0	0	0
SEED	RS	48	738	0	24	52	108	0	36	0	0	0	0	250	201	0
F. Y. M	RS	1223	1254	0	0	0	1076	0	0	0	0	0	0	1050	1123	0
FERTILIZER																
1	RS	176	213	0	0	240	168	0	0	0	0	0	0	160	160	0
2	RS	289	389	0	131	395	292	0	0	0	0	0	0	160	154	0
3	RS	0	0	0	0	0	260	0	0	0	0	0	0	0	0	0
4	RS	163	218	0	0	0	155	0	0	0	0	0	0	136	0	0
SUPPLEMENTARY																
WATER	RS	333	0	0	0	277	305	0	0	0	0	0	0	265	222	0
PESTICIDES	RS	205	75	0	0	14	156	0	0	0	0	0	0	0	0	0
FIXED COSTS																
MECHANICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	130	302	0	20	115	142	0	27	0	0	0	0	80	64	0
PAYMENT TO	RS	340	276	0	9	25	346	0	35	0	0	0	0	46	36	0
WATER RATE	RS	37	65	0	40	22	33	0	35	0	0	0	0	24	25	0
LAND REVENUE	RS	37	21	0	1	5	36	0	3	0	0	0	0	4	3	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	3909	5674	0	938	1765	3532	0	703	0	0	0	0	3509	2512	0
OUTPUTS																
MAIN PRODUCT	RS	5279	3760	0	3120	1462	1998	0	2385	0	0	0	0	3247	1605	0
BYP PRODUCTS	RS	0	0	0	0	0	144	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	5279	3760	0	3120	1462	2142	0	2385	0	0	0	0	3247	1605	0
NET INCOME	RS	1370	-1894	0	2182	-303	-1690	0	1682	0	0	0	0	-262	-907	0

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TABLE 1.3.3 (a)

Physical Input-Output Relationship (per Acre)

ZONE 3 TECHNOLOGY 3

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AVI. PER.																
HIRED LABOUR	HRS	89.43	218.81	0.00	0.00	66.32	38.14	0.00	60.98	0.00	125.56	0.00	272.37	345.54	98.07	0.00
CASUAL																
HIRED LABOUR	HRS	203.54	400.00	0.00	0.00	0.00	31.54	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTORS	HRS	7.64	5.50	0.00	0.00	3.00	4.11	0.00	2.00	0.00	4.06	0.00	2.50	2.89	2.85	0.00
OTHERS	HRS	0.00	0.00	0.00	0.00	0.00	1.70	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	8.57	1400.00	0.00	0.00	20.00	46.36	0.00	6.00	0.00	12.00	0.00	0.00	10.92	33.76	0.00
F. Y. M	B.C	11.72	0.00	0.00	0.00	0.00	13.82	0.00	0.00	0.00	12.00	0.00	12.00	11.44	10.16	0.00
FERTILIZER 1	BAGS	1.28	1.00	0.00	0.00	1.00	1.30	0.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	0.00
2	BAGS	2.61	6.00	0.00	0.00	1.00	2.12	0.00	2.00	0.00	2.00	0.00	1.00	1.41	1.21	0.00
3	BAGS	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
4	BAGS	1.62	0.00	0.00	0.00	0.00	1.57	0.00	0.00	0.00	3.00	0.00	0.00	2.00	1.50	0.00
SUPPLEMENTARY WATER	HRS	16.94	0.00	0.00	0.00	13.00	14.38	0.00	16.50	0.00	21.00	0.00	30.00	21.66	16.15	0.00
PESTICIDES	RS	268.43	200.00	0.00	0.00	0.00	142.43	0.00	0.00	0.00	125.00	0.00	180..0	0.00	0.00	0.00
FIXED COSTS																
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTEREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	865.90	22500.00	0.00	0.00	750.00	921.59	0.00	600.00	0.00	1.00*	0.00	1.00*	1.00*	1.00*	0.00
BYE PRODUCTS	KG	0.00	0.00	0.00	0.00	0.00	831.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00-Acre

TABLE 1.3.3 (o)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 3 TECNOLOGY 3

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PRY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	6.0	1.5	0.0	0.0	0.0	5.5	0.0	0.0	3.1	0.0	6.2	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	52.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	150.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	7.1	0.5	0.0	0.0	3.0	2.6	0.0	10.0	0.0	60.0	0.0	0.0	39.0	5.7	0.0
F. Y. M	23.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	160.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	131.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	62.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	111.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	20.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHNICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTE																
MAIN PRODUCT	0.0	6.0	0.2	0.0	0.0	2.1	2.1	0.0	5.3	0.0	1200.0	0.0	2250.0	3382.7	1820.8	0.0
BYE PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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TABLE 3.3.3 (c)

C. Financial costs and Returns Crops (Rs. Per Acre) ZONE 3 TECHNOLOGY 3

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERMANENT LABOUR	RS	205	503	0	0	152	87	0	140	0	288	0	626	794	225	0
CASUAL HIRED LABOUR	RS	1221	600	0	0	0	173	0	0	0	0	0	0	0	0	0
FARM POWER BULLOCKS	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACTORS	RS	398	287	0	0	156	214	0	104	0	211	0	130	150	145	0
OTHERS	RS	0	0	0	0	0	255	0	300	0	0	0	0	0	0	0
SEED	RS	60	700	0	0	60	120	0	60	0	720	0	0	425	192	0
F. Y. M	RS	271	0	0	0	0	320	0	0	0	278	0	278	265	235	0
FERTILIZER 1	RS	205	160	0	0	160	208	0	160	0	0	0	160	160	162	0
2	RS	343	790	0	0	131	279	0	263	0	263	0	131	185	159	0
3	RS	0	0	0	0	0	62	0	0	0	0	0	62	0	0	0
4	RS	179	0	0	0	0	174	0	0	0	333	0	0	222	164	0
SUPPLEMENTARY WATER	RS	350	0	0	0	269	297	0	341	0	434	0	621	452	334	0
PESTICIDES	RS	268	200	0	0	0	142	0	0	0	112	0	180	0	0	0
FIXED COSTS MECHANICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTEREST RATE	RS	227	410	0	0	58	144	0	92	0	55	0	193	120	87	0
PAYMENT TO	RS	461	958	0	0	25	412	0	80	0	0	0	121	49	47	0
WATER RATE	RS	34	70	0	0	18	31	0	35	0	25	0	60	29	30	0
LAND REVENUE	RS	57	0	0	0	1	50	0	15	0	2	0	15	6	5	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	4279	4678	0	0	1030	2968	0	1590	0	2821	0	2577	2857	1789	0
OUTPUTS MAIN PRODUCT	RS	5195	4500	0	0	1575	1935	0	3180	0	1200	0	2250	3382	1820	0
BYE PRODUCTS	RS	0	0	0	0	0	166	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	5195	4500	0	0	1575	2101	0	3180	0	1200	0	2250	3382	1820	0
NET INCOME	RS	916	-178	0	0	545	-867	0	1590	0	-1621	0	-327	525	32	0

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TABLE 2.3.4 (a)

Physical Input-Output Relationship (per Acre)

ZONE 3 ALL TECHNOLOGY

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR CASUAL	HRS	89.96	402.23	0.00	150.50	47.93	43.64	0.00	61.37	0.00	125.56	0.00	272.37	335.63	95.84	0.00
HIRED LABOUR	HRS	224.40	73.30	0.00	0.00	10.50	29.60	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	19.20	14.35	0.00	0.00	11.00	17.77	0.00	0.00	0.00	0.00	0.00	0.00	18.29	13.27	0.00
TRACTORS	HRS	6.23	3.59	0.00	2.00	3.30	3.35	0.00	1.82	0.00	4.06	0.00	2.50	2.48	2.51	0.00
OTHERS	HRS	0.00	0.00	0.00	0.00	3.00	1.78	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	7.83	1465.00	0.00	8.00	21.66	45.88	0.00	4.66	0.00	12.00	0.00	0.00	9.41	35.69	0.00
F. Y. M	B.C	11.82	16.54	0.00	0.00	8.00	12.05	0.00	0.00	0.00	12.00	0.00	12.00	10.03	8.70	0.00
FERTILIZER 1	BAGS	1.17	1.20	0.00	0.00	1.33	1.18	0.00	1.00	0.00	0.00	0.00	1.00	1.00	0.95	0.00
2	BAGS	2.30	2.86	0.00	1.00	1.66	2.03	0.00	2.00	0.00	2.00	0.00	1.00	1.30	1.17	0.00
3	BAGS	0.00	0.00	0.00	0.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
4	BAGS	1.59	2.00	0.00	0.00	2.00	1.53	0.00	0.00	0.00	3.00	0.00	0.00	1.50	1.50	0.00
SUPPLEMENTARY WATER	HRS	17.16	35.50	0.00	0.00	14.00	14.58	0.00	16.50	0.00	21.00	0.00	30.00	18.96	15.94	0.00
PESTICIDES	RS	456.25	137.50	0.00	0.00	14.00	148.35	0.00	0.00	0.00	125.00	0.00	160..0	0.00	0.00	0.00
FIXED COSTS																
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTEREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	850.91	19237.50	0.00	975.00	750.00	950.73	0.00	500.00	0.00	1.00*	0.00	1.00*	1.00*	1.00*	0.00
RYE PRODUCTS	KG	851.78	0.00	0.00	0.00	0.00	816.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

TABLE 1.3.4 (5)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 3 ALL TECHNOLOGY

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR	2.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	3.7	3.2	4.1	0.0	1.4	4.0	0.0	0.0	3.1	0.0	6.2	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	53.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	131.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	6.9	0.5	0.0	3.0	3.3	2.5	0.0	9.3	0.0	60.0	0.0	0.0	35.9	5.3	0.0
F. Y. M	52.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	156.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	132.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	96.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	110.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	20.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHANICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTEREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	6.1	0.2	0.0	3.2	2.3	2.1	0.0	5.3	0.0	1200.0	0.0	2250.0	3435.0	1794.5	0.0
BYE PRODUCTS	0.0	0.1	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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TABLE 1.5.4

ZONE 3 ALL TECHNOLOGY

C. Financial costs and Returns Crops (Rs. Per Acre)

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERMANENT LABOUR	RS	251	1126	0	421	134	122	0	171	0	351	0	762	939	268	0
CASUAL																
HIRED LABOUR	RS	830	234	0	0	14	168	0	0	0	0	0	0	0	0	0
FARM POWER																
BULLOCKS	RS	192	143	0	0	110	177	0	0	0	0	0	0	182	132	0
TRACTORS	RS	333	192	0	107	176	179	0	97	0	217	0	134	132	134	0
OTHERS	RS	0	0	0	0	393	233	0	262	0	0	0	0	0	0	0
SEED	RS	54	732	0	24	71	114	0	43	0	720	0	0	337	189	0
F. Y. M	RS	619	866	0	0	419	631	0	0	0	628	0	628	525	455	0
FERTILIZER																
1	RS	183	188	0	0	208	184	0	156	0	0	0	156	156	148	0
2	RS	305	379	0	132	220	269	0	265	0	265	0	132	172	155	0
3	RS	0	0	0	0	0	144	0	0	0	0	0	96	0	0	0
4	RS	176	221	0	0	221	169	0	0	0	332	0	0	166	166	0
SUPPLEMENTARY WATER	RS	353	731	0	0	288	300	0	339	0	432	0	618	390	328	0
PESTICIDES	RS	456	137	0	0	14	148	0	0	0	125	0	180	0	0	0
FIXED COSTS																
MECHANICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	202	422	0	20	120	145	0	87	0	157	0	197	101	84	0
PAYMENT TO	RS	367	265	0	9	25	350	0	50	0	0	0	121	47	45	0
WATER RATE	RS	35	63	0	40	19	31	0	35	0	25	0	60	25	25	0
LAND REVENUE	RS	42	18	0	1	3	8	0	7	0	2	0	15	5	4	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	4398	5717	0	754	2435	3422	0	1512	0	3254	0	3099	3177	2133	0
OUTPUTS																
MAIN PRODUCT	RS	5190	3847	0	3120	1725	1996	0	2650	0	1200	0	2250	3435	1794	0
BYE PRODUCTS	RS	85	0	0	0	0	163	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	5275	3847	0	3120	1725	2159	0	2650	0	1200	0	2250	3435	1794	0
NET INCOME	RS	877	-1870	0	2366	-710	-1263	0	1138	0	-2054	0	-849	258	-339	0

(5)

TABLE 1.1.1 (a)

Physical Input-Output Relationship (per Acre)

