

**EVALUATION OF THE INTEGRATED DRY
LAND AGRICULTURAL DEVELOPMENT
PROJECT**

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EVALUATION OF THE
INTEGRATED DRY LAND AGRICULTURAL
DEVELOPMENT PROJECT

A Study of
The Centrally Sponsored Pilot Development
Project in Bijapur District,
Karnataka State

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CHAPTER I

INTRODUCTION

The present study was undertaken at the instance of the Directorate of Economics and Statistics, Ministry of Agriculture and Irrigation, Government of India. The interest in the topic has arisen mainly because the concept of integrated approach to dry land farming is thought to be somewhat a technological innovation in the predominantly arid and semi-arid regions. These regions are characterised by the instability of crop production on account of peculiar soil-climatic conditions. These water-starved areas could not benefit from the technological break through (green revolution) that came about in mid-sixties. The green revolution has succeeded in areas where assured irrigation is available or, to a limited extent, in areas where adequate and evenly distributed rain fall ensures a fair degree of moisture retention in the soil. The situation being different in predominantly dry regions, the agriculture continued to remain backward and the disparity more glaring as compared to other regions. In order to obviate this situation of economic stagnation in dry regions, the suggested remedies range from enhancing the resource-base through protective irrigation to evolving a distinct farm technology adapted to the agro-climatic conditions of these areas.

In the year 1970, the All India Coordinated Research Project for Dry Areas (AICRPDA) ^{initiated} ~~initiated~~ a two-fold approach, namely, (i) research into improved dry farming technology and (ii) testing the efficacy of new technology for dry farming through pilot development projects. The new strategy was expected to reveal advantages like new crop technology, better devices for run-off collection and water conservation and also facilities for testing demonstration of research

results in farmers' plots in the pilot project areas. However, this linkage with research station is only one of several programmes devised to upgrade the resource-base, such as, minor irrigation, supply of farm implements and livestock with subsidised loans. In view of the extremely deficient resource-base of the farmers in dry zones, this resource transfer approach is an added dimension to the new technology and make it an integrated development effort.

The AICRPDA started operating in 1970-71 at 13 locations, later on extended to 24 centres and also linked up with pilot projects. One such project is located in the semi-arid tract of Bijapur district, Karnataka State. The research station of the project is located at about five kms. away from Bijapur. The pilot development project commenced its operation in the year 1971-72, in a watershed area covering 8,000 hectares and comprising five villages. These villages are approachable from Bijapur at a distance varying from 16 to 22 kms. on Bijapur-Solapur section of N.H.13

Broadly speaking, the present study makes an attempt to evaluate, inter alia, the functioning and performance in the first six years of Integrated Dry Land Agricultural Development Project (IDLADP) in Bijapur; the level of participation and reaction of participants in regard to various techniques and schemes and the efficacy of the individual programmes on participant farmers.

The secondary source of material for the report has been obtained from the official records of the IDLAD Project, Bijapur. It is used for bringing out the project formulations and official version of the performance of the project. On the other hand, the data directly obtained from the sample farmers, through field investigation conducted during the year 1978 provide the primary source of material. In view of almost all the farmers deemed to have come under the

contour bunding programme as participants of the project area, the selection of non-participants has been possible only from outside the project jurisdiction. In the project area enveloping five villages, the sample has been drawn in such a way as to include a sizeable number of participants receiving project assistance for each of the major category of schemes. The schemes in operation since the inception and under the consideration are: (i) land improvement works other than the general contour bunding, (ii) water harvesting measure, (iii) minor irrigation, (iv) supply of improved farm implements and machinery and (v) supply of modern agricultural inputs. In all, 68 participants are selected from the project area. However, the sample farmers are not mutually exclusive with regard to individual schemes as most of the participants are the recipients of more than one category of project assistance. Nevertheless, a sizeable number of participants is available for each of the schemes for any meaningful assessment.

Also selected on sample basis are 30 non-participants from Shirnala, a village in the close vicinity and situated just outside the project jurisdiction. This control village, for all practical purposes, shares the same agro-climatic characteristics as are prevalent in the project area. This data from the control farmers (non-participants) are gathered with a view to provide comparison and thereby facilitate the assessment of the relative superiority and economic benefits accruing to the participants in the project schemes.

The report consists of seven chapters in all. The present introductory chapter is followed by the one dealing with the general features of the project area and the agricultural situation prior to the introduction of the I.D.L.A.D. Project. Chapter III brings out the salient features of the schemes formulated and the official version of the performance

of the Project since its inception. In Chapter IV are dealt some characteristics of the selected farmers from Project area as well as, control village to provide background information. The level of participation by the project sample farmers, nature of assistance received under each category of major schemes and participants' experiences and reactions are treated in Chapter V. In Chapter VI, an attempt is made to assess the performance of the participants and the same is compared with that of the control farmers. Lastly, the Chapter VII concluded the study by making some broad observations and tentative suggestions.

CHAPTER II

GENERAL FEATURES OF THE SUBJECT AREA

The present chapter deals with the relevant details concerning the location, topography and infra-structure of the project area and the general pattern of the farm economy before the introduction of the Scheme. The materials presented here are culled from the official records made available to us by the Project authorities.

The Integrated Dry Land Agricultural Development Project is located about 16 kilometers from Bijapur Town on the National Highway No. 13 leading to Solapur. The entire project area lies in Bijapur taluk and consists of five villages, namely, Kamal, Arakeri, Hakanapur, Tidagundi and Ganaki. The area lies at an elevation ranging from 1750' to 1850' above the mean sea level.

The topography of the area is generally undulating with the slope of the area being somewhat complex. Major area of the project is sloping west to east and sub-slopes are usually from south-west to north-east direction. The surface drainage is moderately slow. In shallow soils the internal drainage is impeded with calcium carbonate layer or with hard rock. Erosion is severe due to adverse climatic conditions and uneven topography of the land. This area has been subjected to both sheet and gully erosion. The project area being a semi-arid one, the natural vegetation is represented by a few types like tamarind, neem, babul, thorny shrubs and cacti. No reserve forest exists in this area.

Agro-Climatic Conditions

The Project area is situated in the heart of dry zone of Northern Karnataka State. The mean annual rain fall is 550 mm. The rainfall is bimodal in nature. This district

enjoys both south-west as well as north-east monsoons but, the distribution is most erratic and uncertain. About 50 mm. rainfall is in summer months of March to May but, practically is of no use for crop production as it evaporates quickly due to high temperature. About 265 mm. rainfall is from June to August and about 240 mm. from September to October. The Kharif crops suffer very much on account of uncertain rains coupled with long drought spell of four to six weeks and high velocity wind. The rainfall data of last 65 years reveal that in a five-year crop cycle, one year is severe drought, two years are sub-normal, one year is normal and one year is above normal.

The soils of the project area are grouped with following series.

- (a) Shallow with mostly dark yellowish brown to dark brown colour. The surface structure is silty loam.
- (b) Shallow with mostly yellowish brown to dark brown in colour on the surface. The surface structure is mostly clay loam to clay.
- (c) Deep soils with mostly very dark gray to dark brown in colour, the surface structure being silty clay loam to clay loam.
- (d) Very deep soils mostly dark gray to dark grayish brown, the surface structure being silty clay loam to clay.
- (e) Moderately deep soils with mostly very dark grayish brown to brown in colour, the structure being mostly clay loam.

The land capability classes assigned to the different survey numbers in the project area indicate erosion hazard and limitations such as alkalinity. Broadly speaking, among the three soil types existing in the project area, the sandy loam accounts for nearly 50 per cent, the clay loam and silt loam account for 34 per cent and 16 per cent respectively.

The soils are derived from basic Deccan rocks. About 65 per cent of the soils are shallow. In view of the slopy

nature of the landscape and the undulations forming alternate ridges and gullies, about 60 per cent of the project area is subjected to moderate to severe erosion. This occurs as a result of intensive precipitations during rainy days even though the total rainfall is scanty. Besides the erosion hazards, the soils have been depleted of nutrients owing to traditional method of crop raising without proper manuring.

General Features and Infra-structure Facilities

The area coming under the Integrated Dry Land Agriculture Development Project, Bijapur, belongs to the revenue jurisdiction of five villages, namely, Kannal, Arakeri, Makanapur, Tidagundi and Gunaki. The total geographical area of the project villages is 12,449 hectares. The combined population of the project area stood at 10,170 during the year 1975-76. Four out of five villages may be regarded as small to medium in size, the population varying between a little under one thousand and a little over two thousands. Arakeri is, by far, the largest of the five with a population around 4,600. The following gives the population of the villages covered by the project.

<u>Village</u>	<u>Population</u>
(a) Kannal	1,274
(b) Arakeri	4,588
(c) Makanapur	2,254
(d) Tidagundi	977
(e) Gunaki	1,077
Total	<u>10,170</u>

Land Utilization

The broad land use pattern reveals that a very high proportion of total geographical area of the project comes under cultivable land. Out of the total geographical area

of 12,449 hectares, the area available for cultivation (including cultivable waste, other fallows and current fallows) is 11,678 hectares forming 93.81 per cent. The total cultivable land includes 1,210 hectares of irrigable land. As there are no forests and hillocks, the area not available for cultivation measures only 771 hectares. This area is largely made up of village sites, roads, tank and streams.

Pattern of Ownership and Cultivated Holdings

In all, there are 938 ownership holdings in the entire project area. Relatively speaking, the broad pattern reveals that the smaller holdings up to 4.00 hectares are lesser than medium and larger holdings. About 40 per cent of the total holdings fall in the size group of ^{6.01}~~4.01~~ hectares and above. Another 20 per cent of holdings come under 4.01 - 6.00 hectare size group. The size holdings regarded as small and marginal (2.01 - 4.00 and up to 2.00 hectare groups) account for 23.7 per cent and 17.7 per cent respectively. The pattern is more or less similar in all the villages except Kannel where smaller holdings are relatively greater in proportion than the larger holdings. The relevant details of the distribution of land owners in the project villages according to size of owned holdings are shown in Table 2.1.

The data available in respect of distribution of operational holdings pertain up to the year of 1975-76 when the Project covered the area of only 745 beneficiary cultivators. Nevertheless, the broad pattern indicates that nearly two-thirds of the operational holdings are of medium and large sized ones. The smaller holdings up to the size groups of 4.00 hectares account for only about 37 per cent of the total holdings coming under the operation of Project area. The distribution of operational holdings according to broad size groups is shown in Table 2.2.

**Table 2.f: Distribution of Land Owners in the Project Villages
According to Size of Owned Holding**

Size of Owned Land (in hectares)	Kannal No. (%)	Arakeri No. (%)	Makanapur No. (%)	Tidagundi No. (%)	Gunaki No. (%)	Total Project No. (%)
upto 2.00	58 (32.40)	22 (14.97)	21 (11.35)	42 (13.91)	23 (18.40)	166 (17.70)
2.01-4.00	41 (22.90)	21 (14.28)	41 (22.16)	90 (29.80)	30 (24.00)	223 (23.77)
4.01-6.00	29 (16.20)	32 (21.77)	47 (25.41)	49 (16.23)	23 (18.40)	180 (19.19)
6.01 and above	51 (28.50)	72 (48.98)	76 (41.08)	121 (40.01)	49 (39.20)	369 (39.34)
All Size Groups	179 (100)	147 (100)	185 (100)	302 (100)	125 (100)	938 (100)

Table 2.2 : Distribution of Operational Holdings According to Broad Size Groups (1975-76)

Size of Operational Holdings (in hectares)	No. of Holdings	As per cent to total
Up to 2.00	126	16.91
2.01 - 4.00	152	20.40
4.01 - 10.00	283	37.99
10.01 - 30.00	170	22.62
30.01 and above	14	1.88
Total	745	100

Crop Pattern

The irrigable area being less than three per cent of the total cultivated area, the crops are very few in number and almost entirely dependent on the rainfall conditions. Although the total precipitations are scanty, the area receives rains in both kharif and rabi seasons. Generally the area sown in rabi season is greater than that of kharif. Among the major crops, bajra, groundnut and pulses in kharif and jowar and cotton in rabi season are quite prominent. During the year 1976-77 these crops accounted for 96 per cent and 94 per cent in kharif and rabi seasons respectively. The following figures provide some general idea about the crop pattern in the project area.

Area under different crops (1976-77)

<u>Kharif</u>	<u>Area (ha)</u>	<u>Rabi</u>	<u>Area (ha)</u>
Bajra	1,210	Jowar	2,240
Groundnut	400	Cotton	660
pulses	300	Safflower	150
Others	90	Others	50
Total:	2,000		3,100

Irrigation and Infra-structure

The entire project area is characterized by the absence of any river flowing nearby. The few streams that pass through the area are mostly non-perennial except the one flowing through Makanapur and Tidagundi village areas. There is one tank near Makanapur village and its water is used for both irrigation and other purposes. Majority of the people in the Project area have to depend upon wells for agricultural as well as domestic purposes. The depth of the well water ranges from 8 to 12 metres.

Regarding the facilities of infra-structure in the project area, each of the five villages is having elementary school, postal services and drinking water wells. Besides, electricity is now available in all these villages. However, no medical and telegraphic facilities are available in any of the villages. The Project area is served by four service cooperative societies. For marketing and other needs the villages are dependent upon Bijapur town approachable by all weather motorable roads. However, all the villages in the Project area are well served by the road transport net work.

Agricultural Situation Before the Scheme

Some aspects of the agricultural situation in the Project area prior to introduction of the Integrated Dry Land Agricultural Development Scheme are mentioned here by way of the background information. Broadly speaking, agriculture being the predominant source of livelihood, the situation was entirely at the mercy of annual and seasonal peculiarities of rainfall. The irrigable area formed a meagre 3.45 per cent of the total cultivable area and as such the farming could be regarded as entirely dependent on seasonal precipitations. Although the rainfall has been erratic, untimely and not wholly dependable, the only saving

feature being that it is received by both the monsoons. Consequently, both kharif and rabi crops were raised on shallow and medium soils respectively. The important kharif crops were local variety of bajra, groundnut, pulses and sesamum. The main rabi crops were local jowar, cotton, and to a small extent, wheat and gram.

The agronomic practices also left much to be desired. The shallow soils of kharif crops were ploughed only once and harvested two to three times. Often the kharif crop was grown as mixed crop, with green gram, red gram, etc. On the other hand, rabi crops were raised on somewhat deeper soils, usually as an entire crop but some times jowar being mixed with safflower. Practically, no rotation was strictly followed either in kharif or rabi crops. No manure was applied to farms except in a few cases of irrigated land. Application of fertilizers and use of improved seeds were almost entirely absent even in the case of irrigated lands. Similar was the case in respect of any control measure for pests and diseases.

Under these circumstances, the yield rates of this area were quite low compared to district averages. It was also expected by most of the farmers that yields were declining due to lack of soil and moisture conservation, crop rotation and improved agronomic practices etc. For instance, the average yields of bajara and jowar were about 50 kg. and 25 kg. per acre respectively. With these poor yield of main crops most of the farmers were dependant on services of hired bullocks rather than maintaining their own. Thus resulting in some agricultural operations being conducted out of optimum time. It was estimated that the average cultivable area per pair of bullocks was as high as 90 acres, reflecting on the degree of timely operations.

Prior to the inception of the scheme, there were only 280 wells in existence. The irrigable area under these wells was about 300 hectares. Besides, the command area under the tank was around 130 hectares. There were hardly 54 pump sets in operation. In short, the farming in the project area was almost entirely carried out on traditional lines.

CHAPTER III

SALIENT FEATURES AND PERFORMANCE OF THE PROJECT

The present chapter broadly deals with the various aspects of the I.D.L.A. Project (Bijapur), such as, establishment of the official agency in-charge of the project, the important dry land techniques and schemes adopted and a general review of the performance of the Project since inception.

This centrally sponsored Project in Bijapur district has been functioning since the year 1971-72. The Research Station connected with the Project is located at about five kilometers away from Bijapur. The Headquarters of the Development Project is located at Bijapur Town itself.

The Project establishment comes under the operational control of the Department of Agriculture, Government of Karnataka. The full complement of the staff comprising 15 persons is headed by an agronomist, holding the rank of Deputy Director. This Project Officer is assisted by three Assistant Directors, each a specialist in soil and water management, Plant Protection and Soil Conservation. Besides, there are two Assistant Agricultural Officers and one Statistical Assistant based at the Headquarters. There are four Field Assistants specifically required to operate at the village level. The remaining seven members of the staff are made up by four in charge of office administration, a jeep driver and two peons. In addition to the adequate staff, the Project establishment is also well equipped with a jeep, a well-stocked store of modern farm implements and not to mention the machine tractor services available from the Department of Soil Conservation whenever required. Although the Programme was launched in the year 1971-72,

for some reasons, the actual commencement of the project work was delayed by about six months.

Techniques and Promotion of the Schemes

The important dry land techniques recommended and adopted in the project along with the scheme of subsidies offered to the beneficiaries by way of incentives are mentioned here. Broadly speaking, the techniques are grouped under the following major categories.

- (1) Permanent Land Development measures covering various soil conservation and land improvement works.
- (2) Water harvesting measures comprising farm ponds and check dams.
- (3) Minor Irrigation covering wells, pump sets, pipelines etc
- (4) Supply of agricultural inputs.
- (5) Supply of modern farm implements and machinery.
- (6) Agronomic Techniques and extension services.
- (7) Animal Husbandry Schemes which are provided only to the weaker sections like small and marginal farmers.

In the following are presented the relevant details concerning the nature of the schemes, incentives offered and physical and financial progress achieved in the entire Project area in respect of each of the above mentioned categories of techniques.

(1) Permanent Land Development Works

(a) Soil Conservation Measures:

The schemes under this programme consist of contour bunding, land levelling and such other permanent works relating to soil conservation measures. The nature of technique adopted is to construct contour bunds with a section of 12 sq. ft. in medium soils for checking soil erosion and ensuring moisture conservation. Land levelling is done within two contour bunds with the help of tractor drawn

levellers or with bullock drawn implements to fill up the local depressions to have a uniform soaking of rain as well as to avoid wastage under water stagnation for longer duration. However, the lands are not dead levelled by too much cutting and filling. The approach of technique is to make less scraping by layout of contour border strip and compartment levelling wherever necessary.

The actual work of soil conservation measures is entrusted to the Department of Soil Conservation in view of its technical competence and the requirement of earthwork machinery for bunding, levelling, deep ploughing, etc. However, the coverage of area under this programme is phased out and each year a parcel of about 800 hectares of land is taken up for the operation. The cost of soil conservation operation is worked out at Rs. 200/- per acre. This cost, less subsidy, is to be recovered from the beneficiary land owner in the project. The subsidy offered by way of incentive is 25 per cent of the cost.

The total area proposed to be covered in the entire jurisdiction of the project is 8,000 hectares. The annual target works out to a parcel of 800 hectares. Up to the year 1977-78, the programme has covered 5,600 hectares. In the first six years the progress of physical works was rather erratic. The following figures obtained from the progress report give the general picture of the physical achievement in respect of soil conservation works.

Year	Contour bunding (in ha.)	Land Levelling (in ha.)	Deep Ploughing (in ha.)
1971-72	622	-	-
72-73	377	36	975
73-74	1,412	216	-
74-75	990	140	245
75-76	517	245	425
76-77	917	135	500

(2) Water Harvesting Measures

The water harvesting technique consists of two types of schemes, namely, (a) Check dams across the public streams or rivulets, and, (b) farm ponds in the private lands. The check dam is no more than a small bund or barrage that is intended to impound water during monsoon and create a little reservoir mainly for percolation effect. So far the Project authorities have built only three such dams in the project area. However, it is mainly in respect of farm ponds that the Project authorities have gone ahead in a big way to construct 44 ponds in the first five years of the programme and discontinued the scheme subsequently. In the following we give the official version of the scheme relating to farm ponds.

Farm Ponds

The technique of water harvesting by means of farm ponds in the watershed zone has been conceived by the scientists in order to see that every drop of rain water is utilised to the maximum possible extent for crop production. Since the region receives its monsoon mostly in the form of heavy precipitations, it is estimated that more than 20 per cent of the rain water is wasted in the form of surface run off. This causes not only the wastage of water itself but also damages the soil structure and texture. Besides, there is loss of top soil fertility due to erosion hazard.

In view of the above, the dry land experts have recommended construction of a series of ponds in the black soil area to fulfill the following objectives:

- (i) To store the excess run off for the use of protective irrigation in the critical period of the crop growth.
- (ii) To reduce the run off velocity and thus checking the soil erosion and gully formation.

(iii) To reduce the risk involved in sinking a well in the black soil as there is no certainty of getting water in moderate depth and unpaved walls that are subjected to caving in. Even if water is found, its quality is usually blackish. Besides, land to be irrigated is not suitable for perennial irrigation.

(iv) To achieve the increase in the water table indirectly which will benefit the wells in the vicinity of farm ponds.

The design of the farm pond provides for constructing a large pit measuring 100' x 100' at the top and circular in shape. The depth, however, varies from 10 to 20 feet. In a majority of the cases, the depth is around 15 feet. The side walls of the ponds are not paved or lined up to prevent any leaking. Generally a pond resembles a crater in appearance, and unlike a well, the circumference tapers down gradually toward the bottom, somewhat like a cone.

The ponds are located along the water shed where the natural run off of the rain water is maximum and the catchment area generally extends from 20 to 50 hectares. The ponds in the upper reaches of the water shed fill up first and the spillover and other run offs are collected in the ponds further down. It is also estimated that the water thus collected in ponds and after due percolation and other losses, could adequately give protective irrigation to standing crops to the extent of two hectares.

Initially, in promoting this scheme, the Project authorities have had to meet with lukewarm response from the farmers. The objections on the part of the farmers were mainly based on their fear of losing some portion of their cultivable land, uncertainty about the collection of water in the pond, especially a considerable portion of the same being available in the winter season so as to be adequately useful for protective irrigation for the standing crops.