ZONE 4 TECHNOLOGY 1

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.	HRS	0.00	554.63	187.48	219.49	0.00	81.58	356.75	0.00	0.00	954.00	950.00	257.50	371.90	131.00	0.00
HIRED LABOUR CASUAL	HRS	0.00	0.00	35.20	2.50	0.00	1.63	8.00	0.00	0.00	60.00	0.00	0.00	0.00	0.00	0.00
HIRED LABOUR	HRS	0.00	26.50	20.90	26.98	0.00	24.48	44.50	0.00	0.00	4.00	5.00	76.00	17.85	19.57	0.00
FARM POWER																
BULLOCKS	HRS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTORS	HRS	0.00	0.00	0.00	0.00	0.00	2.28	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHERS	HRS	0.00	1350.00	5.00	4.12	0.00	40.21	0.58	0.00	0.00	15.00	1.12	0.50	17.25	6.75	0.00
SEED	K.Gs	0.00	13.00	0.00	11.50	0.00	13.00	0.00	0.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00
F. Y. M	B.C	0.00	0.83	1.20	1.01	0.00	1.05	1.25	0.00	0.00	2.00	1.00	0.50	1.00	0.75	0.00
FERTILIZER 1	BAGS	0.00	0.50	1.00	0.87	0.00	1.00	0.50	0.00	0.00	2.00	3.00	1.00	1.00	1.00	0.00
2	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	BAGS	0.00	0.00	0.00	2.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00
4	BAGS	0.00	18.00	42.00	46.66	0.00	11.33	28.00	0.00	0.00	0.00	0.00	36.00	11.00	20.00	0.00
SUPPLEMENTARY WATER	HRS	0.00	0.00	500.00	261.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PESTICIDES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIXED COSTS																
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	0.00	10937.50	1021.P	785.15	0.00	874.34	412.50	0.00	0.00	1.00*	1.00*	1.00*	1.00*	1.00*	0.00
BYE PRODUCTS	KG	0.00	4875.00	1012.5	780.46	0.00	815.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

TABLE 1.4.1 (5)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 4 TECHNOLOGY 1

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND FARMER																
HIRED LABOUR	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	0.0	0.0	1.0	4.2	0.0	4.3	12.5	0.0	0.0	12.5	0.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	91.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	0.0	0.6	3.2	4.5	0.0	2.1	30.0	0.0	0.0	30.0	95.0	200.0	5.0	14.4	0.0
F. Y. M	35.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	135.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	127.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	15.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHANICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTEREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	0.0	0.2	1.5	3.2	0.0	2.1	26.6	0.0	0.0	2400.0	6000.0	8100.0	1271.8	2437.5	0.0
BYE PRODUCTS	0.0	0.0	0.1	0.1	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 1.4.1 (c)

ZONE 4 TECHNOLOGY 1

C. Financial costs and Returns Crops (Rs. Per Acre)

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERMANENT LABOUR	RS	0	1386	468	548	0	203	891	0	0	2385	2375	643	929	327	0
CASUAL HIRED LABOUR	RS	0	0	35	10	0	7	100	0	0	750	0	0	0	0	0
FARM POWER BULLOCKS	RS	0	265	209	269	0	244	445	0	0	40	50	760	176	195	0
TRACTORS	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHERS	RS	0	0	0	0	0	208	0	0	0	0	0	0	0	0	0
SEED	RS	0	810	16	18	0	84	17	0	0	450	106	100	86	97	0
F. Y. M	RS	0	455	0	402	0	455	0	0	0	0	0	700	0	0	0
FERTILIZER 1	RS	0	112	163	136	0	142	169	0	0	270	135	67	135	101	0
2	RS	0	63	127	111	0	127	63	0	0	255	383	127	127	127	0
3	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUPPLEMENTARY WATER	RS	0	282	659	732	0	177	439	0	0	0	0	565	172	314	0
PESTICIDES	RS	0	0	500	261	0	0	0	0	0	0	0	0	0	0	0
FIXED COSTS MECHANICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	0	190	112	95	0	56	59	0	0	129	47	129	39	46	0
PAYMENT TO	RS	0	39	166	206	0	199	28	0	0	144	144	37	71	46	0
WATER RATE	RS	0	48	32	53	0	41	30	0	0	100	100	0	25	26	0
LAND REVENUE	RS	0	1	6	10	0	8	0	0	0	4	4	5	2	2	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	0	3651	2508	2851	0	1944	2241	0	0	4527	3344	3133	1764	1285	0
OUTPUTS MAIN PRODUCT	RS	0	2187	1532	2512	0	1836	10972	0	0	2400	6000	8100	1271	2437	0
BYE PRODUCTS	RS	0	487	101	78	0	163	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	0	2674	1632	2590	0	1999	10972	0	0	2400	6000	8100	1271	2437	0
NET INCOME	RS	0	977	-875	-261	0	55	8731	0	0	-2127	2656	4967	493	1152	0

TABLE 1.[illegible].2 (a)

Physical Input-Output Relationship (per Acre) ZONE 4 TECHNOLOGY 2

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other	
VARIABLE PHY. INPUT																	
MANUAL LABOUR																	
FAMILY AND PER. HIRED LABOUR	HRS	0.00	591.25	162.00	215.59	0.00	53.22	184.00	0.00	0.00	0.00	0.00	0.00	502.29	129.11	0.00	
CASUAL HIRED LABOUR	HRS	0.00	0.00	64.00	35.75	0.00	18.22	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
FARM POWER																	
BULLOCKS	HRS	0.00	7.00	2.00	19.87	0.00	13.68	25.00	0.00	0.00	0.00	0.00	0.00	15.37	12.58	0.00	
TRACTORS	HRS	0.00	6.00	5.50	2.00	0.00	2.55	0.00	0.00	0.00	0.00	0.00	0.00	1.71	1.40	0.00	
OTHERS	HRS	0.00	0.00	0.00	0.00	0.00	1.83	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
SEED	K.Gs	0.00	1450.00	6.00	3.56	0.00	41.11	0.12	0.00	0.00	0.00	0.00	0.00	6.00	22.66	0.00	
F. Y. M	B.C	0.00	10.00	2.00	7.38	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	12.04	0.00	0.00	
FERTILIZER 1	BAGS	0.00	1.00	0.50	0.93	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.87	0.00	
2	BAGS	0.00	1.50	0.50	1.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	1.08	1.00	0.00	
3	BAGS	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4	BAGS	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
SUPPLEMENTARY WATER	HRS	0.00	40.00	45.50	42.75	0.00	8.25	0.00	0.00	0.00	0.00	0.00	0.00	19.75	13.16	0.00	
PESTICIDES	RS	0.00	0.00	90.00	192.50	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
FIXED COSTS																	
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
OUTPUTS																	
MAIN PRODUCT	KG	0.00	13125.00	1500.0	740.62	0.00	745.83	375.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
BYE PRODUCTS	KG	0.00	0.00	937.50	693.75	0.00	545.83	0.00	0.00	0.00	0.00	0.00	0.00	1.00*	1.00*	0.00	

* 1.00 = Acre

TABLE 1.4.2 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 4 TECHNOLOGY 2

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR	1.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	0.0	0.0	3.5	8.7	0.0	5.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	57.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	78.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	0.0	0.5	3.0	4.8	0.0	2.5	1.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. Y. M	18.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	32.1	6.0	0.0
FERTILIZER																
1	164.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	134.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	24.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	13.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHANICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	0.0	0.2	1.4	3.4	0.0	1.7	21.3	0.0	0.0	0.0	0.0	0.0	3133.3	1483.3	0.0
BYE PRODUCTS	0.0	0.0	0.0	0.1	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 1.4.2 (c)

ZONE 4 TECHNOLOGY 2

C. Financial costs and Returns Crops (Rs. Per Acre)

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERMANENT LABOUR	RS	0	946	259	344	0	85	294	0	0	0	0	0	803	206	0
CASUAL HIRED LABOUR	RS	0	0	224	311	0	105	0	0	0	0	0	0	0	0	0
FARM POWER BULLOCKS	RS	0	70	20	198	0	136	250	0	0	0	0	0	153	125	0
TRACTORS	RS	0	346	317	115	0	147	0	0	0	0	0	0	95	80	0
OTHERS	RS	0	0	0	0	0	143	0	0	0	0	0	0	0	0	0
SEED	RS	0	725	18	17	0	102	0	0	0	0	0	0	192	135	0
F. Y. M	RS	0	184	36	135	0	9	0	0	0	0	0	0	221	0	0
FERTILIZER 1	RS	0	164	82	152	0	164	0	0	0	0	0	0	164	142	0
2	RS	0	201	67	134	0	134	0	0	0	0	0	0	144	134	0
3	RS	0	100	0	0	0	0	0	0	0	0	0	0	0	0	0
4	RS	0	0	24	0	0	0	0	0	0	0	0	0	0	0	0
SUPPLEMENTARY WATER	RS	0	536	610	572	0	110	0	0	0	0	0	0	264	176	0
PESTICIDES	RS	0	0	90	0	0	0	100	0	0	0	0	0	0	0	0
FIXED COSTS MECHANICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	0	311	107	98	0	68	7	0	0	0	0	0	65	50	0
PAYMENT TO	RS	0	100	228	385	0	496	9	0	0	0	0	0	136	48	0
WATER RATE	RS	0	80	80	75	0	64	0	0	0	0	0	0	55	50	0
LAND REVENUE	RS	0	8	67	27	0	27	0	0	0	0	0	0	6	4	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	0	3771	2229	2563	0	1790	660	0	0	0	0	0	2301	1150	0
OUTPUTS MAIN PRODUCT	RS	0	2625	2100	2518	0	1267	7987	0	0	0	0	0	3133	1483	0
BYE PRODUCTS	RS	0	0	93	69	0	109	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	0	2625	2193	2587	0	1376	7987	0	0	0	0	0	3133	1483	0
NET INCOME	RS	0	-1146	-36	24	0	-414	7327	0	0	0	0	0	832	333	0

TABLE 1.1.3 (a)

Physical Input-Output Relationship (per Acre)

ZONE 4 TECHNOLOGY 3

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.	HRS	0.00	541.26	108.56	173.78	0.00	35.31	286.75	0.00	0.00	377.48	354.37	286.62	434.82	116.61	0.00
HIRED LABOUR CASUAL	HRS	0.00	45.71	24.00	44.16	0.00	16.17	0.00	0.00	0.00	17.77	0.00	0.00	0.00	0.00	0.00
HIRED LABOUR	HRS	0.00	30.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	0.00	9.59	4.93	5.02	0.00	4.43	4.50	0.00	0.00	5.27	3.70	3.87	3.12	2.80	0.00
TRACTORS	HRS	0.00	0.00	1.00	1.01	0.00	1.38	0.00	0.00	0.00	0.00	0.00	0.00	4.00	4.00	0.00
OTHERS	HRS	0.00	1450.00	6.00	3.56	0.00	41.11	0.12	3.00	0.00	0.00	0.00	0.00	6.00	22.66	0.00
SEED	K.Gs	0.00	12.06	0.00	9.01	0.00	1.63	1.00	0.00	0.00	9.00	1.00	2.05	7.68	3.94	0.00
F. Y. M	B.C	0.00	1.57	1.00	1.15	0.00	1.19	0.00	0.00	0.00	1.60	1.00	1.00	1.00	1.00	0.00
FERTILIZER 1	BAGS	0.00	1.07	1.37	1.02	0.00	1.13	0.50	0.00	0.00	1.75	1.50	1.00	1.02	1.08	0.00
2	BAGS	0.00	0.00	1.00	1.30	0.00	1.83	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
3	BAGS	0.00	0.00	1.00	1.08	0.00	1.40	0.00	0.00	0.00	0.00	0.00	1.50	1.00	1.00	0.00
4	BAGS	0.00	46.58	43.66	37.42	0.00	10.51	24.00	0.00	0.00	21.60	34.00	28.50	22.64	10.81	0.00
SUPPLEMENTARY WATER	HRS	0.00	315.00	235.00	269.47	0.00	158.54	0.00	0.00	0.00	150.00	200.00	416.66	0.00	0.00	0.00
PESTICIDES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIXED COSTS																
MECHNICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	0.00	19285.71	1125.00	788.54	0.00	846.15	375.00	0.00	0.00	1.00*	1.00*	1.00*	1.00*	1.00*	0.00
BYE PRODUCTS	KG	0.00	4687.50	656.25	747.11	0.00	729.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

TABLE 1.4.3 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 4 TECNOLOGY 3

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HIRED LABOUR																
CASUAL	0.0	0.0	3.1	2.7	3.7	0.0	11.9	0.0	0.0	2.5	2.5	1.5	0.0	0.0	0.0	0.0
HIRED LABOUR																
FARM POWER																
BULLOCKS	10 .0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	57.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	196.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	0.0	0.4	2.3	9.4	0.0	2.5	0.0	0.0	0.0	63.2	52.6	200.0	37.1	4.8	0.0
F. Y. M	18.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	163.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	133.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	71.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	43.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	15.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHNICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	0.0	0.2	1.8	4.4	0.0	1.9	21.3	0.0	0.0	3271.5	2394.0	2933.3	3211.4	1338.3	0.0
BYE PRODUCTS	0.0	0.0	0.1	0.1	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 1.4.3 (c)

C. Financial Costs and Returns of various Crops (Rs. per acre)

Zone=4 Technology=3

DESCRIPTION	Unit	Cotton	Sugar-cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-seed	Pulses	Rabi	Kharif	Fruit Orchard	Rabi	Kharif	Other
VARIABLE PHYSICAL INPUTS Manual Labour	Rs.															
- Family Labour and Permanent Hired Labour	Rs.	0	1190	238	382	0	77	630	0	0	830	779	630	956	256	0
- Casual Hired Labour	Rs.	0	141	64	163	0	192	0	0	0	44	0	0	0	0	0
Farm Power - Bullocks	Rs.	0	30	0	0	0	0	0	0	0	0	0	0	0	0	0
- Tractors	Rs.	0	550	282	288	0	254	258	0	0	302	212	222	179	160	0
- Others	Rs.	0	0	196	198	0	270	0	0	0	0	0	0	784	784	0
Seed	Rs.	0	580	13	33	0	102	0	0	0	0	0	0	222	108	0
F.Y.M.	Rs.	0	227	0	170	0	30	0	0	0	170	18	37	145	74	0
Fertilizer 1	Rs.	0	257	63	188	0	194	0	0	0	262	163	163	163	163	0
Fertilizer 2	Rs.	0	142	182	135	0	150	66	0	0	233	199	133	133	133	0
Fertilizer 3	Rs.	0	0	71	92	0	130	0	0	0	0	0	0	71	0	0
Fertilizer 4	Rs.	0	0	43	46	0	60	0	0	0	0	0	65	43	43	0
Supplementary Water	Rs.	0	726	681	583	0	163	374	0	0	336	530	444	353	168	0
Pesticides	Rs.	0	315	235	269	0	158	0	0	0	150	200	4 6	0	0	0
FIXED PHYSICAL INPUTS Fixed Costs Mechanical Power		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Interest Rate	Rs.	0	406	132	162	0	125	52	0	0	112	99	222	146	117	0
Payment to Artisians	Rs.	0	147	372	491	0	487	20	0	0	82	64	123	96	61	0
Water Rate	Rs.	0	60	70	65	0	54	30	0	0	72	71	50	47	42	0
Land Revenue	Rs.	0	9	16	48	0	42	1	0	0	9	11	33	6	5	0
Land Rent	Rs.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other Taxes	Rs.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Costs:	Rs.	0	4780	2758	3313	0	2485	1431	0	0	2602	2346	2538	3338	2114	0
INCOME Main Products	Rs.	0	3857	2025	3469	00	1607	7987	0	0	3271	2394	2933	3211	1338	0
By-Products	Rs.	0	468	65	74	0	145	0	0	0	0	0	0	0	0	0
Total Income	Rs.	0	4325	2090	3543	0	1752	7987	0	0	3271	2394	2933	3211	1338	0
Net Income	Rs.	0	-445	-668	230	0	-736	6556	0	0	669	48	395	-127	-776	0

TABLE 1.4.4 (a)

Physical Input-Output Relationship (per Acre)

ZONE 4 TECHNOLOGY 4

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR CASUAL	HRS	0.00	0.00	0.00	190.91	0.00	29.65	0.00	0.00	0.00	272.47	220.75	0.00	485.11	193.69	0.00
HIRED LABOUR	HRS	0.00	0.00	0.00	32.00	0.00	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	0.00	0.00	0.00	9.25	0.00	7.31	0.00	0.00	0.00	6.00	6.00	0.00	2.66	2.66	0.00
TRACTORS	HRS	0.00	0.00	0.00	3.22	0.00	3.85	0.00	0.00	0.00	5.35	6.00	0.00	2.55	2.80	0.00
OTHERS	HRS	0.00	0.00	0.00	1.16	0.00	0.67	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	0.00	0.00	0.00	4.00	0.00	55.00	0.00	0.00	0.00	6.81	20.00	0.00	7.25	17.00	0.00
F. Y. M	B.C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FERTILIZER																
1	BAGS	0.00	0.00	0.00	1.50	0.00	1.50	0.00	0.00	0.00	2.00	1.00	0.00	1.00	1.00	0.00
2	BAGS	0.00	0.00	0.00	1.37	0.00	1.37	0.00	0.00	0.00	1.75	0.00	0.00	1.00	1.00	0.00
3	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUPPLEMENTARY WATER	HRS	0.00	0.00	0.00	44.00	0.00	8.00	0.00	0.00	0.00	35.00	30.00	0.00	23.33	19.33	0.00
PESTICIDES	RS	0.00	0.00	0.00	525.00	0.00	0.00	0.00	0.00	0.00	160.00	0.00	0.00	0.00	0.00	0.00
FIXED COSTS																
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	0.00	0.00	0.00	984.37	0.00	796.87	0.00	0.00	0.00	1.00*	1.00*	0.00	1.00*	1.00*	0.00
BYE PRODUCTS	KG	0.00	0.00	0.00	843.75	0.00	843.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

TABLE 1.4.2 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 4 TECNOLOGY 4

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR	2.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	0.0	0.0	0.0	3.9	0.0	4.0	0.0	0.0	6.6	0.0	0.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	53.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	375.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	0.0	0.0	0.0	4.0	0.0	2.5	0.0	0.0	0.0	190.0	70.0	0.0	29.2	6.0	0.0
F. Y. M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	157.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	133.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	9.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHNICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	0.0	0.0	0.0	3.3	0.0	1.9	0.0	0.0	0.0	1600.0	4250.0	0.0	2900.0	1500.0	0.0
BYE PRODUCTS	0.0	0.0	0.0	0.0	0.6	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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TABLE 1.1.4 (c)

C. Financial costs and Returns Crops (Rs. Per Acre) ZONE 4 TECNOLOGY 4

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERAMENNT LABOUR	RS	0	0	0	420	0	65	0	0	0	599	485	0	1067	426	0
CASUAL HIRED LABOUR	RS	0	0	0	124	0	20	0	0	0	0	0	0	0	0	0
FARM POWER BULLOCKS	RS	0	0	0	92	0	73	0	0	0	60	60	0	26	26	0
TRACTORS	RS	0	0	0	170	0	204	0	0	0	284	318	0	135	148	0
OTHERS	RS	0	0	0	435	0	251	0	0	0	0	0	0	0	0	0
SEED	RS	0	0	0	16	0	137	0	0	0	1293	1400	0	211	102	0
F. Y. M	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FERTILIZER 1	RS	0	0	0	235	0	235	0	0	0	314	157	0	157	157	0
2	RS	0	0	0	182	0	182	0	0	0	233	0	0	133	133	0
3	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUPPLEMENTARY WATER	RS	0	0	0	418	0	76	0	0	0	332	285	0	221	183	0
PESTICIDES	RS	0	0	0	525	0	0	0	0	0	160	0	0	0	0	0
FIXED COSTS MECHNICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	0	0	0	158	0	83	0	0	0	196	162	0	64	54	0
PAYMENT TO	RS	0	0	0	622	0	675	0	0	0	132	0	0	134	143	0
WATER RATE	RS	0	0	0	80	0	72	0	0	0	60	60	0	62	61	0
LAND REVENUE	RS	0	0	0	80	0	110	0	0	0	18	24	0	13	14	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	0	0	0	3557	0	2183	0	0	0	3681	2951	0	2223	1447	0
OUTPUTS MAIN PRODUCT	RS	0	0	0	3248	0	1514	0	0	0	1600	4250	0	2500	1500	0
BYE PRODUCTS	RS	0	0	0	506	0	168	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	0	0	0	3754	0	1682	0	0	0	1600	4250	0	2500	1500	0
NET INCOME	RS	0	0	0	197	0	-501	0	0	0	-2081	1291	0	677	53	0

TABLE 1.4.5 (a)

Physical Input-Output Relationship (per Acre) ZONE 4 ALL TECHNOLOGY

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR	HRS	0.00	549.45	153.36	191.50	0.00	49.64	296.06	3.75	0.00	408.02	412.12	280.80	431.72	128.64	0.00
CASUAL																
HIRED LABOUR	HRS	0.00	29.09	33.60	31.93	0.00	11.91	4.00	0.00	0.00	18.33	0.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	0.00	23.30	17.75	22.41	0.00	19.48	38.00	1.00	0.00	5.00	5.50	76.00	15.43	15.87	0.00
TRACTORS	HRS	0.00	9.14	5.05	4.36	0.00	4.06	4.50	2.00	0.00	5.29	4.08	3.87	2.86	2.59	0.00
OTHERS	HRS	0.00	0.00	1.00	1.04	0.00	1.64	0.00	0.00	0.00	0.00	0.00	0.00	4.00	4.00	0.00
SEED	K.Gs	0.00	1581.81	5.33	3.92	0.00	41.32	0.33	3.00	0.00	11.29	10.37	0.50	9.18	15.41	0.00
F. Y. M	B.C	0.00	12.04	2.00	9.29	0.00	4.33	1.00	0.00	0.00	9.00	1.00	6.54	8.92	3.94	0.00
FERTILIZER																
1	BAGS	0.00	1.31	1.06	1.11	0.00	1.14	1.25	1.00	0.00	1.75	1.00	0.83	1.00	0.95	0.00
2	BAGS	0.00	1.05	1.16	1.04	0.00	1.11	0.50	1.00	0.00	1.77	1.75	1.00	1.02	1.06	0.00
3	BAGS	0.00	2.00	1.00	1.30	0.00	1.83	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00
4	BAGS	0.00	0.00	1.00	1.21	0.00	1.41	0.00	0.00	0.00	0.00	0.00	1.50	1.00	1.00	0.00
SUPPLEMENTARY WATER	HRS	0.00	42.18	43.10	39.28	0.00	10.05	26.00	0.00	0.00	25.42	33.00	30.00	21.63	12.42	0.00
PESTICIDES	RS	0.00	315.00	259.00	262.63	0.00	150.17	0.00	0.00	0.00	153.33	200.00	416.66	0.00	0.00	0.00
FIXED COSTS																
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	0.00	16448.86	1100.0	793.94	0.00	838.20	393.75	0.00	0.00	1.00*	1.00*	1.00*	1.00*	1.00*	0.00
BYE PRODUCTS	KG	0.00	4750.00	881.25	752.88	0.00	733.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

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TABLE 1.4.5 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 4 ALL TECHNOLOGY

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	0.0	3.1	2.5	4.3	0.0	6.1	12.5	0.0	4.5	7.5	1.5	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	57.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	159.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	0.0	0.5	2.8	7.2	0.0	2.4	30.0	0.0	0.0	83.3	61.1	200.0	27.9	8.1	0.0
F. Y. M	21.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	156.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	133.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	67.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	41.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	14.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHANICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	0.0	0.2	1.6	3.9	0.0	1.9	23.9	0.0	0.0	2888.3	1856.4	4225.0	2696.0	1720.4	0.0
BYE PRODUCTS	0.0	0.0	0.1	0.1	0.1	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 1.1.5 (c)

ZONE 4 ALL TECHNOLOGY

C. Financial costs and Returns Crops (Rs. Per Acre)

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERMANENT LABOUR	RS	0	1153	322	402	0	104	621	0	0	856	865	589	906	270	0
CASUAL HIRED LABOUR	RS	0	90	84	137	0	72	50	0	0	137	0	0	0	0	0
FARM POWER BULLOCKS	RS	0	233	177	224	0	194	380	0	0	50	55	760	154	158	0
TRACTORS	RS	0	521	288	248	0	231	256	0	0	302	232	220	163	147	0
OTHERS	RS	0	0	159	166	0	261	0	0	0	0	0	0	638	638	0
SEED	RS	0	790	14	28	0	99	9	0	0	940	633	100	256	124	0
F. Y. M	RS	0	263	43	203	0	94	21	0	0	197	21	143	195	86	0
FERTILIZER 1	RS	0	204	165	173	0	177	195	0	0	273	156	129	156	148	0
2	RS	0	139	154	138	0	147	66	0	0	235	232	133	135	140	0
3	RS	0	135	67	88	0	124	0	0	0	0	0	0	67	0	0
4	RS	0	0	41	49	0	58	0	0	0	0	0	61	41	41	0
SUPPLEMENTARY WATER	RS	0	628	642	585	0	149	387	0	0	378	491	447	322	185	0
PESTICIDES	RS	0	315	259	262	0	150	0	0	0	153	200	416	0	0	0
FIXED COSTS MECHANICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	0	423	146	140	0	110	72	0	0	181	146	246	133	107	0
PAYMENT TO	RS	0	147	372	491	0	487	20	0	0	82	64	123	96	61	0
WATER RATE	RS	0	60	70	65	0	54	30	0	0	72	71	50	47	42	0
LAND REVENUE	RS	0	9	16	48	0	42	1	0	0	9	11	33	6	5	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	0	5110	2476	3447	0	2553	2099	0	0	3856	3177	3450	3315	2152	0
OUTPUTS MAIN PRODUCT	RS	0	3289	1760	3096	0	1592	9410	0	0	2888	1856	4225	2696	1720	0
BYE PRODUCTS	RS	0	475	88	75	0	146	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	0	3764	1848	3171	0	1738	9410	0	0	2888	1856	4225	2696	1720	0
NET INCOME	RS	0	-1346	-629	-276	0	-815	7311	0	0	-977	-1321	775	-619	-432	0

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TABLE 1.5.1 (a)

Physical Input-Output Relationship (per Acre)

ZONE 5 TECHNOLOGY 1

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR	HRS	0.00	426.60	170.06	0.00	0.00	55.48	0.00	0.00	0.00	92.16	0.00	15.50	0.00	69.50	0.00
CASUAL																
HIRED LABOUR	HRS	0.00	0.00	3.42	0.00	0.00	16.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	0.00	25.00	22.78	0.00	0.00	23.12	0.00	0.00	0.00	29.70	0.00	0.00	0.00	9.00	0.00
TRACTORS	HRS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHERS	HRS	0.00	0.00	1.50	0.00	0.00	1.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	0.00	2400.00	26.21	0.00	0.00	48.75	0.00	0.00	0.00	31.66	0.00	0.00	0.00	40.00	0.00
F. Y. M	B.C	0.00	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	14.00	0.00	0.00	0.00
FERTILIZER 1	BAGS	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
2	BAGS	0.00	1.33	1.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
3	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUPPLEMENTARY WATER	HRS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PESTICIDES	RS	0.00	0.00	141.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIXED COSTS																
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	0.00	19125.00	1440.4	0.00	0.00	600.00	0.00	0.00	0.00	1.00*	0.00	1.00*	0.00	1.00*	0.00
BYE PRODUCTS	KG	0.00	0.00	1240.8	0.00	0.00	643.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