Besides, the farmers have had to think of the lifting device to avail of the water, if any, from the pond. Eventually, the authorities succeeded in breaking the resistance by offering 100 per cent subsidy and promise of hiring out the project owned diesel pump sets on concessional rates. In short, the beneficiary farmer has merely to make available the required extent of land to the project authorities who would construct the pond free of cost to the land owner.

Regarding the progress of the water harvesting measures, 46 farm ponds and three small check dams have been constructed, at a total cost of Rs. 216,300, in the first four years of the project. Two of these ponds were completed in 1/71-72, 31 in 1/72-73, ten ponds during 1/73-74 and only one in 1973-74. Since then, the authorities have discontinued the construction of farm ponds and concentrating only on building check dams.

(3) Minor Irrigation

This measure covers renovation of old wells, sinking of new wells, electric pump sets, pipe lines and sprinkler sets. In point of fact, this may not be strictly regarded as a technique for improvement of dry farming. It is merely a measure aimed at enhancing the much needed resource-base of the farmer by converting a part of the predominant dry holding into a better endowed land which can raise crops needing more water input. Also it can create an opportunity to cultivate the land more than one season during a year. Before the programme was launched, the project area had 200 wells, capable of giving protective irrigation to nearly 300 hectares of land. The average command area per well was only about 1.47 hectares. The objective of the minor irrigation measure is to increase the total irrigable area by deepening the old wells and sinking new wells wherever feasible. Besides, it also provided for energisation of wells and laying of pipe lines.

To promote this campaign, the Project authorities have been offering financial incentive and technical guidance to some extent. The physical works are to be carried out by the beneficiary farmers themselves. The subsidy offered by the Project amounts to 50 per cent of the total cost to the farmers owning up to ten acres of land and 25 per cent to those owning more than 10 acres. Farmers seeking loans under this scheme have to approach either Primary Land Development Bank, Bijapur or any of the commercial banks. The Project authorities have been providing farmers the technical guidance needed for institutional loans, selection of the site for sinking wells, purchase of pump sets and accessories.

The following gives the progress achieved in the project area up to the year 1976-77.

Items of Minor Irrigation	Physical Achievements in						Total
	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	
(a) New wells dug. (No.)	3	32	25	10	11	81	
(b) Renovation of old wells (No.)	15	55	50	15	6	141	
(c) Pump sets installed (No.)	9	42	55	21	25	159	
(d) Pipe lines (No.)	-	-	6	7	1	14	
(e) Sprinkler sets (No.)	2	-	-	-	-	2	

The overall financial achievement up to the year 1976-77 for the above schemes of minor irrigation ~~amounts~~ amounts to Rs. 2.212 lakhs by way of Project subsidies and ~~Rs.~~ Rs. 6.768 lakhs in the form of loans arranged through the P.L.D. and scheduled banks.

(b) Scheme for Promoting Modern Farm Inputs

The objective of the present scheme is to promote the use of modern farm inputs, namely, improved and high yielding

variety seeds, fertilisers and plant protection chemicals. This has to be viewed in the context of almost total absence of such a practice prevailing in the Project area prior to the introduction of the I.D.I.A.D. programmes. Even in the irrigated patches, only a negligible number of farmers had been credited with using modern inputs. This scheme, however, is one of the several measures adopted in the Project area so as to enable the farmers to benefit from the available technologies.

Promotion of this scheme is being achieved by offering financial incentives to project farmers using improved or hybrid seeds, fertilisers and plant protection chemicals. The farmers are free to choose any one or combination of the above three inputs and whatever the quantity they require. However, the subsidy provided is restricted to 50 per cent in the first year the farmer avails of it and 25 per cent of the cost of input in the subsequent years for the same farmer. This system of higher rate of subsidy in the first try is supposed to act as a greater inducement to break the ice and later the continuation of subsidy at a lesser rate is to ensure the perpetuation of the farmers' reliance on the practice. The response has been fairly good and a considerable proportion of the farmers has been repeatedly utilising this offer.

The following gives the annual physical achievements during the first six years of the Project in respect of seeds, fertilisers and pesticides.

	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77
1. <u>Improved/Hybrid Seeds</u>						
(a) Quantity Distributed (Kgs)	-	7553	19416	955	38650	82415
(b) Farmers Benefitted (No.)	-	190	375	56	600	950
(c) Area Covered (Acres)	-	1390	4023	800	4200	12750
2. <u>Fertilizers</u>						
(a) Quantity Distributed (Tonne)	7.05	81.59	135.63	125.57	169.00	500.00
(b) Farmers Benefitted (No.)	15	190	468	235	777	950
(c) Area Covered (Acres)	90	2959	2370	2015	N.A.	4562
3. <u>P.P. Chemicals</u>						
(a) Liquids (Litres)	6.4	-	39	178	450	304
(b) Dust (Kgs.)	-	-	2944	2440	5650	14300
(c) Area Benefitted (Acres)	N.A.	-	202	470	1295	3485

In terms of financial achievement the overall expenditure on all the items of inputs, up to the year 1976-77, amounts to Rs. 399,000 by way of loans and Rs. 208,800 as subsidies provided to the beneficiaries.

(5) Improved Farm Implements and Machinery

The farmers in the project area had not been using improved implements prior to the introduction of I.D.L.A.D. Programme. Even the old type iron plough was rarely seen in the area. The dry land strategy considers that the use of modern implements is as important as other techniques to carry out the improvements in agronomic and other farm practices. This being the case, the Project authorities have been campaigning for the promotion of use of such implements. The farmers intending to benefit from this scheme are given 50 per cent subsidy if they come forward to purchase the implements. In order to help those farmers who are not in a position to buy any or all types of implements, the Project authorities have come to own a large number of implements and machinery which are hired out to needy people. However, no hire charges are levied on several implements and the entire expenditure is deemed as grants to the Project.

The implements and machinery, possessed by the Project for almost free hire service, make an assortment of varied types and descriptions. In all, 418 pieces of implements are available to farmers on first come first service basis. In the following are given the broad categorywise number of implements and machinery purchased for the Project stores up to the year 1976-77.

Major Type	No. of Sub-types	No. of pieces
(a) Ploughs	3	165
(b) Seed and Fertiliser Drills	4	75
(c) Hoes	5	59
(d) Adjustable Ridger	1	41
(e) Band Formers	2	23
(f) Scrapers (Steel & Duck)	2	20
(g) Threshing Stone Rollers	1	14
(h) Seed Dressing Drums	1	10
(i) Sprayers and Dusters	5	9
(j) Diesel Pump Sets	1	2
	<u>25</u>	<u>418</u>

About 43 per cent of the total number of implements have been acquired during the year 1973-74. In the last two years (1975-76 and 1976-77) another 32 per cent have been added to the store. The diesel pump sets are meant for hiring out to those requiring the equipment for pumping water from farm ponds. In all, about Rs. 131,000 has been incurred on purchasing the implements and machinery.

(6) Agronomic Techniques and Extension

The techniques included in this category, by and large, cover various agronomic practices, crop production strategy and agricultural extension activities. The techniques are quite important by themselves and also act as supplementary to the measures that primarily aim at improving the resource-base. The efforts of permanent soil conservation, water harvesting, modern inputs and such other measures would not fully achieve the desired objectives unless they are supported by agronomic and crop production techniques as well as demonstration and training of farmers. In the light of cultivation practices prevailing in the area prior to

introduction of the programme, this category of techniques assumes considerable importance.

Broadly speaking, the recommendations to be adopted under this category of techniques cover quite a number of improved practices specially devised to suit the local conditions such as the terrain, soil types, rainfall etc. The more important among them recommended techniques, in brief, are noted below.

- (i) Deep ploughing once in three years or one-third of land every year and also digging to eradicate perennial weeds.
- (ii) Three to four harrowings to be carried out across the slope and along the contour to prevent run off and soil erosion and thereby to increase the intake of rain in the soil.
- (iii) Application of farm yard manure to the ploughed land and mix it well with the soil.
- (iv) Use of fertilizers through deep placement seed-cum-fertilizer drill up to 10 cms. depth where moisture is available.
- (v) Flat and furrow methods of sowing and proper seed rates and spacing.
- (vi) Improved method $\frac{A}{A}$ of interculturing to postpone early soil cracking and to prevent lodging.
- (vii) Crop protection measures.
- (viii) Suitable crops and crop mix to be grown during kharif and rabi seasons depending upon time of rainfall and type of the soil.
- (ix) Treatment of seeds with fungicide and insecticide.
- (x) Advancing sowing dates of rabi crops.
- (xi) Extension activities covering crop demonstrations on the pilots of beneficiary farmers and training of farmers by arranging training camps, study tours, field days and super digest compost training.

In order to promote these measures, the Project authorities have been offering subsidies at 100 per cent of the cost. The subsidies are specifically applicable to making available technical personnel of the project for advisory work, expenditure on demonstration plots up to Rs. 100/- per acre, foliar spraying and various types of farmers' training.

Regarding the progress achieved in the category, it may be noted that most of the techniques pertaining to agronomic practices and crop production strategy are to be carried out by the farmers on their own. However, the project personnel have been providing mostly the technical advice. It is mainly in respect of crop demonstration and training programme for farmers that the progress in physical as well as financial terms is available. In the case of demonstration campaign, the usual practice is to select one acre plots in different holdings in the project area, provide all the necessary material inputs at the project's cost and carry out the task under the supervision of technical personnel. Only in a negligible number of cases, particularly in summer season, there is a practice of selecting half an acre plots for the demonstration. Beginning from the rabi season of 1972-73, the Project has laid out 327 demonstration plots up to the year 1976-77. The information on seasonal number of demonstrations conducted during these years is given below.

Year	No. of Demonstrations during the Season			Total
	Rabi	Kharif	Summer	
1972-73	-	22	-	22
1973-74	38	54	6	98
1974-75	30	37	6	73
1975-76	35	35	-	70
1976-77	31	33	-	64
Total	134	181	12	327

The crops selected for demonstration are quite varied and include all the improved and high yielding varieties that are recommended to the farmers under the crop production strategy. The information given below refers to cropwise demonstrations undertaken during the years 1972-73 - 1976-77.

Crop / Crop Mix (Variety)	No. of Demonstration Plots laid in			Total
	Kharif	Post	Summer	
(1) Jowar (Mugati)	-	88	-	88
(2) Hybrid Jowar (CMI - 1)	-	2	5	7
(3) Hybrid Bajra (H.B. - 3)	12	-	1	13
(4) Other Cereals (Sateria - Wheat)	11	9	-	20
(5) Pulses (Mung, Tur, Gram)	21	8	-	29
(6) Groundnut (S. 206)	27	-	4	31
(7) Cotton (Jyodhar)	-	14	-	14
(8) Safflower (7-13-3)	-	51	-	51
(9) Sunflower (Se. 6615)	17	6	2	25
(10) Castor (H.H - 1)	12	-	-	12
(11) Mustard	-	3	-	3
(12) Hybrid Bajra with Tur	22	-	-	22
(13) Groundnut with Cotton	8	-	-	8
(14) Sateria with Cotton	4	-	-	4
Total	134	181	12	327

The project authorities claim that the demonstration work undertaken on the plots of the cultivators has been a remarkable success in convincing the farmers the advantages of modern farm inputs, agronomic practices and other techniques recommended to them. The performance of the demonstration plots has been very impressive in terms of gross yields as well as high returns. It is vastly superior

to that of control plots observed by the Project personnel. In terms of average net profit per hectare^{as} derived in different years almost all the crops taken on demonstration plots have performed remarkably well. This may be seen by the performance of those major crops which have been raised for four to five years continuously and in a fairly substantial number of plots. Thus from the information available for 15 crops in project records three kharif and three rabi crops have been considered here on account of their being amenable to continuous observation for four to five years and the fact these together account for nearly 70 per cent of the total plots laid out for demonstration during the five-year period. The average net profit per hectare derived in different years in respect of main demonstration crops is shown below.

Crop	Total No. of Plots	Average Net Profit Per Hectare (in Rs.)					Avera for a years
		1972-	1973-	1974-	1975-	1976-	
		73	74	75	76	77	
1. Kharif							
a) Hybrid Bajra & Tur	22	-	823	623	1142	577	791
b) Sun flower	17	-	808	375	779	509	638
c) Groundnut	27	-	366	619	700	857	636
2. Rabi							
a) Jowar	88	16	394	725	416	389	308
b) Safflower	51	75	421	475	83	773	365
c) Cotton	14	-	574	536	100	264	369

The Project authorities have also utilised the demonstration plots to convince the farmers the advantages of advancing the sowing dates of jowar and safflower during the rabi seasons. This has been achieved by sowing different

plots assigned to these crops in different weeks beginning from September 2nd week and lasting up to November 1st week during the last four rabi seasons. The average yield rates thus obtained against the sowing weeks have revealed that jowar plots sown in September 3rd week and safflower sown in October 2nd week flourished well to give the highest results.

The progress reported under the programme of farmers' training shows that 59 training camps, eight study tours, 23 study trips, 41 field days and 32 super digest compost training have been organised and conducted successfully up to the year 1976-77. As a result, 3,616 farmers in all have been trained in dry farming practices. The yearwise details (excepting field days) are as shown below.

Type of Training	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	Total
a) Training Camps	No. 1	4	10	16	16	12	59
b) Study Tours	No. -	-	2	2	2	2	8
c) Study Trips	No. -	-	4	8	6	5	23
d) Compost Training	No. -	-	3	9	16	4	32
e) Total Farmers Trained	No. 60	322	834	800	800	800	3616

The Project has incurred Rs. 49,300 towards the crop demonstration and Rs. 48,700 in respect of farmers' Training programmes during the years 1971-72 to 1976-77.

(7) Animal Husbandry Programme

This programme is restricted to only the small and marginal farmers owning land up to ten acres and landless labourers. It has been in operation only from the year 1974-75. This delay had been on account of lack of interest

shown by the financial institutions in extending the required loans. Under this programme, the beneficiaries are given 30 per cent subsidy to buy she-buffaloes or sheep units. Since 1974-75, Syndicate, Canara and Punjab National Banks have been advancing loans to the farmers. During the three-year period, 101 buffaloes and 10 sheep units have been distributed and a sum of Rs. 40,300 has been shown as subsidy released to 34 beneficiaries.

Level of Response

According to the Project authorities the farmers' response to various schemes has been fairly satisfactory. While almost all the farmers have readily agreed to participate in general contour bunding works, it is in the case of acceptance of other dry land techniques and resource improvement measures that the response is gradual and in varied degrees. It is quite understandable that every farmer is not able to accept every scheme like minor irrigation, water harvesting, animal husbandry and such other measures owing to physical, financial and technical constraints. Nevertheless, the Project authorities feel that the subsidy scheme operating as incentive and backed by the extension work, they have succeeded in a fairly good measure in convincing the farmers the advantages of the new techniques. By and large, most of the farmers have been covered by the Soil Conservation measure like general contour bunding works and a considerable number of farmers from the work of crop demonstration conducted on their plots. Apart from these two, as well as farmers' training programmes, the campaign for agricultural inputs, minor irrigation, farm machinery and other land development works has achieved a satisfactory level of participation.

A general idea about the level of response in regard to these measures may be obtained from the data as shown below.

Major Category of Techniques	No. of Farmers during the years				Total
	1971-74	1974-75	1975-76	1976-77	
1) Land Improvement	93	37	3	11	144
2) Minor Irrigation	86	70	22	34	212
3) Water Harvesting(Pond)	43	1	-	-	44
4) Farm Machinery	52	73	33	42	199
5) Farm Inputs	252	43	54	95	444
6) Animal Husbandry	-	20	-	14	34

The above account includes some farmers who have availed of more than one category of benefits and also those who have obtained subsidies for the same category more than once in different years. In the latter case, the examples include different items of assistance being obtained at subsequent periods - assistance for well and pump set under minor irrigation, different kinds of farm machinery, agricultural inputs and so on and so forth.

A considerable number of farmers are seen lifting two or three different categories of benefits. However, the cases of four to five benefits are not many. The information given below reveals the extent of more than one category of benefits availed of by the project farmers.

No. of Project Aid used	No. of Farmers
Used one category of Aids	346
" two categories "	172
" three " "	81
" four " "	49
" five " "	6
Total	654

Regarding the repeated use of the same category of benefits, a fairly good number has done twice and the number repeating it on third occasion is rather meagre. The relevant figures are as given below.

Category of Benefits	No. of Times Aid Received		
	One	Two	Three
1. Land Development	122	21	1
2. Water Harvesting	46	-	-
3. Minor Irrigation	179	33	-
4. Farm Machinery	178	17	4
5. Farm Inputs	416	26	2
6. Animal Husbandry	34	-	-
Total	973	97	7

Finally, a broad account of the financial aspect of the Project is given here. The information available from the Project office reveals categorywise account shown under two components, namely, loan and grant. The subsidy amount paid to the farmers is regarded as grant. Similarly, the expenditure on establishment is also shown as grant. In all, a sum of Rs. 10.949 lakhs is distributed as subsidy and Rs. 6.445 lakhs is shown as expenditure on establishment. The establishment accounts for the single largest item of expenditure under the grants and forms 37.5 per cent of the total grants incurred in the first six years of the Project. The overall expenditure involved in financial achievement, including Rs. 17.113 lakhs during the years 1971-72 to 1976-77. The details are as given below.

Item of Expenditure	Loan	Grant/ Subsidy	Total
1. Permanent Works	4,45,900	1,48,400	5,94,300
2. Land Development	43,000	31,400	74,400
3. Water Harvesting (Ponds and check dams)	-	2,16,200	2,16,200
4. Minor Irrigation	6,76,800	2,21,200	8,98,000
5. Farm Machinery & Implements	-	1,30,600	1,30,600
6. Farm Inputs	3,99,000	2,08,800	6,07,800
7. Demonstrations	-	49,300	49,300
8. Extension (Farmers' Training)	-	48,700	48,700
9. Animal Husbandry	1,46,600	40,300	1,86,900
10. Establishment	-	6,44,500	6,44,500
Total	17,11,300	17,39,400	34,50,700

CHAPTER IV

GENERAL CHARACTERISTICS OF SELECTED FARMERS

The present chapter gives a brief account of the general characteristics of the farmers selected from among the beneficiaries in the Project area, as well as those selected from outside the Project to serve the purpose of control. Although limited in scope, the chapter includes such background information as patterns of land holding, land utilization, seasonwise crops raised, caste and literacy, family size, earners and incomes. The data refer to the agricultural year 1977-78.

Land Holding and Land Utilization

From the point of view of size of ownership holdings, the selected cultivators from the Project area, as well as the control village reflect the pattern generally available in dry zones of the district. It may also be mentioned here that a considerable proportion of the ownership holdings in the predominantly semi-arid areas of Bijapur tends to be larger in size than is the case in the fertile areas of the State. Among the selected farmers about 27 per cent of the Project and 17 per cent of the control areas are seen owning holdings above 25 acres in size. Those owning up to 10 acres (small holdings) form roughly 41 per cent and 43 per cent of the selected farmers, from the Project and control areas respectively. The average size of owned holding works out to 13.30 acres in the case of Project participants and 15.66 acres in respect of control farmers. The data showing land owned, cultivated and other relevant details of land utilisation are set in Table 4.1 (Project farmers) and Table 4.2 (control farmers).

Table 4.1: Land Utilisation Pattern of the Project Sample

Size of Cultivated Holding	No. of Farmers	Land Owned			Leased in			(Area in Acres) Total Cultivated		
		Irrigated	Non Irrigated	Total	Irrigated	Non Irrigated	Total	Irrigated	Non Irrigated	Total
Upto 5 Acres	12	20.60	16.00	36.00	-	-	-	20.60	16.00	36.60
5.01-10.00	16	37.45	90.75	128.20	-	4.00	4.00	37.45	94.75	132.20
10.01-15.00	12	30.15	95.82	125.97	-	18.00	18.00	30.15	113.82	143.97
15.01-25.00	10	34.50	153.43	187.93	-	8.00	8.00	34.50	161.43	195.93
25.01-50.00	14	63.50	454.05	517.55	-	-	-	63.50	454.05	517.55
50.01 and above	4	14.75	233.50	248.25	-	-	-	14.75	233.50	248.25
Total	68	200.95	1043.55	1244.50	-	30.00	30.00	200.95	1073.55	1274.50

Table 4.1: (Contd)

Size of Cultivated Holding	No. of Farmers	(Area in Acres)									
		Fallow	Net Cultivated			Current Fallow	Net Sown Area	Area Sown More Than Once	Gross Cropped Area		
			Irrigated	Non Irrigated	Total				Irrigated	Non Irrigated	Total
Upto 5 Acres	12	1.05	20.60	14.95	35.55	-	35.55	23.05	40.60	18.00	58.60
5.01-10.00	16	7.95	37.45	86.80	124.25	1.68	122.57	73.15	80.60	115.12	195.72
10.01-15.00	12	3.05	30.15	110.77	140.92	1.99	138.93	60.00	63.50	135.43	198.93
15.01-25.00	10	8.48	34.50	152.95	187.45	2.00	185.45	75.00	74.00	186.45	260.45
25.01-50.00	14	14.12	63.50	439.93	503.43	12.81	490.62	170.25	125.25	535.62	660.87
50.01 and above	4	18.50	14.75	215.00	229.75	9.75	220.00	97.75	30.25	287.50	317.75
Total	68	53.15	200.95	1020.40	1221.35	28.23	1193.12	499.20	414.20	1278.12	1692.32

Table 4.2: Land Utilisation Pattern of the Selected Control Farmers

(Area in Acres)

Size of Cultivated Holding	No. of Farmers	Land Owned			Leased in*			Total Cultivated		
		Irrig- gated	Non Irrigated	Total	Irrig- gated	Non Irrigated	Total	Irrig- gated	Non Irrigated	Total
Upto 5 Acres	6	11.09	6.50	17.58	-	-	-	11.09	6.50	17.58
5.01 to 10.00	7	7.00	41.48	48.48	-	-	-	7.00	41.48	48.48
10.01 to 15.00	5	2.75	58.25	61.00	-	-	-	2.75	58.25	61.00
15.01 to 25.00	7	14.55	124.82	139.37	-	-	-	14.55	124.82	139.37
25.01 to 50.00	5	18.50	184.80	203.30	-	-	-	18.50	184.80	203.30
Total	30	53.88	415.85	469.73	-	-	-	53.88	415.85	469.73

Contd...