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TABLE 1.5.1 (a)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 5 TECNOLOGY 1

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	0.0	0.0	2.5	0.0	0.0	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	118.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	0.0	0.3	2.1	0.0	0.0	2.4	0.0	0.0	0.0	10.4	0.0	0.0	0.0	3.0	0.0
F. Y. M	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	143.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	148.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHNICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	0.0	0.3	1.6	0.0	0.0	2.1	0.0	0.0	0.0	1445.0	0.0	5000.0	0.0	4000.0	0.0
BYE PRODUCTS	0.0	0.0	0.0	0.2	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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TABLE 1.5.1 (c)

C. Financial costs and Returns Crops (Rs. Per Acre) ZONE 5 TECNOLOGY 1

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERMANENT LABOUR	RS	0	981	391	0	0	127	0	0	0	211	0	35	0	159	0
CASUAL HIRED LABOUR	RS	0	0	8	0	0	120	0	0	0	0	0	0	0	0	0
FARM POWER BULLOCKS	RS	0	250	227	0	0	231	0	0	0	297	0	0	0	90	0
TRACTORS	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHERS	RS	0	0	177	0	0	154	0	0	0	0	0	0	0	0	0
SEED	RS	0	720	55	0	0	117	0	0	0	329	0	0	0	120	0
F. Y. M	RS	0	0	80	0	0	0	0	0	0	200	0	280	0	0	0
FERTILIZER 1	RS	0	143	143	0	0	143	0	0	0	143	0	0	0	0	0
2	RS	0	197	146	0	0	148	0	0	0	148	0	0	0	0	0
3	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUPPLEMENTARY WATER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PESTICIDES	RS	0	141	0	0	0	0	0	0	0	0	0	0	0	0	0
FIXED COSTS MECHANICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	0	180	40	0	0	51	0	0	0	46	0	42	0	9	0
PAYMENT TO	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
WATER RATE	RS	0	150	86	0	0	95	0	0	0	0	0	100	0	50	0
LAND REVENUE	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	0	2762	1355	0	0	1186	0	0	0	1374	0	457	0	428	0
OUTPUTS MAIN PRODUCT	RS	0	5737	2304	0	0	1260	0	0	0	1445	0	5000	0	4000	0
BYE PRODUCTS	RS	0	0	248	0	0	128	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	0	5737	2552	0	0	1388	0	0	0	1445	0	5000	0	4000	0
NET INCOME	RS	0	2975	1197	0	0	202	0	0	0	71	0	4543	0	3572	0

TABLE 1.5.2 (a)

Physical Input-Output Relationship (per Acre)

ZONE 5 TECNOLOGY 2

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR	HRS	0.00	404.37	159.67	0.00	0.00	56.32	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CASUAL																
HIRED LABOUR	HRS	0.00	45.71	16.21	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	0.00	6.00	7.55	0.00	0.00	7.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTORS	HRS	0.00	3.20	2.06	0.00	0.00	2.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHERS	HRS	0.00	0.00	5 25	0.00	0.00	1.31	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	0.00	2457.14	27.07	0.00	0.00	48.91	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
F. Y. M	B.C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FERTILIZER																
1	BAGS	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	BAGS	0.00	1.85	1.30	0.00	0.00	1.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	BAGS	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUPPLEMENTARY WATER	HRS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PESTICIDES	RS	0.00	250.00	183.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIXED COSTS																
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	0.00	20035.71	1604.4	0.00	0.00	613.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BYE PRODUCTS	KG	0.00	0.00	1635.0	0.00	0.00	616.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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TABLE 1.5.2 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 5 TECHNOLOGY 2

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND FERMEN																
HIRED LABOUR	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL HIRED LABOUR	0.0	0.0	2.5	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	80.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	109.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	0.0	0.3	2.0	0.0	0.0	2.5	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. Y. M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER 1	171.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	139.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	120.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHANICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	0.0	0.3	1.6	0.0	0.0	2.1	0.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BYE PRODUCTS	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 7.4.2 (c)

ZONE 5 TECNOLOGY 2

C. Financial costs and Returns Crops (Rs. Per Acre)

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERMANENT LABOUR	RS	0	970	383	0	0	135	0	0	0	0	0	0	0	0	0
CASUAL																
HIRED LABOUR	RS	0	114	37	0	0	0	0	0	0	0	0	0	0	0	0
FARM POWER																
BULLOCKS	RS	0	60	75	0	0	75	0	0	0	0	0	0	0	0	0
TRACTORS	RS	0	256	165	0	0	165	0	0	0	0	0	0	0	0	0
OTHERS	RS	0	0	572	0	0	142	0	0	0	0	0	0	0	0	0
SEED	RS	0	737	54	0	0	122	0	0	0	0	0	0	0	0	0
F. Y. M	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FERTILIZER																
1	RS	0	171	171	0	0	171	0	0	0	0	0	0	0	0	0
2	RS	0	258	181	0	0	174	0	0	0	0	0	0	0	0	0
3	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	RS	0	0	0	0	0	120	0	0	0	0	0	0	0	0	0
SUPPLEMENTARY WATER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PESTICIDES	RS	0	250	183	0	0	0	0	0	0	0	0	0	0	0	0
FIXED COSTS																
MECHNICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	0	268	102	0	0	67	0	0	0	0	0	0	0	0	0
PAYMENT TO	RS	0	36	96	0	0	72	0	0	0	0	0	0	0	0	0
WATER RATE	RS	0	150	68	0	0	66	0	0	0	0	0	0	0	0	0
LAND REVENUE	RS	0	0	17	0	0	15	0	0	0	0	0	0	0	0	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	0	3270	2104	0	0	1324	0	0	0	0	0	0	0	0	0
OUTPUTS																
MAIN PRODUCT	RS	0	6010	2566	0	0	1267	0	0	0	0	0	0	0	0	0
BYE PRODUCTS	RS	0	0	163	0	0	61	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	0	6010	2729	0	0	1348	0	0	0	0	0	0	0	0	0
NET INCOME	RS	0	2740	625	0	0	24	0	0	0	0	0	0	0	0	0

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TABLE 1.5.3 (a)

Physical Input-Output Relationship (per Acre) ZONE 5 TECNOLOGY 3

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR CASUAL	HRS	0.00	421.12	145.03	0.00	0.00	49.96	0.00	0.00	0.00	68.49	0.00	0.00	80.16	300.35	0.00
HIRED LABOUR	HRS	0.00	0.00	9.76	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	0.00	0.00	19.00	0.00	0.00	14.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTORS	HRS	0.00	3.00	2.30	0.00	0.00	2.55	0.00	0.00	0.00	2.25	0.00	0.00	0.75	0.00	0.00
OTHERS	HRS	0.00	0.00	5.17	0.00	0.00	1.48	0.00	0.00	0.00	1.37	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	0.00	2700.00	29.19	0.00	0.00	46.25	0.00	0.00	0.00	34.37	0.00	0.00	10.00	9.50	0.00
F. Y. M	B.C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FERTILIZER 1	BAGS	0.00	1.00	1.02	0.00	0.00	1.00	0.00	0.00	0.00	1.25	0.00	0.00	0.00	0.00	0.00
2	BAGS	0.00	1.50	1.25	0.00	0.00	1.13	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00
3	BAGS	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	BAGS	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUPPLEMENTARY WATER	HRS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PESTICIDES	RS	0.00	0.00	231.37	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIXED COSTS																
MECHNICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	0.00	18750.00	1613.9	0.00	0.00	719.53	0.00	0.00	0.00	1.00*	0.00	0.00	1.00*	1.00*	0.00
BYE PRODUCTS	KG	0.00	0.00	1591.3	0.00	0.00	715.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

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TABLE 1.5.3 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 5 TECHNOLOGY 3

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR CASUAL	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HIRED LABOUR	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	75.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	88.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	0.0	0.2	2.1	0.0	0.0	2.7	0.0	0.0	0.0	11.5	0.0	0.0	35.0	37.5	0.0
F. Y. M	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER 1	169.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	141.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	100.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHANICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	0.0	0.3	1.6	0.0	0.0	2.1	0.0	0.0	0.0	1270.0	0.0	0.0	633.3	3000.0	0.0
BYI PRODUCTS	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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TABLE 1.5.3 (c)

ZONE 5 TECNOLOGY 3

C. Financial costs and Returns Crops (Rs. Per Acre)

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
EFFAMENT LABOUR CASUAL	RS	0	1137	391	0	0	134	0	0	0	184	0	0	216	810	0
HIRED LABOUR	RS	0	0	26	0	0	0	0	0	0	0	0	0	0	0	0
FARM POWER BULLOCKS	RS	0	0	190	0	0	140	0	0	0	0	0	0	0	0	0
TRACTORS	RS	0	227	174	0	0	193	0	0	0	170	0	0	56	0	0
OTHERS	RS	0	0	459	0	0	131	0	0	0	121	0	0	0	0	0
SEED	RS	0	540	61	0	0	124	0	0	0	0	0	0	350	356	0
F. Y. M	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FERTILIZER 1	RS	0	169	172	0	0	169	0	0	0	211	0	0	0	0	0
2	RS	0	211	176	0	0	159	0	0	0	282	0	0	0	0	0
3	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	RS	0	0	100	0	0	100	0	0	0	0	0	0	0	0	0
SUPPLEMENTARY WATER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PESTICIDES	RS	0	231	0	0	0	0	0	0	0	0	0	0	0	0	0
FIXED COSTS MECHANICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTEREST RATE	RS	0	206	100	0	0	66.	0	0	0	59	0	0	30	26	0
PAYMENT TO	RS	0	0	110	0	0	94	0	0	0	62	0	0	60	17	0
WATER RATE	RS	0	150	69	0	0	78	0	0	0	35	0	0	33	30	0
LAND REVENUE	RS	0	0	14	0	0	20	0	0	0	8	0	0	2	0	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	0	2871	2042	0	0	1408	0	0	0	1132	0	0	147	1239	0
OUTPUTS MAIN PRODUCT	RS	0	5625	2582	0	0	1511	0	0	0	1270	0	0	833	3000	0
BYE PRODUCTS	RS	0	0	159	0	0	71	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	0	5625	2741	0	0	1582	0	0	0	1270	0	0	833	3000	0
NET INCOME	RS	0	2754	699	0	0	174	0	0	0	138	0	0	86	1761	0

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TABLE 1.3.4 (a)

Physical Input-Output Relationship (per Acre)

ZONE 5 ALL TECHNOLOGY

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR CASUAL	HRS	0.00	412.72	156.21	0.00	0.00	54.01	0.00	0.00	0.00	83.57	0.00	128.02	80.16	223.40	0.00
HIRED LABOUR	HRS	0.00	26.66	11.11	0.00	0.00	2.80	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	0.00	12.33	16.91	0.00	0.00	14.83	0.00	0.00	0.00	29.70	0.00	0.00	0.00	0.00	0.00
TRACTORS	HRS	0.00	3.15	2.17	0.00	0.00	2.29	0.00	0.00	0.00	2.25	0.00	0.00	0.75	0.00	0.00
OTHERS	HRS	0.00	0.00	4.96	0.00	0.00	1.37	0.00	0.00	0.00	1.37	0.00	0.00	0.00	0.00	0.00
SEED	K.GE	0.00	2483.33	27.70	0.00	0.00	47.97	0.00	0.00	0.00	33.75	0.00	8.00	10.00	19.66	0.00
F. Y. M	B.C	0.00	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00	10.00	0.00	14.00	0.00	0.00	0.00
FERTILIZER																
1	BAGS	0.00	1.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	1.12	0.00	0.00	0.00	0.00	0.00
2	BAGS	0.00	1.66	1.22	0.00	0.00	1.15	0.00	0.00	0.00	1.33	0.00	0.00	0.00	0.00	0.00
3	BAGS	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	BAGS	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUPPLEMENTARY WATER	HRS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PESTICIDES	RS	0.00	250.00	181.59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIXED COSTS																
MECHNICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	0.00	19593.75	1571.5	0.00	0.00	647.07	0.00	0.00	0.00	1.00*	0.00	1.00*	1.00*	1.00*	0.00
BYE PRODUCTS	KG	0.00	0.00	1561.6	0.00	0.00	655.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

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TABLE 1.5.4 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 5 ALL TECHNOLOGY

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	0.0	2.5	2.5	0.0	0.0	7.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	76.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	100.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	0.0	0.3	2.0	0.0	0.0	2.5	0.0	4.5	0.0	8.7	3.2	32.0	35.0	26.0	0.0
F. Y. M	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	164.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	142.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	104.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHNICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	0.0	0.3	1.6	0.0	0.0	2.1	0.0	2.5	0.0	1357.5	0.0	5000.0	833.3	3333.3	0.0
BYE PRODUCTS	0.0	0.0	0.0	0.1	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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TABLE 1.5.6 (C)

C. Financial costs and Returns Crops (Rs. Per Acre) ZONE 5 ALL TECHNOLOGY

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERMANENT LABOUR	RS	0	1031	390	0	0	135	0	0	0	208	0	320	200	558	0
CASUAL HIRED LABOUR	RS	0	66	27	0	0	20	0	0	0	0	0	0	0	0	0
FARM POWER BULLOCKS	RS	0	123	169	0	0	148	0	0	0	297	0	0	345	90	0
TRACTORS	RS	0	246	169	0	0	178	0	0	0	175	0	0	58	0	0
OTHERS	RS	0	0	498	0	0	137	0	0	0	137	0	0	0	0	0
SEED	RS	0	744	55	0	0	119	0	0	0	293	0	256	350	511	0
F. Y. M	RS	0	0	80	0	0	0	0	0	0	200	0	280	0	0	0
FERTILIZER 1	RS	0	164	164	0	0	164	0	0	0	184	0	0	164	0	0
2	RS	0	236	173	0	0	163	0	0	0	189	0	0	0	0	0
3	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	RS	0	0	104	0	0	104	0	0	0	0	0	0	0	0	0
SUPPLEMENTARY WATER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PESTICIDES	RS	0	250	181	0	0	0	0	0	0	0	0	0	0	0	0
FIXED COSTS MECHNICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	0	256	109	0	0	66	0	0	0	73	0	38	38	38	0
PAYMENT TO	RS	0	36	104	0	0	85	0	0	0	45	0	0	28	17	0
WATER RATE	RS	0	150	70	0	0	74	0	0	0	37	0	62	40	36	0
LAND REVENUE	RS	0	0	16	0	0	17	0	0	0	7	5	1	2	0	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	0	3302	2309	0	0	1410	0	0	0	1845	0	957	1225	250	0
OUTPUTS MAIN PRODUCT	RS	0	5878	2514	0	0	1358	0	0	0	1357	0	5000	833	3333	0
BYE PRODUCTS	RS	0	0	156	0	0	65	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	0	5878	2670	0	0	1423	0	0	0	1357	0	5000	833	3333	0
NET INCOME	RS	0	2576	361	0	0	13	0	0	0	-488	0	4043	-386	2083	0

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TABLE 1.8.1 (a)

Physical Input-Output Relationship (per Acre) ZONE 6 TECHNOLOGY 1

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR CASUAL	HRS	114.26	0.00	0.00	267.75	0.00	79.50	0.00	0.00	0.00	0.00	241.00	0.00	227.55	60.86	0.00
HIRED LABOUR	HRS	309.71	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	26.67	0.00	0.00	34.00	0.00	20.73	0.00	0.00	0.00	0.00	28.50	0.00	11.07	11.07	0.00
TRACTORS	HRS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHERS	HRS	0.00	0.00	0.00	0.00	0.00	1.78	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	8.81	0.00	0.00	20.63	0.00	49.73	0.00	0.00	0.00	0.00	5.62	0.00	5.75	22.00	0.00
F. Y. M	B.C	12.00	0.00	0.00	14.00	0.00	10.66	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FERTILIZER																
1	BAGS	1.00	0.00	0.00	1.40	0.00	1.05	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
2	BAGS	1.00	0.00	0.00	1.20	0.00	1.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00	1.00	0.00
3	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUPPLEMENTARY WATER	HRS	14.62	0.00	0.00	0.00	0.00	11.00	0.00	0.00	0.00	0.00	0.00	0.00	27.12	10.00	0.00
PESTICIDES	RS	529.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIXED COSTS																
MECHNICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTISIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	501.13	0.00	0.00	825.00	0.00	748.02	0.00	0.00	0.00	0.00	212.00	0.00	1.00*	1.00*	0.00
BYE PRODUCTS	KG	0.00	0.00	0.00	750.00	0.00	740.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

TABLE 1.6.1 (a)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 6 TECHNOLOGY 1

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND FERMEN																
HIRED LABOUR	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	96.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	6.0	0.0	0.0	4.5	0.0	2.4	0.0	0.0	0.0	0.0	121.5	0.0	43.7	4.6	0.0
F. Y. M	27.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	137.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	154.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	11.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHANICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	5.9	0.0	0.0	3.2	0.0	3.1	0.0	0.0	0.0	0.0	2.6	0.0	1725.0	775.0	0.0
BY PRODUCTS	0.0	0.0	0.0	0.0	0.5	0.0	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 1.3.1 (c)

C. Financial costs and Returns Crops (Rs. Per Acre) ZONE 6 TECHNOLOGY 1

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
IMPAMENT LABOUR	RS	262	0	0	615	0	182	0	0	0	0	554	0	523	139	0
CASUAL																
FIXED LABOUR	RS	433	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FARM POWER																
BULLOCKS	RS	266	0	0	340	0	207	0	0	0	0	265	0	110	110	0
TRACTORS	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHERS	RS	0	0	0	0	0	170	0	0	0	0	0	0	0	0	0
SEED	RS	52	0	0	93	0	119	0	0	0	0	662	0	251	105	0
F. Y. M	RS	324	0	0	378	0	267	0	0	0	0	0	0	0	0	0
FERTILIZER																
1	RS	137	0	0	191	0	143	0	0	0	0	137	0	0	0	0
2	RS	154	0	0	185	0	154	0	0	0	0	154	0	154	154	0
3	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUPPLEMENTARY WATER	RS	168	0	0	0	0	126	0	0	0	0	0	0	111	115	0
PESTICIDES	RS	529	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FIXED COSTS																
MECHANICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTEREST RATE	RS	110	0	0	35	0	53	0	0	0	0	73	0	54	28	0
PAYMENT TO	RS	37	0	0	80	0	67	0	0	0	0	0	0	6	6	0
WATER RATE	RS	43	0	0	40	0	25	0	0	0	0	40	0	26	26	0
LAND REVENUE	RS	1	0	0	5	0	3	0	0	0	0	0	0	0	0	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	2516	0	0	1962	0	1536	0	0	0	0	1925	0	1435	683	0
OUTPUTS																
MAIN PRODUCT	RS	2956	0	0	2640	0	2318	0	0	0	0	18525	0	1725	775	0
BYE PRODUCTS	RS	0	0	0	375	0	222	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	2956	0	0	3015	0	2540	0	0	0	0	18525	0	1725	775	0
NET INCOME	RS	440	0	0	1053	0	1004	0	0	0	0	16600	0	290	92	0

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TABLE 1.6.2 (a)

Physical Input-Output Relationship (per Acre)

ZONE 6 TECHNOLOGY 2

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER. HIRED LABOUR	HRS	112.24	475.01	0.00	0.00	0.00	50.49	0.00	0.00	40.00	315.25	0.00	354.00	320.71	93.72	0.00
CASUAL HIRED LABOUR	HRS	186.66	8.72	0.00	0.00	0.00	19.58	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	14.31	17.65	0.00	0.00	0.00	11.18	0.00	0.00	6.00	10.00	0.00	0.00	9.63	9.47	0.00
TRACTORS	HRS	2.39	2.20	0.00	0.00	0.00	1.81	0.00	0.00	1.00	3.00	0.00	4.50	1.62	1.61	0.00
OTHERS	HRS	0.00	0.00	0.00	0.00	0.00	1.56	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	8.24	2650.00	0.00	0.00	0.00	50.31	0.00	0.00	6.00	4.00	0.00	0.00	9.06	30.59	0.00
F. Y. M	B.C	11.14	14.00	0.00	0.00	0.00	14.00	0.00	0.00	0.00	12.00	0.00	0.00	11.75	14.25	0.00
FERTILIZER 1	BAGS	1.15	1.50	0.00	0.00	0.00	1.15	0.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.00
2	BAGS	1.59	1.77	0.00	0.00	0.00	1.48	0.00	0.00	0.00	2.00	0.00	3.00	1.01	1.01	0.00
3	BAGS	2.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00
4	BAGS	1.37	1.66	0.00	0.00	0.00	1.22	0.00	0.00	0.00	0.00	0.00	0.00	1.33	1.00	0.00
SUPPLEMENTARY WATER	HRS	14.90	39.00	0.00	0.00	0.00	13.86	0.00	0.00	0.00	0.00	0.00	60.00	22.05	13.33	0.00
PESTICIDES	RS	176.19	245.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIXED COSTS																
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTEREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTISANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	804.61	16056.81	0.00	0.00	0.00	955.00	0.00	0.00	327.50	1.00*	0.00	1.00*	1.00*	1.00*	0.00
BYE PRODUCTS	KG	937.50	0.00	0.00	0.00	0.00	799.63	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 - acre

TABLE 1.6.2 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 6 TECHNOLOGY 2

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND FERMER																
HIRED LABOUR	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	1.6	4.1	0.0	0.0	0.0	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	63.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	99.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	6.2	0.3	0.0	0.0	0.0	2.5	0.0	0.0	10.0	35.0	0.0	0.0	39.2	5.0	0.0
F. Y. M	21.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	160.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	134.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	134.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	121.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	12.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHNICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	5.8	0.2	0.0	0.0	0.0	2.0	0.0	0.0	7.8	3000.0	0.0	2000.0	2595.0	1423.3	0.0
BYE PRODUCTS	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 1.6.2 (c) TABLE 1.6.2 (c)

ZONE 6 TECNOLOGY 2

C. Financial costs and Returns Crops (Rs. Per Acre)

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERMANENT LABOUR	RS	269	1140	0	0	0	121	0	0	96	756	0	849	769	224	0
CASUAL HIRED LABOUR	RS	298	35	0	0	0	95	0	0	0	0	0	0	0	0	0
FARM POWER BULLOCKS	RS	143	176	0	0	0	111	0	0	60	100	0	0	96	94	0
TRACTORS	RS	152	140	0	0	0	115	0	0	63	191	0	287	103	102	0
OTHERS	RS	0	0	0	0	0	155	0	0	198	0	0	0	0	0	0
SEED	RS	51	804	0	0	0	125	0	0	60	140	0	0	355	152	0
F. Y. M	RS	237	298	0	0	0	298	0	0	0	255	0	0	250	303	0
FERTILIZER 1	RS	184	240	0	0	0	184	0	0	0	160	0	0	160	160	0
2	RS	213	237	0	0	0	198	0	0	0	268	0	402	135	135	0
3	RS	268	0	0	0	0	268	0	0	0	0	0	0	134	134	0
4	RS	165	201	0	0	0	147	0	0	0	0	0	0	161	121	0
SUPPLEMENTARY WATER	RS	183	479	0	0	0	170	0	0	0	0	0	738	271	163	0
PESTICIDES	RS	176	245	0	0	0	0	0	0	0	0	0	0	0	0	0
FIXED COSTS MECHANICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTEREST RATE	RS	127	357	0	0	0	109	0	0	24	57	0	214	99	73	0
PAYMENT TO	RS	130	29	0	0	0	123	0	0	0	9	0	117	14	15	0
WATER RATE	RS	48	82	0	0	0	39	0	0	15	52	0	0	28	28	0
LAND REVENUE	RS	17	1	0	0	0	18	0	0	0	0	0	0	2	4	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	2661	4464	0	0	0	2276	0	0	516	1988	0	2607	2577	1708	0
OUTPUTS MAIN PRODUCT	RS	4666	3211	0	0	0	1910	0	0	2632	3000	0	2000	2595	1423	0
BYE PRODUCTS	RS	93	0	0	0	0	79	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	4759	3211	0	0	0	1989	0	0	2632	3000	0	2000	2595	1423	0
NET INCOME	RS	2098	-1253	0	0	0	-287	0	0	2116	1012	0	-607	-18	-285	0

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TABLE 1.5.3 (a)

Physical Input-Output Relationship (per Acre)

ZONE 6 TECHNOLOGY 3

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR	HRS	65.20	562.63	0.00	0.00	0.00	37.79	0.00	0.00	0.00	0.00	0.00	0.00	330.94	74.82	0.00
CASUAL																
HIRED LABOUR	HRS	218.85	0.00	0.00	0.00	0.00	9.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTORS	HRS	5.32	5.12	0.00	0.00	0.00	4.32	0.00	0.00	0.00	0.00	0.00	0.00	2.70	2.87	0.00
OTHERS	HRS	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	8.57	2700.00	0.00	0.00	0.00	46.42	0.00	0.00	0.00	0.00	0.00	0.00	8.60	26.25	0.00
F. Y. M	B.C	0.00	12.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	12.00	0.00	0.00
FERTILIZER																
1	BAGS	1.20	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	BAGS	1.30	1.50	0.00	0.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00
3	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
4	BAGS	1.00	2.00	0.00	0.00	0.00	3.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SUPPLEMENTARY WATER	HRS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PESTICIDES	RS	146.78	375.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIXED COSTS																
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	905.35	15984.37	0.00	0.00	0.00	1205.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
BYE PRODUCTS	KG	0.00	0.00	0.00	0.00	0.00	725.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00*	1.00*	0.00

* 1.00 Acre

TABLE 1.6.3 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 6 TECHNOLOGY 3

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR CASUAL	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HIRED LABOUR	0.0	1.1	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	53.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	211.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	6.3	0.3	0.0	0.0	0.0	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. Y. M	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	33.0	5.2	0.0
FERTILIZER																
1	163.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	132.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	127.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHANICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	6.6	0.2	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
BYE PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	2560.0	1275.0	0.0