Table 4.2: (Contd)

Size of Cultivated Holding	No. of Farmers	(Area in Acres)									
		Fallow	Not Cultivated			Current Fallow	Net Sown Area	Area Sown More Than Once	Gross Cropped Area		
			Irrigated	Non Irrigated	Total				Irrigated	Non Irrigated	Total
Up to 5 Acres	6	-	11.08	6.50	17.58	-	17.58	15.97	23.05	10.50	33.55
5.01 to 10.00	7	1.15	7.00	40.33	47.33	-	47.33	31.32	14.00	64.65	78.65
10.01 to 15.00	5	3.90	2.75	54.35	57.10	-	57.10	26.75	5.50	78.35	83.85
15.01 to 25.00	7	11.40	14.55	113.42	127.97	-	127.97	90.55	29.10	189.42	218.52
25.01 to 50.00	5	16.80	18.50	168.00	186.50	3.00	183.50	142.50	36.00	290.00	326.00
Total	30	33.25	53.88	382.60	436.48	3.00	433.48	307.09	107.65	632.92	740.57

In conformity with the general observation, the proportion of irrigable component of the owned land is very high in the case of smaller holdings and rather quite low in that of larger holdings group. In the case of smallest holdings of both category ⁺and samples, the irrigable component forms over 35 per cent and declines considerably as the size of holding increases. At the overall sample level it forms 16.15 per cent of owned land in respect of project farms and 11.47 per cent in the case of control. The higher proportion of the irrigable component in the case of project sample is due mainly to the fact it contains a considerable number of beneficiaries of minor irrigation and water harvesting schemes.

Neither category of sample farmers has reported leasing out any portion of their land. It is only in respect of project farmers that some negligible extent of land is leased in and mostly in medium size groups. The total leased in land (30 acres) constitutes a meagre 2.35 per cent of the total cultivated land.

All types of fallow lands together constitute only 6.39 per cent and 7.72 per cent of total cultivated lands of project and control farmers respectively. As a result, the proportion of irrigated area to the net sown area works out to 16.84 per cent in the case of project sample and 12.43 per cent in the case of control.

From Tables 4.1 and 4.2, it may be seen that the area sown more than once forms 41.84 per cent and 70.84 per cent of the net sown area respectively for project and control samples. Such area coming under repeated sowing during the year is made up by irrigated lands as well as unirrigated lands to a substantial extent. In the case of project sample the crop intensity for irrigated area works out to 206. This has been possible by resorting to third cropping

during summer season in some cases. Similar index for control farms in respect of irrigated area works out to 200. On the other hand, the crop intensity for unirrigated lands works out to 129 for project farms and 167 for control farms. The unirrigated lands being sown more than once to a considerable extent is due to the peculiarity of this region in receiving both south-west and north-east monsoons. By and large the intensity of cropping is greater in the smaller holding groups than in the case in the larger holdings.

Cropping Pattern

The pattern of area under crops reveals that substantial proportions of lands are put to use in both kharif and rabi seasons, and to a small extent during summer season as well. That a very small number of crops, say, three to four, overwhelmingly dominate the cropping scene. The pattern is generally similar between project farms and control farms. The data showing seasonwise area under crops in different size groups are set in Table 4.3 (Project farms) and Table 4.4 (control farms).

The seasonwise total cropped area at the aggregate level in respect of each category of sample is summarised as under:

Season	Project Farms		Control Farms	
	(acres)	As per cent of total	Area	%
Kharif	758.10	44.40	410.25	55.40
Rabi	883.22	52.19	311.69	42.09
Summer	51.00	3.01	18.63	2.51
Total	1692.32	100.00	740.57	100.00

Table 4.3: Seasonwise Cropping Pattern According to Size of Holdings (Project Sample)

Size of cultivated holding group	Kharif							
	Jowar		Bajra		Maize		Pulses	
	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated
Upto 5 Acres	-	-	10.75	11.25	-	-	-	0.75
5.01-10.00	3.00	-	23.50	46.00	1.50	-	3.07	1.00
10.01-15.00	2.00	-	20.50	62.15	-	-	-	6.00
15.01-25.00	-	6.00	20.00	78.00	-	-	2.00	6.00
25.01-50.00	2.00	15.00	33.50	164.00	2.00	-	5.00	27.00
50.01 and above	-	-	11.00	82.00	-	-	2.00	6.00
Total	7.00	21.00	119.25	443.40	3.50	-	12.07	46.75
(% to Gross Cropped Area)	(0.92)	(2.77)	(15.73)	(58.49)	(0.46)	-	(1.59)	(6.17)

Contd...

Table 4.3: (Continued)

Size of cultivated holding group	Kharif (Area in Acres)										
	Groundnut		Cotton		Oilseeds		Sugarcane		Total cropped area		
	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated	
Upto 5 Acres	3.00	1.25	-	-	-	-	-	-	13.75	13.25	27.00
5.01-10.00	2.00	7.00	0.38	-	-	-	0.50	-	33.95	54.00	87.95
10.01-15.00	5.00	-	-	-	-	-	-	-	27.50	68.15	95.65
15.01-25.00	7.00	16.00	-	-	-	-	2.00	-	31.00	106.00	137.00
25.01-50.00	12.00	11.00	3.00	-	2.00	8.00	1.00	-	60.50	225.00	285.00
50.01 and above	-	24.00	-	-	-	-	-	-	13.00	112.00	125.00
Total	29.00	59.25	3.38	-	2.00	8.00	3.50	-	179.70	578.40	758.10
(% to Gross Cropped Area)	(3.83)	(7.82)	(0.44)	-	(0.26)	(1.06)	(0.46)	-	(23.70)	(76.30)	(100.00)

Contd...

Table 4.3: (Continued)

Size of cultivated holding group	<u>Rabi</u> (Area in Acres)							
	Jowar		Wheat		Paddy		Pulses	
	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated
Upto 5 Acres	16.75	4.00	2.55	-	-	-	-	-
5.01-10.00	33.00	54.62	2.80	0.50	-	-	0.50	-
10.01-15.00	22.50	52.28	6.50	3.00	-	-	-	-
15.01-25.00	31.00	63.95	2.50	4.00	-	-	-	-
25.01-50.00	38.00	190.22	1.50	35.25	2.00	-	-	-
50.01 and above	15.50	115.50	-	4.00	-	-	-	-
Total	156.75	480.57	15.85	46.75	2.00	-	0.50	-
(% to Gross Cropped Area)	(17.75)	(54.41)	(1.79)	(5.29)	(0.23)	-	(0.06)	-

23

Contd...

Table 4.3: (Continued)

Size of cultivated holding group	Groundnut		Cotton		Rabi Oilseeds		Vegetables		(Area in Acres)		
	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Total cropped area		
									Irrigated	Non Irrigated	Total
Upto 5 Acres	-	-	1.00	-	-	-	-	-	20.30	4.00	24.30
5.01-10.00	-	-	-	6.00	-	-	1.15	-	37.45	61.12	98.57
10.01-15.00	0.50	-	-	7.00	-	5.00	-	-	29.50	67.28	96.78
15.01-25.00	-	-	-	12.00	4.00	-	-	-	37.50	79.95	117.45
25.01-50.00	1.00	-	-	63.15	2.00	22.00	-	-	44.50	310.62	355.12
50.01 and above	-	-	-	37.50	-	18.50	-	-	15.50	175.50	191.00
Total	1.50	-	1.00	125.65	6.00	45.50	1.15	-	184.75	698.47	883.22
(% to Gross Cropped Area)	(0.10)	-	(0.11)	(14.23)	(0.68)	(5.15)	(0.13)	-	(20.92)	(79.08)	(100.00)

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Table 4.3: (Continued)

Size of cultivated holding group	<u>Summer</u>							
	Sajara		Wheat		Groundnut		Cotton	
	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated
Upto 5 Acres	-	0.75	-	-	1.05	-	5.00	-
5.01-10.00	-	-	3.00	-	1.00	-	3.70	-
10.01-15.00	-	-	0.50	-	1.00	-	5.00	-
15.01-25.00	-	-	-	-	-	-	4.00	-
25.01-50.00	-	-	-	-	0.50	-	13.75	-
50.01 and above	-	-	-	-	-	-	1.00	-
Total	-	0.75	3.50	-	3.55	-	32.45	-
(% to Gross Cropped Area)	-	(1.47)	(6.86)	-	(6.96)	-	(63.63)	-

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Table 4.3: (Continued)

Size of cultivated holding group	<u>Summer</u>						(Area in Acres)	
	Maize		Vegetables		Total cropped area			
	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Total	
Upto 5 Acres	-	-	0.50	-	6.55	0.75	7.30	
5.01-10.00	-	-	1.50	-	9.20	-	9.20	
10.01-15.00	-	-	-	-	6.50	-	6.50	
15.01-25.00	-	-	1.50	0.50	5.50	0.50	6.00	
25.01-50.00	4.50	-	1.50	-	20.25	-	20.25	
50.01 and above	-	-	0.75	-	1.75	-	1.75	
Total	4.50	-	5.75	0.50	49.75	1.25	51.00	
(% to Gross Cropped Area)	(8.82)	-	(11.28)	(0.98)	(97.55)	(2.45)	(100.00)	

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Table 4.4: Seasonwise Cropping Pattern According to Size of Holdings (Control Farmers)

Size of cultivated holding group	Kharif							
	Jowar		Bajara		Groundnut		Paddy	
	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated
Upto 5 Acres	1.00	-	0.90	-	-	-	1.25	-
5.01 to 10.00	-	-	4.00	34.33	-	2.00	-	1.00
10.01 to 15.00	-	-	-	44.35	-	-	-	-
15.01 to 25.00	-	-	9.00	95.65	-	6.00	-	-
25.01 to 50.00	-	10.00	10.50	109.00	1.50	34.00	-	2.00
Total	1.00	10.00	24.40	283.33	1.50	42.00	1.25	3.00
(% to Total Cropped Area)	(0.24)	(2.44)	(5.95)	(69.06)	(0.37)	(10.24)	(0.30)	(0.73)

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Table 4.4: (Continued)

Size of cultivated holding group	<u>Eherif</u>						(Area in Acres)		
	Pulses		Sugarcane		Vegetables		Total Cropped Area		
	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Total
Upto 5 Acres	-	4.00	-	-	-	-	3.15	4.00	7.15
5.01 to 10.00	1.00	-	-	-	-	-	5.00	37.33	42.33
10.01 to 15.00	-	10.00	-	-	-	-	-	54.35	54.35
15.01 to 25.00	4.00	11.77	-	-	-	-	13.00	113.42	126.42
25.01 to 50.00	-	8.00	3.00	-	2.00	-	17.00	163.00	180.00
Total	5.00	33.77	3.00	-	2.00	-	38.15	372.10	410.25
(% to Total Cropped Area)	(1.22)	(8.23)	(0.73)	-	(0.49)	-	(9.30)	(90.70)	(100.00)