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TABLE 1.6.3 (c)

C. Financial costs and Returns Crops (Rs. Per Acre) ZONE 6 TECHNOLOGY 3

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERMANENT LABOUR	RS	149	1294	0	0	0	86	0	0	0	0	0	0	761	172	0
CASUAL HIRED LABOUR	RS	240	0	0	0	0	45	0	0	0	0	0	0	0	0	0
FARM POWER BULLOCKS	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACTORS	RS	286	275	0	0	0	232	0	0	0	0	0	0	145	154	0
OTHERS	RS	0	0	0	0	0	211	0	0	0	0	0	0	0	0	0
SEED	RS	53	810	0	0	0	125	0	0	0	0	0	0	283	136	0
F. Y. M	RS	0	300	0	0	0	0	0	0	0	0	0	0	300	0	0
FERTILIZER 1	RS	195	163	0	0	0	163	0	0	0	0	0	0	0	0	0
2	RS	172	198	0	0	0	198	0	0	0	0	0	0	132	132	0
3	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	RS	127	255	0	0	0	446	0	0	0	0	0	0	0	0	0
SUPPLEMENTARY WATER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PESTICIDES	RS	146	375	0	0	0	0	0	0	0	0	0	0	0	0	0
FIXED COSTS	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
MECHANICAL POWER	RS	91	311	0	0	0	106	0	0	0	0	0	0	42	32	0
INTREST RATE	RS	189	136	0	0	0	184	0	0	0	0	0	0	28	55	0
PAYMENT TO	RS	38	75	0	0	0	28	0	0	0	0	0	0	22	22	0
WATER RATE	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LAND REVENUE	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	1686	4192	0	0	0	1824	0	0	0	0	0	0	1713	703	0
TOTAL COSTS	RS															
OUTPUTS																
MAIN PRODUCT	KG	5975	3196	0	0	0	2531	0	0	0	0	0	0	2560	1275	0
BYP PRODUCTS	KG	0	0	0	0	0	72	0	0	0	0	0	0	0	0	0
TOTAL INCOME	KG	5975	3196	0	0	0	2603	0	0	0	0	0	0	2560	1275	0
NET INCOME	KG	4289	-996	0	0	0	779	0	0	0	0	0	0	847	572	0

TABLE 1.F.4 (a)

Physical Input-Output Relationship (per Acre) ZONE 6 ALL TECHNOLOGY

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR CASUAL	HRS	111.65	498.38	0.00	267.75	0.00	57.20	0.00	0.00	40.00	315.25	241.00	354.00	316.00	90.22	0.00
HIRED LABOUR	HRS	200.95	6.40	0.00	0.00	0.00	13.81	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	16.62	16.27	0.00	34.00	0.00	14.67	0.00	0.00	6.00	10.00	28.50	0.00	9.82	9.68	0.00
TRACTORS	HRS	3.86	2.98	0.00	0.00	0.00	2.99	0.00	0.00	1.00	3.00	0.00	4.50	2.54	2.57	0.00
OTHERS	HRS	0.00	0.00	0.00	0.00	0.00	1.57	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	8.33	2685.33	0.00	20.83	0.00	49.66	0.00	0.00	6.00	4.00	5.62	0.00	8.71	29.76	0.00
F. Y. M	B.C	11.25	13.33	0.00	14.00	0.00	12.33	0.00	0.00	0.00	12.00	0.00	0.00	11.76	14.25	0.00
FERTILIZER																
1	BAGS	1.12	1.33	0.00	1.40	0.00	1.11	0.00	0.00	0.00	1.00	1.00	0.00	1.00	1.00	0.00
2	BAGS	1.47	1.69	0.00	1.20	0.00	1.36	0.00	0.00	0.00	2.00	1.00	3.00	1.01	1.01	0.00
3	BAGS	2.00	0.00	0.00	0.00	0.00	2.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	1.00	0.00
4	BAGS	1.33	1.80	0.00	0.00	0.00	1.63	0.00	0.00	0.00	0.00	0.00	0.00	1.33	1.00	0.00
SUPPLEMENTARY WATER	HRS	14.88	39.00	0.00	0.00	0.00	13.57	0.00	0.00	0.00	0.00	0.00	60.00	24.76	13.00	0.00
PESTICIDES	RS	215.22	288.33	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FIXED COSTS																
MECHNICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	763.47	16037.50	0.00	825.00	0.00	924.29	0.00	0.00	337.50	1.00*	7125.00	1.00*	1.00*	1.00*	0.00
BYE PRODUCTS	KG	937.50	0.00	0.00	750.00	0.00	669.44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

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TABLE 1.6.4 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 6 ALL TECHNOLOGY

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND FARMER																
HIRED LABOUR	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL	0.0	1.5	4.1	0.0	0.0	0.0	4.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HIRED LABOUR																
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	62.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	108.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	6.2	0.3	0.0	4.5	0.0	2.5	0.0	0.0	10.0	35.0	121.5	0.0	39.0	5.0	0.0
F. Y. M	22.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	154.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	135.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	134.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	122.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	12.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHANICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTEREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTISAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	5.9	0.2	0.0	3.2	0.0	2.3	0.0	0.0	7.6	3000.0	2.6	2000.0	2520.4	1355.5	0.0
BYP PRODUCTS	0.0	0.1	0.0	0.0	0.5	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 1.6.4 (c)

C. Financial costs and Returns Crops (Rs. Per Acre) ZONE 6 ALL TECHNOLOGY

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERMANENT LABOUR	RS	256	1146	0	615	0	131	0	0	92	725	554	818	726	207	0
CASUAL HIRED LABOUR	RS	301	26	0	0	0	67	0	0	0	0	0	0	0	0	0
FARM POWER																
BULLOCKS	RS	166	162	0	340	0	146	0	0	60	100	265	0	98	96	0
TRACTORS	RS	241	186	0	0	0	186	0	0	62	167	0	281	158	160	0
OTHERS	RS	0	0	0	0	0	169	0	0	216	0	0	0	0	0	0
SEED	RS	51	805	0	93	0	124	0	0	60	140	682	0	339	148	0
F. Y. M	RS	253	299	0	315	0	277	0	0	0	270	0	0	264	320	0
FERTILIZER 1	RS	172	205	0	215	0	171	0	0	0	154	154	0	154	154	0
2	RS	204	234	0	166	0	188	0	0	0	277	138	416	140	140	0
3	RS	268	0	0	0	0	268	0	0	0	0	0	0	134	134	0
4	RS	162	219	0	0	0	199	0	0	0	0	0	0	162	122	0
SUPPLEMENTARY WATER	RS	181	475	0	0	0	165.	0	0	0	0	0	732	302	155	0
PESTICIDES	RS	215	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FIXED COSTS																
MECHANICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTEREST RATE	RS	135	322	0	35	0	115	0	0	25	57	73	214	104	76	0
PAYMENT TO	RS	130	55	0	80	0	120	0	0	0	9	0	117	16	19	0
WATER RATE	RS	46	80	0	40	0	35	0	0	15	52	40	0	27	27	0
LAND REVENUE	RS	8	1	0	5	0	7	0	0	0	0	0	0	3	4	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	2785	4215	0	1904	0	2368	0	0	530	1971	1926	2574	2627	1765	0
OUTPUTS																
MAIN PRODUCT	RS	4504	3207	0	2640	0	2125	0	0	2632	3000	18525	2000	2520	1355	0
BYE PRODUCTS	RS	93	0	0	18	0	133	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	4597	3207	0	2658	0	2258	0	0	2632	3000	18525	2000	2520	1355	0
NET INCOME	RS	1808	-1008	0	754	0	-110	0	0	2102	1029	16599	5 74	107	-410	0

TABLE 1.7.1 (a)

Physical Input-Output Relationship (per Acre) ZONE 7 TECHNOLOGY 1

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR CASUAL	HRS	0.00	0.00	197.50	0.00	0.00	63.91	0.00	0.00	0.00	311.00	0.00	509.92	0.00	0.00	0.00
HIRED LABOUR	HRS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	0.00	0.00	9.50	0.00	0.00	9.33	0.00	0.00	0.00	20.50	0.00	0.00	0.00	0.00	0.00
TRACTORS	HRS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHERS	HRS	0.00	0.00	0.00	0.00	0.00	1.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	0.00	0.00	34.00	0.00	0.00	56.66	0.00	0.00	0.00	330.00	0.00	0.00	0.00	0.00	0.00
F. Y. M	B.C	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	25.71	0.00	0.00	0.00
FERTILIZER																
1	BAGS	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.08	0.00	0.00	0.00
2	BAGS	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.60	0.00	0.00	0.00
3	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
4	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	3.10	0.00	0.00	0.00
SUPPLEMENTARY WATER	HRS	0.00	0.00	0.00	0.00	0.00	24.00	0.00	0.00	0.00	40.00	0.00	51.25	0.00	0.00	0.00
PESTICIDES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	370.44	0.00	0.00	0.00
FIXED COSTS																
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTISIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	0.00	0.00	1650.00	0.00	0.00	562.50	0.00	0.00	0.00	1.00*	0.00	1.00*	0.00	0.00	0.00
BYE PRODUCTS	KG	0.00	0.00	0.00	0.00	0.00	656.25	0.00	0.00	0.00	0.00	0.00	3750	0.00	0.00	0.00

* 1.00 = Acre

TABLE 1.7.1 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 7 TECHNOLOGY 1

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN	3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HIRED LABOUR CASUAL	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.0	0.0	0.0	0.0	0.0
HIRED LABOUR	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	78.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	0.0	0.0	0.0	2.0	0.0	0.0	2.5	0.0	0.0	0.0	12.2	0.0	0.0	0.0	0.0	0.0
SEED	45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. Y. M	163.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER 1	134.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	107.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHANICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	0.0	0.0	1.5	0.0	0.0	2.2	0.0	0.0	0.0	5049.5	0.0	4496.6	0.0	0.0	0.0
BYE PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0

TABLE 1.7.1 (c)

ZONE 7 TECNOLOGY 1

C. Financial costs and Returns Crops (Rs. Per Acre)

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERAMENNT LABOUR	RS	0	0	632	0	0	204	0	0	0	995	0	1631	0	0	0
CASUAL HIRED LABOUR	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FARM POWER BULLOCKS	RS	0	0	95	0	0	93	0	0	0	205	0	0	0	0	0
TRACTORS	RS	0	0	0	0	0	0	0	0	0	0	0	420	0	0	0
OTHERS	RS	0	0	0	0	0	117	0	0	0	0	0	0	0	0	0
SEED	RS	0	0	68	0	0	141	0	0	0	4026	0	0	0	0	0
F. Y. M	RS	0	0	0	0	0	0	0	0	0	0	0	1156	0	0	0
FERTILIZER 1	RS	0	0	163	0	0	163	0	0	0	163	0	176	0	0	0
2	RS	0	0	134	0	0	134	0	0	0	134	0	241	0	0	0
3	RS	0	0	0	0	0	0	0	0	0	100	0	0	0	0	0
4	RS	0	0	0	0	0	0	0	0	0	107	0	333	0	0	0
SUPPLEMENTARY WATER	RS	0	0	0	0	0	340	0	0	0	568	0	727	0	0	0
PESTICIDES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FIXED COSTS MECHANICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	0	0	27	0	0	67	0	0	0	382	0	285	0	0	0
PAYMENT TO	RS	0	0	50	0	0	50	0	0	0	0	0	0	0	0	0
WATER RATE	RS	0	0	45	0	0	45	0	0	0	0	0	0	0	0	0
LAND REVENUE	RS	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	0	0	1214	0	0	1354	0	0	0	6680	0	4969	0	0	0
OUTPUTS MAIN PRODUCT	RS	0	0	2475	0	0	1237	0	0	0	5049	0	4496	0	0	0
BYE PRODUCTS	RS	0	0	0	0	0	65	0	0	0	0	0	750	0	0	0
TOTAL INCOME	RS	0	0	2475	0	0	1302	0	0	0	5049	0	5246	0	0	0
NET INCOME	RS	0	0	1261	0	0	-32	0	0	0	-1631	0	277	0	0	0

TABLE 1.7.2 (a)

Physical Input-Output Relationship (per Acre) ZONE 7 TECHNOLOGY 2

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other	
VARIABLE PHY. INPUT																	
MANUAL LABOUR																	
FAMILY AND PER.																	
HIRED LABOUR	HRS	0.00	0.00	173.96	0.00	0.00	49.18	0.00	21.17	0.00	0.00	0.00	421.50	160.50	0.00	0.00	
CASUAL																	
HIRED LABOUR	HRS	0.00	0.00	1.66	0.00	0.00	3.20	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
FARM POWER																	
BULLOCKS	HRS	0.00	0.00	6.12	0.00	0.00	10.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
TRACTORS	HRS	0.00	0.00	1.75	0.00	0.00	2.22	0.00	2.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
OTHERS	HRS	0.00	0.00	1.75	0.00	0.00	1.69	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
SEED	K.Gs	0.00	0.00	29.79	0.00	0.00	51.66	0.00	4.00	0.00	0.00	0.00	0.00	5.50	0.00	0.00	
F. Y. M	B.C	0.00	0.00	0.00	0.00	0.00	6.00	0.00	0.00	0.00	0.00	0.00	6.00	0.00	0.00	0.00	
FERTILIZER																	
1	BAGS	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	
2	BAGS	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	
3	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
SUPPLEMENTARY WATER	HRS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PESTICIDES	RS	0.00	0.00	131.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	200.00	0.00	0.00	0.00	
FIXED COSTS																	
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
OUTPUTS																	
MAIN PRODUCT	KG	0.00	0.00	1353.12	0.00	0.00	800.00	0.00	90.00	0.00	0.00	0.00	1.00*	1.00*	0.00	0.00	
BYE PRODUCTS	KG	0.00	0.00	1520.45	0.00	0.00	815.62	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