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Table 4.4: (Continued)

Size of cultivated holding group	<u>Rabi</u> (Area in Acres)							
	Jowar		Wheat		Bateria		Cotton	
	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated
Upto 5 Acres	1.90	6.50	7.17	-	2.00	-	-	-
5.01 to 10.00	5.00	23.32	2.00	2.00	-	-	-	2.00
10.01 to 15.00	1.00	23.00	1.75	1.00	-	-	-	-
15.01 to 25.00	11.55	62.00	3.00	4.00	-	-	-	10.00
25.01 to 50.00	9.50	93.00	4.00	11.00	-	-	-	16.00
Total	28.95	207.82	17.92	18.00	2.00	-	-	28.00
(% to Total Cropped Area)	(9.30)	(66.63)	(5.75)	(5.77)	(0.64)	-	-	(8.98)

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Table 4.4: (Continued)

Size of cultivated holding group	<u>Rabi</u>						<u>(Area in Acres)</u>		
	Pulses		Oilseeds		Paddy		Total Cropped Area		
	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Total
Upto 5 Acres	-	-	-	-	-	-	11.07	6.50	17.57
5.01 to 10.00	-	-	-	-	-	-	7.00	27.32	34.32
10.01 to 15.00	-	-	-	-	-	-	2.75	24.00	26.75
15.01 to 25.00	-	-	-	-	-	-	14.55	76.00	90.55
25.01 to 50.00	2.00	-	-	5.00	-	2.00	15.50	127.00	142.50
Total	2.00	-	-	5.00	-	2.00	50.87	260.82	311.69
(% to Total Cropped Area)	(0.64)	-	-	(1.60)	-	(0.64)	(16.32)	(83.68)	(100.00)

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Table 4.4: (Continued)

Size of cultivated holding group	Summer						(Area in Acres)	
	Cotton		Vegetables		Total Cropped Area			
	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Irrigated	Non Irrigated	Total	
Upto 5.00	6.83	-	2.00	-	8.83	-	8.83	
5.01 to 10.00	2.00	-	-	-	2.00	-	2.00	
10.01 to 15.00	1.88	-	0.87	-	2.75	-	2.75	
15.01 to 25.00	1.55	-	-	-	1.55	-	1.55	
25.01 to 50.00	3.00	-	0.50	-	3.50	-	3.50	
Total	15.26	-	3.37	-	18.63	-	18.63	
(% to Total Cropped Area)	(81.91)	-	(18.09)	-	(100.00)	-	(100.00)	

The irrigated component of the total cropped area of the respective season works out to 23.70 per cent in kharif, 20.92 per cent in rabi and 97.55 per cent in summer season in respect of project farms. Similar proportions in the case of control farms work out to 9.30 per cent in kharif, 16.32 per cent in rabi and 100 per cent in summer (Tables 4.3 and 4.4).

The irrigated crops are raised to the greater extent in rabi season rather than kharif. This may be observed in all size groups excepting the 15.01 - 25.00 acre holding in both categories of samples. At the aggregate level, the rabi irrigated crops account for 45 per cent of the total gross cropped area under irrigation in respect of project sample. The kharif and summer crops respectively account for 43 per cent and 12 per cent. Similarly, in the case of control farms the rabi, kharif and summer seasons respectively account for 47 per cent, 36 per cent and 17 per cent of the gross cropped area under irrigation.

In all, there are a dozen crops that figure in the cropping pattern of the two categories of samples. However, some major crops clearly emerge as seasonally predominant in the sense that they are overwhelmingly raised in a given season of the year. For instance, bajra, groundnut and pulses are almost entirely grown in kharif season. These three crops account for nearly 94 per cent of total cropped area in kharif season of the project sample. Similar proportion works out to 95 per cent in the case of control farms. On the other hand, in rabi season jowar, cotton and wheat dominate the cropping pattern. In the project sample these three together account for 94 per cent of the total rabi area. In the case of control farms, jowar, wheat and cotton account for nearly 97 per cent of the area under rabi crops. In the latter case, however, cotton is mainly

confined to larger holding groups. Among the summer crops, cotton also figures prominently and together with vegetables and minor cereals, nearly 64 per cent of the project sample area is devoted to these three crops. Cotton (82%) and vegetables (13%) take up all the summer cropping in the case of control farms.

Considering all the seasons together, we find that jowar (39.2%), bajra (33.3%), cotton (9.6%) and groundnut (5.5%) emerge as major crops with nearly 88 per cent of the gross cropped area of the project sample. In the case of control farms, bajra (42%), jowar (33%), groundnut (6%) and cotton (6%) constitute as principal crops and together account for 87 per cent of gross cropped area. Besides, these four main crops account for nearly 85 per cent and 66 per cent of the total cropped area under irrigation in project and control farms respectively. Among the remaining crops, mention may be made of wheat, pulses and other oil seed crops like sunflower, castor and safflower which account for 11 per cent of project sample and in identical proportion of total cropped area of control farms.

It may also be seen that smaller holdings are inclined to raise relatively greater proportions of cereal crops. Even among cash crops, their preference is mainly restricted to groundnut and cotton. The larger holdings have devoted a considerable proportions of their land to commercial crops like cotton, groundnut, other oil seed crops and vegetables. Pulses and wheat also mainly come from the larger holdings.

Residence, Caste and Literacy

Among the 68 cultivators selected from the Project area, nearly one half belongs to Karnal village. It is in this village where the programme has made the beginning and has conducted vigorous propaganda. Besides, the villagers

being more progressive than those of other four villages in the project jurisdiction, they have taken to all kinds of project aids. Also it may be mentioned that Field Assistant in charge of Kannal has established a fairly good rapport with most of the farmers. The village-wise distribution of sample farmers is as given below.

Village	No. of farmers in broad size groups			Total
	Up to 10.00 acres	10.01 to 25.00 acres	25.01 acres and above	
1. Kannal	12	12	9	33
2. Arakeri	5	2	3	10
3. Maknapur	7	2	1	10
4. Tidagundi	2	4	3	9
5. Gunaki	2	2	2	6
Total	28	22	18	68

Among the selected farmers, eleven caste Hindus and twelve Lemanis, a scheduled tribe fully taken to agricultural settlement, reside away from proper village sites. While the eleven caste Hindus stay in their farm houses, scattered all over the project area, the 12 Lemanis are drawn from three principal 'Tandas' (separate residential clusters of this tribe, located away from the village sites) belonging to Kannal, Maknapur and Arakeri village jurisdictions. Thus, about a third of the selected farmers is residing away from the main village sites.

The castewise pattern of the selected farmers reveals that the leading cultivating communities like Lingayath and Lemani dominate the scene. However, the sample comprises all castes including two Harijans and a Muslim. The following

gives a broad idea about the caste-wise pattern of the selected farmers from the project area.

Caste Groups	No. of farmers in broad size groups			Total
	Up to 10.00 acres	10.01 to 25.00 acres	25.01 acres and above	
1. Lingayath (Hindu)	15	11	12	38
2. Hindu Intermediate	4	3	1	8
3. Hindu Backward	2	3	2	7
4. Lamani	5	5	2	12
5. Harijan	2	-	-	2
6. Muslim	-	-	1	1
Total	28	22	18	68

The literacy pattern of the informants broadly indicates that only about half of them may be regarded as literates. Among the 68 informants, as many as 35 (51.5 per cent) are rank illiterates. Those having had education up to primary level form 22.0 per cent. The middle and high school levels of education are obtained by 10.3 per cent and 11.8 per cent of the informants respectively. Three of the informants have been to college and two of them obtained their graduation. These three persons account for 4.4 per cent of the total informants. Broadly speaking, the illiterates are mostly from the backward communities. The broad holdingwise distribution of educational status of the heads of the selected households is shown below.

Educational Status	No. of informants in size of holding groups			Total
	Up to 10.00 acres	10.01 to 25.00 acres	25.01 acres and above	
1. Illiterates	17	13	5	35
2. Primary School	7	4	4	15
3. Middle School	1	4	2	7
4. High School	2	1	5	8
5. College level	1	-	2	3
Total	28	22	18	68

Relatively speaking, the illiterates form 61 per cent in the small holdings, 59 per cent in the medium size holdings and 38 per cent in the large holdings. Conversely, the proportion of literates increases with the corresponding increase in the size of holding.

Among the 30 control households selected from Shirnal village (outside the Project jurisdiction), Kuruba caste forms 47 per cent, followed by Lingayaths with 30 per cent, artisans with 13 per cent, Muslims with seven per cent and a Laxali forms three per cent. The Kuruba caste dominates the medium and large sized holdings. Regarding the literacy level, 53.3 per cent of the informants are reported as literates, most of them having had only primary level of education. However, illiterates are proportionately greater in small holdings (54 per cent) than in medium (50 per cent) and large holdings (40 per cent).

Family Size and Work Force

A brief account of the aspects dealing with the family size and composition of work force in respect of sample

households of both categories is taken up here. The data are presented in the abridged form, that is, for the broader size groups. Broadly, these size groups correspond to small, medium and large holdings. The non-adults of either sex are lumped together and they are relevant only to indicate the family size as there are no earners below the age of 14 years.

It may be seen that adults of either sex outnumber those of non-adults in all size groups. The average family size is around 6.5 and 7.4 for project sample and control households respectively. The average size of family increases with the corresponding increase in the size of holding of the household in respect of both categories of sample. The following data indicate the family size in respect of sample categories.

1. Members and Average Family Size in Project Sample

Size Group (acres)	No. of Fami- lies	Adults		Non- adults	Total Mem- bers	Average Family size
		Male	Female			
Up to 10.00	28	60	46	56	162	5.8
10.01-25.00	22	50	39	51	140	6.4
25.01 & above	18	44	40	56	138	7.7
Total	68	154	125	161	440	6.5

2. Members and Average Family Size in respect of CONTROL FARMERS

Size Groups (acres)	No. of Fami- lies	Adults		Non- adults	Total Mem- bers	Average Family Size
		Male	Female			
Up to 10.00	13	31	24	25	80	6.2
10.01-25.00	12	43	28	23	24	7.8
25.01 & above	5	19	16	14	49	9.8
Total	30	93	68	62	223	7.4

The work force is entirely composed of male and female adults. The per family average size of work force works out to 2.5 members in the case of project sample and 4.4 in that of control households. In the case of former category it declines with the corresponding increase in the size group. On the contrary, it is quite the reverse in the case of control households. The proportion of earners or working members to total adults works out to 60.6 per cent and 82.6 per cent in project and control households respectively. For obvious reasons the male earners out-number the female work force available from the family. In proportion to their respective numbers, 76 per cent of adult males and 41.6 per cent of female adults constitute work force in the project sample. Similarly, 87.1 per cent and 76.5 per cent of male and female adults respectively are reported as earners in the case of control households. The data in respect of total work force, the average per family and proportions to total numbers are shown in the following.

Details of Work Force by Size of Holding Groups

1. Project Sample

Size Group (in acres)	Work Force No.			Proportion %			
	Male	Fee male	Total	Ave- rage per fa- mily	76.0 Male ear- ners to male adults	Female earners to Female	Total earners to total adults
Up to 10.00	51	25	76	2.7	85.0	54.3	71.7
10.01-25.00	35	18	53	2.4	70.0	46.2	59.6
25.01 and above	31	9	40	2.2	70.6	22.5	47.6
Total	117	52	169	2.5	76.0	41.6	60.6

2. Control Households

Size Group (in acres)	Work Force No.			Proportion %			
	Male	Female	Total	Average per family	Male earners to male adults	Female earners to Female	Total earners to total adults
Up to 10.00	25	16	41	3.2	80.6	66.7	74.5
10.01-25.00	38	22	60	5.0	88.4	78.6	84.5
25.01 & above	18	14	32	6.4	94.7	87.5	91.4
Total	81	52	133	4.4	87.1	76.5	82.6

Occupation and Income Pattern

In addition to cultivation, several subsidiary occupations are pursued by many a sample household. Among the subsidiary occupations, the pursuit of agricultural labour is reported in all the holdings up to 50-acre size groups. The animal husbandry is reported from only the project sample category and pursued by some households up to 15-acre holding groups. Service and independent occupations are followed by more than one household in several size groups. However, in most of the cases, cultivation remains the main occupation and provides principal source of income to the families. In the case of 50-acre and above size groups, cultivation is the only occupation reported. The data showing occupations pursued by the households in different size of cultivated holding groups and incomes derived thereof are set in Table 4.5 in respect of project sample and Table 4.6 in the case of control farmers.

It may be seen from the data that income from cultivation constitutes the single largest source of total family incomes in all the size groups. In the case of Project sample the proportion of income from cultivation increases

**Table 4.5: Income from Different Occupations According to Size of Cultivated Holding.
Project Sample**

(Amount in Rs.)

Size of Cultivated Holding	No. of Families	Income from agriculture	Income from agriculture labour	Income from milk selling	Income from sheep rearing	Income from trade	Income from independent occupation	Income from services	Income from oil engine rent received	Income from religious service	Total income
Upto 5 Acres	12	14906 (57.11)	10040 (38.47)	315 (1.20)	480 (1.84)	-	-	360 (1.38)	-	-	26101 (100.00)
5.01-10.00	16	45221 (88.11)	3340 (6.50)	300 (0.58)	-	200 (0.39)	850 (1.66)	1175 (2.29)	240 (0.47)	-	51326 (100.00)
10.01-15.00	12	38109 (86.24)	4520 (10.23)	1020 (2.31)	-	-	-	40 (0.09)	-	500 (1.13)	44189 (100.00)
15.01-25.00	10	44871 (94.32)	1300 (2.73)	-	-	-	360 (0.76)	1040 (2.19)	-	-	47571 (100.00)
25.01-50.00	14	120422 (97.35)	2300 (1.86)	-	-	-	980 (0.79)	-	-	-	123682 (100.00)
50.01 and above	4	48350 (100.00)	-	-	-	-	-	-	-	-	48350 (100.00)
Total	68	311859 (91.40)	21500 (6.30)	1635 (0.48)	480 (0.14)	200 (0.06)	2190 (0.64)	2615 (0.76)	240 (0.07)	500 (0.15)	341219 (100.00)

(Figures in brackets indicate percentage to total income from all sources)

Table 4.6: Income from Different Occupations According to Size of Cultivated Holding

Size of Cultivated Holding	No. of Families	Control Farmers					(Amount in Rs.)	
		Income from agriculture	Income from agricultural labour	Income from service	Income from independent occupation	Income from trade	Total income	
Upto 5 Acres	6	5748 (69.61)	2460 (29.79)	50 (0.60)	-	-	8258 (100.00)	
5.01 to 10.00	7	8888 (64.74)	1400 (10.20)	1440 (10.49)	1750 (12.75)	250 (1.82)	13728 (100.00)	
10.01 to 15.00	5	7767 (55.30)	5320 (37.87)	950 (6.83)	-	-	14047 (100.00)	
15.01 to 25.00	7	14851 (66.09)	7620 (33.91)	-	-	-	22471 (100.00)	
25.01 to 50.00	5	27715 (95.19)	1100 (3.78)	300 (1.03)	-	-	29115 (100.00)	
Total	30	64969 (74.15)	17900 (20.43)	2750 (3.14)	1750 (2.00)	250 (0.28)	87619 (100.00)	

(Figures in brackets indicate percentage to total)

with the corresponding increase in the size of holding. At the aggregate level, the income from cultivation forms 91 per cent and 74 per cent of total income from all sources, respectively for Project and control households. The pursuit of agricultural labour constitutes the second most important occupation in terms of participation as well as proportion in the total income in almost all the size groups. Relatively speaking, the incomes from the other occupations form meagre proportions, and all put together account for less than five per cent. In some size groups of control households (5-10 and 10-15 acre groups), however, incomes from service and independent occupations constitute substantial proportions.

Another way of looking at the income pattern is to distribute the sample households according to their broad income groups and the occupationwise sources of incomes in each income group. The relevant details are shown in Table 4.7 (Project sample) and Table 4.8 (control households). In order to get a general idea, the following gives the frequency distribution of households according to the income groups and the average income per family in each group. (See next page).

It may be seen from the data that 66 per cent of the project sample falls into Rs. 2501 - 10,000 groups, the average family income varying between Rs. 3,600 and Rs. 7,209. Similarly in the case of control households, 70 per cent is seen in income groups ranging from Rs. 1,001 to Rs. 5,000 with the family average income varying between Rs. 1,650 and Rs. 3,420. The project sample fares relatively better than that of control with greater average incomes in all size groups except the lowest one.

Income Group (in Rs.)	Project Households				Control Households			
	No. of Fami- lies	As % to Total	Total Household Income	Average per family	No. of Fami- lies	As % to Total	Total Household Income	Average per Family
Up to 1,000	4	5.9	2211	553	9	16.7	3555	711
1,001 - 2,500	11	16.2	19652	1787	8	26.7	13213	1652
2,501 - 5,000	31	45.6	111918	3610	13	43.3	44467	3421
5,001 - 10,000	14	20.6	100970	7212	4	13.3	26384	6596
10,000 and above	8	11.7	106468	13309	-	-	-	-
Total	68	100.0	341219	5018	30	100.0	87619	2921

Table 4.7: Income from Different Occupations According to Income Group

Income group	No. of families	Project Sample									Total income
		Income from agriculture	Income from agricultural labour	Income from milk selling	Income from sheep rearing	Income from trade	Income from independent occupation	Income from service	Income from oil engine rent received	Income from religious services	
Upto 1000	4	551 (24.92)	700 (31.66)	=	=	=	600 (27.14)	360 (16.28)	=	=	2211 (100.00)
1001-2500	11	12337 (62.78)	6090 (30.99)	695 (3.13)	360 (1.83)	=	250 (1.27)	=	=	=	19652 (100.00)
2501-5000	31	93473 (83.52)	13410 (11.98)	1020 (0.91)	120 (0.11)	=	1340 (1.20)	1815 (1.62)	240 (0.21)	500 (0.45)	111918 (100.00)
5001-10000	14	99030 (98.08)	1300 (1.29)	=	=	200 (0.20)	=	440 (0.43)	=	=	100970 (100.00)
10001 and above	8	106468 (100.00)	=	=	=	=	=	=	=	=	106468 (100.00)
Total	68	311859 (91.40)	21500 (6.30)	1635 (0.48)	480 (0.14)	200 (0.06)	2190 (0.64)	2615 (0.78)	240 (0.07)	500 (0.15)	341219 (100.00)

(Figures in brackets indicate percentage to income from all sources)

Table 4.8: Income from Different Occupations According to Income Group

(Amount in Rs.)

Control Farmers

Income Group	No. of Families	Income from agriculture	Income from agricultural labour	Income from service	Income from independent occupation	Income from trade	Total income
Upto 1000	5	3055 (85.94)	200 (5.62)	-	300 (8.44)	-	3555 (100.00)
1001 to 2500	8	10653 (80.63)	2260 (17.10)	50 (0.38)	-	250 (1.89)	13213 (100.00)
2501 to 5000	13	26277 (59.09)	14340 (32.25)	2100 (5.40)	1450 (3.26)	-	44467 (100.00)
5001 to 10000	4	24984 (94.69)	1100 (4.17)	300 (1.14)	-	-	26384 (100.00)
Total	30	64969 (74.15)	17900 (20.43)	2750 (3.14)	1750 (8.00)	250 (0.28)	87619 (100.00)

(Figures in brackets indicate percentage to total incomes)

By and large, the data in Tables 4.7 and 4.8 reveal that income from cultivation forms the major share (60-100 per cent) in respect of almost all the income groups in both categories of sample households. The solitary exception being the lowest income group in project sample, where the four households obtain their major share of incomes from farm labour and non-agricultural occupations. In the case of project sample, the proportion of income from agriculture keeps increasing with the corresponding increase in the size of income group. The income from agricultural labour is sizeable only in small income groups up to Rs. 2,500. All the eight households in the largest group entirely depend upon income from cultivation. This includes the four households from the 50-acre and above groups and the other four possibly belong to 25-50 acre size group (See Table 4.5). In the case of control category, all the income as well as cultivated holding groups show deriving about 95 per cent of income from both cultivation and farm labour. In the same category of sample, incomes from service and independent occupations are quite substantial in the case of 5-10 acre holding group having income range of Rs. 2500-5000.

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CHAPTER V

PARTICIPATION AND REACTION OF SAMPLE FARMERS

The present chapter includes within its scope such aspects as the level of overall participation of sample farmers in the various schemes; the nature and extent of project aid received by the direct participants and their general experience and reaction to each of the specific categories of schemes; the participation and reaction to general project services promoting proper crop selection and farming techniques including improved agronomic practices and demonstration plots and finally, the overall impression of the informants about the working of the project.

1. Level of Participation

Before we proceed with the analysis of impact of the measures undertaken by the project, it may be necessary to know the various aspects of level of adoption of these measures by the sample cultivators. Apart from the contour bunding work carried out by the Department as a part of the Programme, which has touched almost all the cultivable lands in varying extent, the farmers have been involved under different project aids. Most of these measures are to be carried out by the farmers with the technical and financial assistance rendered by the project authorities. The project benefits are conveniently grouped under five major categories. These are: (i) land development works, (ii) farm pond as water harvesting measure, (iii) minor irrigation, (iv) farm implements and (v) agricultural inputs. Also it may be mentioned that five farmers have obtained

assistance under the recently introduced animal husbandry scheme which figures in our analysis only to indicate the extent of additional benefits received by the sample farmers.

The distribution of sample farmers according to the category of benefits received by them is shown in Table 5.1. In all, 68 sample farmers have received 154 benefits, the average number per farmer being 2.3. Obviously, most of the farmers in each group appear more than once under different categories and as such the figure of number of farmers is not additive. The average number of benefits is the lowest (1.4) in the smallest holding group and it increases with the corresponding increase in the size group excepting the highest group, where it declines to 2.3. Among the categories of benefits, the land development attracts the largest participation, 72 per cent of farmers opting for it. Minor irrigation and farm implements are other popular categories. In all the size groups, these categories together account for major proportion of total number of benefits received. Farm pond, which is endowed on whosoever willing, has been mainly opted by some farmers in middle and larger holding groups. However, in terms of total number of benefits, the free benefit accounts for only 11.7 per cent. Besides, just about 26.0 per cent of sample farmers have accepted it as one of the additional benefits.