* 1.00 = Acre

TABLE 1.7.2 (b)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 7 TECHNOLOGY 2

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR	3.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	0.0	0.0	1.5	0.0	0.0	2.1	0.0	0.0	3.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	81.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	98.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	0.0	0.0	2.0	0.0	0.0	2.5	0.0	5.6	0.0	0.0	0.0	0.0	32.5	0.0	0.0
F. Y. M	27.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER																
1	164.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	134.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHNICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	0.0	0.0	1.5	0.0	0.0	2.0	0.0	5.0	0.0	0.0	0.0	8333.0	1350.0	0.0	0.0
BYE PRODUCTS	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 1.7.2 (c)

C. Financial costs and Returns Crops (Rs. Per Acre) ZONE 7 TECNOLOGY 2

Description	Unit	Cotton	Sugar-Cane	Rice-lr	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERMANENT LABOUR	RS	0	0	678	0	0	191	0	82	0	0	0	1643	625	0	0
CASUAL HIRED LABOUR	RS	0	0	2	0	0	6	0	0	0	0	0	0	0	0	0
FARM POWER																
BULLOCKS	RS	0	0	61	0	0	102	0	0	0	0	0	0	0	0	0
TRACTORS	RS	0	0	142	0	0	180	0	182	0	0	0	0	0	0	0
OTHERS	RS	0	0	171	0	0	165	0	49	0	0	0	0	0	0	0
SEED	RS	0	0	59	0	0	129	0	22	0	0	0	0	178	0	0
F. Y. M	RS	0	0	0	0	0	162	0	0	0	0	0	162	0	0	0
FERTILIZER 1	RS	0	0	164	0	0	164	0	0	0	0	0	164	0	0	0
2	RS	0	0	134	0	0	134	0	0	0	0	0	134	0	0	0
3	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SUPPLEMENTARY WATER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
PESTICIDES	RS	0	0	131	0	0	0	0	0	0	0	0	0	200	0	0
FIXED COSTS																
MECHANICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	0	0	60	0	0	58	0	19	0	0	0	45	28	0	0
PAYMENT TO	RS	0	0	69	0	0	70	0	53	0	0	0	0	0	0	0
WATER RATE	RS	0	0	43	0	0	43	0	0	0	0	0	0	0	0	0
LAND REVENUE	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	0	0	1714	0	0	1404	0	407	0	0	0	2148	1031	0	0
OUTPUTS																
MAIN PRODUCT	RS	0	0	2029	0	0	1600	0	450	0	0	0	8333	1350	0	0
BYE PRODUCTS	RS	0	0	304	0	0	81	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	0	0	2333	0	0	1681	0	450	0	0	0	8333	1350	0	0
NET INCOME	RS	0	0	619	0	0	277	0	43	0	0	0	6185	319	0	0

TABLE 1.7.3 (a)

Physical Input-Output Relationship (per Acre) ZONE 7 TECNOLOGY 3

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PER.																
HIRED LABOUR CASUAL	HRS	0.00	0.00	0.00	0.00	0.00	51.92	329.42	0.00	0.00	419.70	0.00	380.11	0.00	0.00	0.00
HIRED LABOUR	HRS	0.00	0.00	0.00	0.00	0.00	12.36	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FARM POWER																
BULLOCKS	HRS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TRACTORS	HRS	0.00	0.00	0.00	0.00	0.00	5.68	9.00	0.00	0.00	4.00	0.00	4.81	0.00	0.00	0.00
OTHERS	HRS	0.00	0.00	0.00	0.00	0.00	2.10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
SEED	K.Gs	0.00	0.00	0.00	0.00	0.00	51.00	0.50	0.00	0.00	902.00	0.00	0.00	0.00	0.00	0.00
F. Y. M	B.C	0.00	0.00	0.00	0.00	0.00	24.00	0.00	0.00	0.00	21.00	0.00	17.25	0.00	0.00	0.00
FERTILIZER																
1	BAGS	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.66	0.00	0.00	0.00
2	BAGS	0.00	0.00	0.00	0.00	0.00	2.00	2.14	0.00	0.00	1.66	0.00	1.67	0.00	0.00	0.00
3	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
4	BAGS	0.00	0.00	0.00	0.00	0.00	2.00	1.00	0.00	0.00	2.00	0.00	1.85	0.00	0.00	0.00
SUPPLEMENTARY WATER	HRS	0.00	0.00	0.00	0.00	0.00	15.50	0.00	0.00	0.00	39.33	0.00	60.00	0.00	0.00	0.00
PESTICIDES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	237.06	0.00	0.00	0.00
FIXED COSTS																
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PAYMENT TO ARTSIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
OUTPUTS																
MAIN PRODUCT	KG	0.00	0.00	0.00	0.00	0.00	627.27	600.00	0.00	0.00	1.00*	0.00	1.00*	0.00	0.00	0.00
BYE PRODUCTS	KG	0.00	0.00	0.00	0.00	0.00	652.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

* 1.00 = Acre

TABLE 1.7.3 (5)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 7 TECNOLOGY 3

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN																
HIRED LABOUR	3.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	0.0	0.0	0.0	0.0	0.0	0.0	6.7	0.0	0.0	0.0	0.0	5.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	57.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	97.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SEED	0.0	0.0	0.0	0.0	0.0	0.0	2.7	50.0	0.0	0.0	3.7	0.0	0.0	0.0	0.0	0.0
F. Y. M	44.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER 1	161.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	134.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	90.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	10.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHANICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	0.0	0.0	0.0	0.0	0.0	2.4	14.2	0.0	0.0	9666.0	0.0	2863.8	0.0	0.0	0.0
BYE PRODUCTS	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

TABLE 1.7.3 (c)

C. Financial costs and Returns Crops (Rs. Per Acre) ZONE 7 TECNOLOGY 3

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERAMENNT LABOUR	RS	0	0	0	0	0	181	1152	0	0	1468	0	1330	0	0	0
CASUAL HIRED LABOUR	RS	0	0	0	0	0	82	0	0	0	0	0	0	0	0	0
FARM POWER BULLOCKS	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TRACTORS	RS	0	0	0	0	0	324	514	0	0	228	0	275	0	0	0
OTHERS	RS	0	0	0	0	0	203	0	0	0	0	0	0	0	0	0
SEED	RS	0	0	0	0	0	137	25	0	0	3337	0	0	0	0	0
F. Y. M	RS	0	0	0	0	0	1065	0	0	0	932	0	765	0	0	0
FERTILIZER 1	RS	0	0	0	0	0	161	0	0	0	161	0	267	0	0	0
2	RS	0	0	0	0	0	269	288	0	0	223	0	225	0	0	0
3	RS	0	0	0	0	0	0	0	0	0	0	0	90	0	0	0
4	RS	0	0	0	0	0	160	80	0	0	160	0	148	0	0	0
SUPPLEMENTARY WATER	RS	0	0	0	0	0	159	0	0	0	405	0	618	0	0	0
PESTICIDES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FIXED COSTS MECHNICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	0	0	0	0	0	112	36	0	0	339	0	243	0	0	0
PAYMENT TO	RS	0	0	0	0	0	20	0	0	0	0	0	0	0	0	0
WATER RATE	RS	0	0	0	0	0	45	0	0	0	0	0	0	0	0	0
LAND REVENUE	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	0	0	0	0	0	2918	2095	0	0	1253	0	3961	0	0	0
OUTPUTS MAIN PRODUCT	RS	0	0	0	0	0	1505	8520	0	0	9666	0	2863	0	0	0
BYE PRODUCTS	RS	0	0	0	0	0	130	0	0	0	0	0	0	0	0	0
TOTAL INCOME	RS	0	0	0	0	0	1635	8520	0	0	9666	0	2863	0	0	0
NET INCOME	RS	0	0	0	0	0	-1283	6425	0	0	2413	0	-1098	0	0	0

TABLE 1.7.1 (a)

Physical Input-Output Relationship (per Acre) ZONE 7 ALL TECHNOLOGY

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Tobacco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other	
VARIABLE PHY. INPUT																	
MANUAL LABOUR																	
FAMILY AND PER.																	
HIRED LABOUR	HRS	0.00	0.00	175.77	0.00	0.00	52.28	329.42	21.17	0.00	376.22	0.00	443.90	160.50	0.00	0.00	
CASUAL																	
HIRED LABOUR	HRS	0.00	0.00	1.53	0.00	0.00	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
FARM POWER																	
BULLOCKS	HRS	0.00	0.00	7.81	0.00	0.00	9.56	0.00	0.00	0.00	20.50	0.00	0.00	0.00	0.00	0.00	
TRACTORS	HRS	0.00	0.00	1.75	0.00	0.00	4.03	9.00	2.25	0.00	4.00	0.00	5.05	0.00	0.00	0.00	
OTHERS	HRS	0.00	0.00	1.75	0.00	0.00	1.86	0.00	0.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
SEED	K.Ge	0.00	0.00	30.11	0.00	0.00	52.00	0.50	4.00	0.00	673.20	0.00	0.00	5.50	0.00	0.00	
F. Y. M	B.C	0.00	0.00	0.00	0.00	0.00	15.00	0.00	0.00	0.00	21.00	0.00	20.25	0.00	0.00	0.00	
FERTILIZER																	
1	BAGS	0.00	0.00	1.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	0.00	1.25	0.00	0.00	0.00	
2	BAGS	0.00	0.00	1.00	0.00	0.00	1.46	2.14	0.00	0.00	1.40	0.00	1.70	0.00	0.00	0.00	
3	BAGS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.00	0.00	1.00	0.00	0.00	0.00	
4	BAGS	0.00	0.00	0.00	0.00	0.00	2.00	1.00	0.00	0.00	1.50	0.00	2.16	0.00	0.00	0.00	
SUPPLEMENTARY WATER	HRS	0.00	0.00	0.00	0.00	0.00	18.33	0.00	0.00	0.00	39.50	0.00	53.63	0.00	0.00	0.00	
PESTICIDES	RS	0.00	0.00	131.50	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	301.69	0.00	0.00	0.00	
FIXED COSTS																	
MECHANICAL POWER	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
INTREST RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
PAYMENT TO ARTESIANS	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
WATER RATE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAND REVENUE	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
LAND RENT	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
OTHER TAXES	RS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
OUTPUTS																	
MAIN PRODUCT	KG	0.00	0.00	1379.00	0.00	0.00	686.41	600.00	90.00	0.00	1.00*	0.00	1.00*	1.00*	0.00	0.00	
BYE PRODUCTS	KG	0.00	0.00	1543.00	0.00	0.00	718.12	0.00	0.00	0.00	0.00	0.00	3750.0	0.00	0.00	0.00	

* 1.00 = Acre

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TABLE 1.7.4 (5)

Financial Prices of Input-Output (Rs. Per Unit) ZONE 7 ALL TECHNOLOGY

Description	Unit	Cotton	Sugar-Cane	Rice Irri	Rice Basmati	Maize	Wheat	Toba-cco	Oil-Seed	Pulses	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
VARIABLE PHY. INPUT																
MANUAL LABOUR																
FAMILY AND PERMEN	3.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
HIRED LABOUR	0.0	0.0	0.0	1.5	0.0	0.0	5.8	0.0	0.0	3.0	0.0	4.0	0.0	0.0	0.0	0.0
CASUAL																
HIRED LABOUR	10.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FARM POWER																
BULLOCKS	71.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
TRACTORS	92.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHERS	0.0	0.0	0.0	2.0	0.0	0.0	2.6	50.0	5.6	0.0	4.7	0.0	0.0	32.5	0.0	0.0
SEED	43.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
F. Y. M	163.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FERTILIZER 1	134.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	95.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	88.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	12.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SUPPLEMENTARY WATER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PESTICIDES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
FIXED COSTS																
MECHNICAL POWER	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
INTREST RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
PAYMENT TO ARTSIAN	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
WATER RATE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND REVENUE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
LAND RENT	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OTHER TAXES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
OUTPUTS																
MAIN PRODUCT	0.0	0.0	0.0	1.5	0.0	0.0	2.2	14.2	5.0	0.0	7819.4	0.0	4074.7	1350.0	0.0	0.0
BYE PRODUCTS	0.0	0.0	0.0	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0

TABLE 1.7.4 (c)

ZONE 7 ALL TECHNOLOGY

C. Financial costs and Returns Crops (Rs. Per Acre)

Description	Unit	Cotton	Sugar-Cane	Rice-Ir	Rice Ba	Maize	Wheat	Tobacco	Oil-Seed	Pulse	Vegetable Rabi	Vegetable Kharif	Fruit	Fodder Rabi	Fodder Kharif	Other
PERMANENT LABOUR	RS	0	0	597	0	0	177	1120	71	0	1279	0	1509	545	0	0
CASUAL HIRED LABOUR	RS	0	0	2	0	0	40	0	0	0	0	0	0	0	0	0
FARM POWER BULLOCKS	RS	0	0	78	0	0	95	0	0	0	205	0	0	0	0	0
TRACTORS	RS	0	0	124	0	0	286	640	160	0	284	0	359	0	0	0
OTHERS	RS	0	0	162	0	0	172	0	46	0	0	0	0	0	0	0
SEED	RS	0	0	60	0	0	135	25	22	0	3164	0	0	178	0	0
F. Y. M	RS	0	0	0	0	0	652	0	0	0	913	0	880	0	0	0
FERTILIZER 1	RS	0	0	163	0	0	163	0	0	0	163	0	204	0	0	0
2	RS	0	0	134	0	0	196	287	0	0	188	0	228	0	0	0
3	RS	0	0	0	0	0	0	0	0	0	95	0	95	0	0	0
4	RS	0	0	0	0	0	176	88	0	0	132	0	190	0	0	0
SUPPLEMENTARY WATER	RS	0	0	0	0	0	234	0	0	0	506	0	666	0	0	0
PESTICIDES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
FIXED COSTS MECHANICAL POWER	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
INTREST RATE	RS	0	0	48	0	0	105	42	17	0	340	0	264	13	0	0
PAYMENT TO	RS	0	0	65	0	0	58	0	53	0	0	0	0	0	0	0
WATER RATE	RS	0	0	44	0	0	44	0	0	0	0	0	0	0	0	0
LAND REVENUE	RS	0	0	0	0	0	0	0	0	0	0	0	10	0	0	0
LAND RENT	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
OTHER TAXES	RS	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL COSTS	RS	0	0	1477	0	0	2533	2202	369	0	7269	0	4425	736	0	0
OUTPUTS MAIN PRODUCT	RS	0	0	2068	0	0	1510	8520	450	0	7819	0	4074	1350	0	0
BYE PRODUCTS	RS	0	0	308	0	0	71	0	0	0	0	0	750	0	0	0
TOTAL INCOME	RS	0	0	2376	0	0	1581	8520	450	0	7819	0	4824	1350	0	0
NET INCOME	RS	0	0	899	0	0	-952	6318	81	0	550	0	399	614	0	0

APPENDIX-B

Q U E S T I O N N A I R E

QUESTIONNAIRE

FOR

IMPACT OF FARM MECHANIZATION ON PRODUCTIVITY AND EMPLOYMENT

1. **Village Name:** ..... Tehsil Name: ..... District Name: _____
2. **Respondent Name:** _____ S/o _____
   Age (years): _____ Farming Experience (Years) _____
3. **Educational Status of Respondent:**
   1. Illiterate ☐ 2. Upto Matric ☐ 3. Above Matric ☐
4. **Tenure Status:**
   1. Owner ☐ 2. Owner-cum-Tenant ☐ 3. Tenant ☐
5. **Farm Size:**
   1. Small (below 12.5 Acres) ☐ 2. Medium (12.5-25 Acres) ☐
   3. Large (Above 25 acres) ☐
6. **Farm Location:**
   - Distance from nearest market _____ Km.
   - Approach road to market Kacha _____ Km. Pacca _____ Km.
7. **Contact with Agriculture Extension Staff:** **
   1. Frequent ☐ 2. Infrequent ☐ 3. Not at all ☐
8. **Farm Technology:**
   1. Bullocks only ☐ 2. Bullocks + Thresher ☐
   3. Bullocks+Thresher+Tractor ☐ 4. Tractor + Thresher ☐
   5. Tractor+Combine Harvester ☐ 6. Crop specific technology: _____
9. **Farm Area (Acres):**

TOTAL AREA	CULTIVATED			UNCULTIVATED			Reasons*
	Irrigated	Unirrigated	Total	Culturable	Non-culturable	Total	
1	2	3	4	5	6	7	8

*Use the following code numbers for reasons:

1. Water logging and salinity
2. Non availability of Irrigation Water
3. Needs levelling
4. Lack of finances
5. Do not need more land
6. Any other (Specify) _____

10. **Prevailing Land Rent in the Village** Rs. ..... /Acre/Year
11. **Farm Labour:**

a) Family Labour work on farm:

Category	Number	Full Time	Part Time		Equivalent Man-days
			Number	Hours of work	
1	2	3	4	5	6
Male					
Female					
Children (10-18 years)					

** Frequent = Fortnight/Monthly/Quarterly
Infrequent = Six monthly/Yearly

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b) Permanent Hired Labour:

Number	Equivalent Man-days	Total Annual Wages				
		In Cash (Rs.)	Kind (Qty.)	P/U (Rs.)	Sub-Total	Total
1	2	3	4	5	6=(4X5)	7=(3+6)
Male						
Female						
Children (10-18 Years)						

c) Casual Hired Labour on Farm

Crops	Operation	Number of Labourers	Time Spent (hrs.)	Equivalent Man-days	Total Wages				
					In Cash	In kind (Qty)	Price/ Unit (Rs.)	Value (Rs.)	Total
1	2	3	4	5	6	7	8	9 (7X8)	10=(6+9)
Cotton	Hoeing								
	Picking								
Sugar-cane	Stripping								
Rice Irri	Puddling								
	Trans-planting								
	Harvesting								
	Threshing								
Rice Basmati	Puddling								
	Trans-planting								
	Harvesting								
	Threshing								
Maize	Harvesting								
	Shelling								
Wheat	Harvesting								
	Threshing								
Tobacco	Trans-planting								
	Hoeing/ Weeding								
Oil-seed	Harvesting								
	Threshing								
Pulses	Hoeing/ weeding								
	Harvesting								
	Threshing								
Vegetables (Rabi) (Specify)	Hoeing								
	Picking								
Vegetables (Kharif) (Specify)	Hoeing								
	Picking								
Fruit Orchard (Specify)	Hoeing								
	Picking/ packing								
Fodder (Rabi)									
Fodder (Kharif)									

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12. a) Cropwise Number of Treatments (per acre) for the year 1986-87.

Crops	Cropped Area (Acre)	Ploughing		Planking		Sowing			F.Y.M. (Nos.)			Fertilizer(s)(Bags)				Irrigation		Hoeing/Weeding			Plant Protection	
		B	T	B	T	M	B	T	B.C	D	T	1	2	3	4	C	TW	M	B	T	H.O.	T.O
Cotton																						
Sugarcane																						
Rice Irri																						
Rice Basmati																						
Maize																						
Wheat																						
Tobacco																						
Oil-seed																						
Pulses																						
Vegetables Rabi (Sev)																						
Vegetables Kharif (Sev)																						
Fruit Orchard																						
Fodder (Rabi)																						
Fodder (Kharif)																						
Other Specify																						

B= Bullocks T= Tractor M= Manual B.C= Bullock Cart D= Donkey Cart T= Trolley C= Canal TW= Tubewell H.O.= Hand Operated T.O.= Tractor Operated
1. D.A.P. 2. Urea 3. Potash 4. Other Specify.

b) i) Time Spent per operation per acre

(Hours/Minutes)

Ploughing		Planking		F.Y.M.			Fertilizers	Irrigation	
Bullocks	Tractor	Bullocks	Tractor	Bullock Carts	Donkey Carts	Trolley		Canal (Wara Bandi Time)	Tubewell

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ii) Cropwise Time spent per operation per acre

(Hours/Mins

Crops	Sowing			Hoeing/Weeding			Plant Protection		Harvesting/ Picking			Thr.	
	M	B	T	M	B	T	H.O	T.O	M	T	C	M	T
Cotton													
Sugarcane													
Rice Irri													
Rice Basmati													
Maize													
Wheat													
Tobacco													
Oil-Seed													
Pulses													
Vegetables (Rabi)													
Vegetables (Kharif)													
Fruit Orchard													
Fodder (Rabi)													
Fodder (Kharif)													
Other (Specify)													

M= Manual B= Bullocks T= Tractor H.O.= Hand Operated T.O= Tractor Operated
C= Combine T/S= Thresher/Sheller

c) i) Cropwise cash inputs per acre

Crops	Seed		Plant Protection (Rs.)	Water Charges (Rs.)	Other Taxes	
	Quantity	Price/Unit Rs.			Usher	Other
Cotton						
Sugarcane						
Rice Irri						
Rice Basmati						
Maize						
Wheat						
Tobacco						
Oil-Seed						
Pulses						
Vegetable (Rabi)						
Vegetable (Kharif)						
Fruit Orchard						
Fodder (Rabi)						
Fodder (Kharif)						
Other(Specify)						

c) ii) Prices of Inputs and other Payments

(Rupees)

Inputs	F.Y.M.			Fertilizer				Payment to Artisans	Land Revenue
	B.C.	D	T	1	2	3	4		
Prices Per unit/ Payment									

B.C= Bullock Carts D= Donkey Carts T= Trolley
1. D.A.P. 2. Urea 3. Potash 4. Other Specify

Cropwise and Monthwise number of irrigation per acre.

C- Canal
T- Tubewell

Crops		Magh	Phagan	Cheet	Besakhh	Jathe	Har	Sawan	Badoon	Asuj	Katak	Magar	Pooh
	Months	1	2	3	4	5	6	7	8	9	10	11	12
Cotton	C												
	T												
Sugarcane	C												
	T												
Rice Irri	C												
	T												
Rice Basmati	C												
	T												
Maize	C												
	T												
Wheat	C												
	T												
Tobacco	C												
	T												
Oil-seed	C												
	T												
Pulses	C												
	T												
Vegetable (Rabi)	C												
	T												
Vegetable (Kharif)	C												
	T												
Fruit Orchard	C												
	T												
Fodder (Rabi)	C												
	T												
Fodder (Kharif)	C												
	T												
Other (Specify)	C												
	T												
	C												
	T												

e) Output and Prices per acre

Crops	Main Product		Bye-Product	
	Yield (Maund)	Price/Maund (Rs.)	Yield (Maund)	Price/Maund (Rs.)
Cotton				
Sugarcane				
Rice Irri				
Rice Basmati				
Maize				
Wheat				
Tobacco				
Oil-seed				
Pulses				
Vegetable (Rabi)				
Vegetable (Kharif)				
Fruit Orchard				
Fodder (Rabi)				
Fodder (Kharif)				
Other (Specify)				

13. a) **Details of Farm Machinery** (For owned only)

Name of Machinery	Nos.	Year of Purchase	Make	Size of Machinery	Purchase Price (Rs.)	Do you Rent out Yes/No	If yes at what rate/day/hour/acre (Rs.)
Tractor:							
Cultivator							
Tractor Blade Karah							
Disc Plough							
Rotavator							
Seed Drill							
Trolley							
Ridger							
Tractor Sprayer							
Thresher							
Transplanter							
Combine Harvester							
Tubewell:							
Diesel							
Electric							
Any Other Specify							

b) Do you hire the farm machinery? Yes ☐ No ☐

If yes, ask the following:

Name of Machinery	Total Hours	Rate/Hour (Rs.)	Total Amount (Rs.)
Tractor:			
Cultivator			
Tractor Blade Karah			
Disc Plough			
Rotavator			
Seed Drill			
Trolley			
Ridger			
Tractor Sprayer			
Thresher			
Transplanter			
Combine Harvester			
Tubewell:			
Diesel			
Electric			
Any other (Specify)			

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c) Was the Farmer able to hire the Tractor?

- At proper Time ☐
- Had to wait longer than desired? ☐

If the farmer had to wait longer than desired, for what crop and at what time operation?

Crops	Operation/Time
Cotton	_____
Sugarcane	_____
Rice	_____
Wheat	_____
Other	_____

d) Operating Cost of Tractor, Tubewell and Combine Harvestor (1986-87).

Items	Tractor			Tubewell						Combine Harvestor		
				Diesel Tubewell			Elect Tubewell					
	Qty.	P/U	Total	Qty.	P/U	Total	Qty.	P/U	Total	Qty.	P/U	Total
Diesel Oil (Drum)/ Electricity												
Mobile (Tin)												
Repair Charges												
Salary of Attendants												
Other Expenses												
Sub-Total												
Depreciation												
TOTAL:												
Total Working (Hours)												

e) Use of Tractor/Farm Machinery, Tubewell and Combine, On-Farm and Off-Farm (Hours).

Type of Work	Tractor		Tubewell		Combine		Other Specify	
	On-Farm	Off-Farm	On-Farm	Off-Farm	On-Farm	Off-Farm	On-Farm	Off-Farm
i) Agricultural Work								
- Ploughing/ Planking								
- Puddling								
- Scraping								
- Sugar-cane Transportation								
- Threshing								
- Other*								
ii) Non-Agricultural Work								
- Self**								
- For Other**								

* Transportation of other inputs, other outputs, fodder and other custom work

** Earth, brick work and other Transportation.

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14. Livestock

Type of Animal	Bullocks	Buffalows	Cows	Sheeps	Donkey	Camel
Number						

15. During the past ten (10) years, has the Farmer ever been ejected from land on whcih he was a tenant? Yes [ ] No [ ]

If yes:

How many acres did he lose? .....

Why did the landlord take back his land? [ ]

Use following Codes:

1. Because he began self farming it with a tractor.
2. Because he began self farming it without a tractor.
3. Because the tenant farming did not pay enough
4. Because of a dispute with the tenant.
5. Because he gave it to another relative
6. Because he gave it to another tenant
7. other reasons specify _____

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