It may be seen that availing of more than one category of benefits is quite widespread in all the size groups. Nearly 73 per cent of all the sample farmers figure in receiving more than one. However, the proportion figuring in multiple benefits declines with the

Table 5.1: Distribution of Beneficiaries According to the Category of Project Aid and Number of Aids Received

Size of Cultivated Holding (in acres)	Total No. of Sample Farmers	No. Availing Project Benefits Under:							Total No. of Benefits	Average No. of Benefits Per Farmer	Sample Farmers Receiving No. of Categories				
		Land Deve-lop-ment	Farm Pond	Minor Irri-gation	Farm Imple-ment	Agri-cultural Inputs	Animal Husbandry	1			2	3	4	5	
Upto 5.00	12	8	-	4	1	3	1	17	1.4	7	5	-	-	-	
5.01-10.00	16	10	5	6	6	7	3	37	2.3	7	2	4	1	2	
10.01-15.00	12	11	3	7	3	4	1	29	2.4	1	6	2	2	-	
15.01-25.00	10	8	4	3	6	4	-	25	2.5	1	3	6	-	-	
25.01-50.00	14	9	4	11	9	4	-	37	2.6	4	2	3	5	-	
50.01 and above	4	3	2	1	2	1	-	9	2.3	1	1	2	-	-	
Total	68	49	18	32	27	23	5	154	2.3	21	20	17	6	2	
As Per cent of Sample	100.0	72.1	26.5	47.1	39.7	33.8	7.4	-	-	-	-	-	-	-	
As Per cent of Total No. of Benefits	-	31.8	11.7	20.8	17.5	14.9	3.3	100.0	-	-	-	-	-	-	

increase in number of categories of benefits and only about 3.03 per cent is seen receiving five categories of benefits. In the smallest size group, the major proportion (53 per cent) is seen opting for only one category each, and the rest just two categories of benefits. It is only in the case of 5-10 acre group that we find some receiving as many as five categories of benefits. In the next higher group (10-15 acre holding), we find as many as 92 per cent farmers figuring in multiple benefits.

Among the 21 farmers opting for just one category of benefits each, 33 per cent have chosen for agricultural inputs, 33 per cent that of minor irrigation, 24 per cent land development works, and about five per cent farm implements. The figures are as given below:

<u>Category</u>	<u>No. of Farmers</u>
Land Development	5
Minor Irrigation	7
Farm Implements	1
Agricultural implements Inputs	8
<hr/>	
Total receiving just one Aid	21
<hr/>	

Those opting for land development works and agricultural inputs as their only aid are mostly from the smallest size groups upto 10 acres. The middle and the large groups are quite prominent in opting for minor irrigation as their sole choice.

2. Land Development Works

At the outset, we may see the broad pattern of different types of works carried out under land development category. The data available in respect of sample

farmers are set in Table 5.2. It gives a general idea about the extent of area directly getting the benefit from various types of works carried out. It may be noted that though the contour bunding has been carried out covering most of the farmers, only the area directly benefiting is considered here. Besides, as a given portion of land is being used for more than one type of improvement, the area coming under all types of works is not additive.

It may be seen from the Table that contour bunding has been reported in all the size groups though in varying extent. At the overall sample level, about 50 per cent of total net cultivated land is directly benefited from this scheme. Similarly, deep ploughing is carried out in considerable extent of land, covering about 30 per cent of the total land. Other types needing mention are repair to old bunds, deep digging and levelling of land which account for over seven per cent of each. However, graded bunding and drainage works have not evoked much response.

Regarding the expenditure incurred by reporting farmers on these works only a broad idea may be obtained from the available data. Since the contour bunding work has been undertaken departmentally it does not feature here. The following (see on next page) gives itemwise expenditure on some major items of works at the aggregate level.

Experience and Opinion

In so far as land improvement measures are concerned, all the sample farmers have expressed favourable opinion about the efficacy of contour bunding programme. Everyone has stated that the land is no more subjected to

Table 3.2: Area Coming under Various Types of Land Development Works

Size of Cultivated Holding	Total Net Cultivated Area	(Area in Acres)						
		Contour Bunding	Graded Bunding	Repair to Old Bunds	Levelling of Land	Drainage	Deep Ploughing	Digging the Soil to Remove Cynodon dactylon etc
Upto 5 Acres	35.55	14.00 (39.38)	3.00 (8.44)	10.62 (29.87)	8.50 (23.91)	0.55 (1.55)	15.00 (42.20)	18.05 (50.77)
5.01-10.00	124.25	69.65 (56.05)	-	10.00 (8.05)	18.00 (14.49)	2.50 (2.01)	31.45 (25.31)	21.00 (16.90)
10.01-15.00	140.92	85.93 (60.98)	-	15.50 (11.00)	10.00 (7.10)	2.50 (1.77)	31.45 (22.10)	16.50 (11.70)
15.01-25.00	187.45	88.45 (47.18)	-	26.00 (13.87)	17.00 (9.07)	14.00 (7.47)	14.00 (7.47)	8.00 (4.27)
25.01-50.00	503.43	185.45 (36.84)	-	31.00 (6.15)	23.00 (4.57)	8.50 (1.69)	259.47 (51.55)	12.00 (2.38)
50.01 and above	229.75	168.00 (73.13)	-	10.00 (4.35)	12.00 (5.22)	-	15.00 (6.53)	15.00 (6.53)
Total	1221.35	611.48 (50.07)	3.00 (0.25)	103.12 (8.44)	88.50 (7.25)	28.05 (2.30)	366.07 (29.97)	90.55 (7.41)

(Bracketed figures are percentage to net cultivated area)

Item of Land Development	Actual Area benefited (acres)	Total amount (Rs.)	Average per acre (Rs.)
1. Repairs to old bunds	133.12	16050	156
2. Land Levelling	88.50	19470	220
3. Deep Ploughing	366.07	13945	38
4. Deep Digging	90.55	18535	205

soil erosion and gully formation. The direct recipients of the project assistance for various types of works are all convinced about the utility of the same. Although almost all the sample farmers are aware of the gains of such works as land levelling, graded bunding, deep ploughing, etc., some of them are not in a position to opt for the same owing to lack of funds. Those carrying out some of these measures are of the opinion that the moisture retention capacity of the soil has increased appreciably and the crops are uniform in growth. Several farmers have stated that as a result of these works, the extent of fallow lands is considerably lessened to facilitate more land for crop production. In short, excepting the somewhat adverse opinion about the land improvement works being very expensive (minority of opinion) there is no general dissatisfaction at all about the land improvement programme.

3. Farm Pond

The farm pond is the only type of water harvesting measure made available to the individual farms. Despite the lukewarm enthusiasm on the part of the farmers, the project authorities have managed to endow this

measure on several land owners with 100 per cent subsidy. Information concerning various aspects of this measure, as obtained from the 13 sample farmers, is presented here. At the outset, it may be stated that many a farmer is not fully convinced about the usefulness of this aid. From the beginning the scheme has proved almost a non-starter and, so much so, it has eventually forced the authorities to discontinue it altogether. As such, the information available from both the farmers and the project authorities is quite sketchy and inadequate.

The yearwise completion of the sample ponds shows that only one in 1972, four in 1973, eleven in 1974 and just two in the year 1975. The location of the ponds reveals that 15 are dug up in the lower reaches and the remaining three in the middle of catchment areas. Regarding the water level, it is claimed that only during the rainy season, all but two ponds touch the maximum level provided for. During the winter season, the level decreases to one-third of the depth of the ponds. At the beginning of the summer season, only four ponds report having two feet depth of muddy water. However, three of the 18 sample ponds are dormant, two of them on account of lack of water and the third one remains abandoned owing to salty water adversely affecting the soil. All the three inoperative ponds belong to small holdings group.

One of the important dimensions of the farm pond scheme is that it has deprived the participating land owners of valuable portions of their lands. The reported extent of loss varies from a minimum of half acre to as much as one acre in several cases. Generally,

the 100' x 100' pond occupies not more than 0.50 acre surface, but in certain cases, the dug-up earth is so unevenly dumped all around that the land effectively lost for the purpose of cultivation admeasures three-fourths to one acre. The total extent of land thus lost to 18 fara ponds measures 15 acres. All this land had been under plough and the farmers used to take one or two crops annually. The reported average loss of production per annum amounts to about Rs. 250 per acre. The following account gives some general idea about the extent of loss of land surface and the value of produce grown prior to the informants joining the scheme.

Size of Holding (acres)	No Reporting	Area lost to pond (acres)	Value of produce previously grown	
			Total (Rs.)	Average per acre (Rs.)
Upto 5.00	-	-	-	-
5.01 - 10.00	5	4.75	1,070	225
10.01 - 15.00	3	2.50	530	212
15.01 - 25.00	4	4.00	935	234
25.01 - 50.00	4	2.25	1,200	533
50.01 and above	2	1.50	600	400
Total	18	15.00	4,335	289

Among the 15 sample ponds currently in use, eight provide some quantity of water only during rabi season, six in both kharif and rabi and just one exclusively during kharif season. The total gross cropped area making use of ponds measures 43.50 acres, the seasonwise break-up being 15.00 and 28.50 acres - kharif and rabi respectively. Jowar and green gram dominate the cropping scene. The cropwise area is as shown below.

Kharif	No.	Area	Rabi	No.	Area
Green gram	5	11.00	Jowar	13	26.50
Bajra	1	2.00	Safflower	1	2.00
Hy. Jowar	1	2.00			
Total	7	15.00	Total	14	23.50

During kharif season, six ponds report having command area of two acres a piece and one pond having three acres. In rabi season two ponds report having a command area of 4.00 acres each, eight ponds with 2.00 acres each, one commanding 1.5 acre and three with one acre each. Regarding the number of waterings obtained the 15 ponds have yielded 39 times of watering in all during both the seasons. The seven ponds operational in kharif have yielded 14 waterings to 15 acres of cropped area. Similarly, the command area of 23.5 acres under 14 ponds during rabi has received 25 waterings. During the year under reference, the average gross cropped area per pond works out to 2.9 acres and the average number of times the water pumped out is 2.6 per pond. Actually six out of 15 ponds have yielded water in both the seasons. Three ponds are able to give only one watering each and six ponds two waterings each during the whole year. In other words only six ponds are able to store water that is sufficient to provide more than two times of protective irrigation during a year.

Apart from the loss of some portion of useful land and low level of water especially when the need for irrigation is most acute, the pond farmers have

to face the problem of lifting the water. The only feasible device is oil engines. The experience of sample pond owners reveals that only three of them manage with their own oil engines and need to spend on fuel and the transportation of the device. However, in the case of other 80 per cent the engine is being hired on daily basis and then meet the expenses on fuel and transportation. Among those required to hire, only three have managed to get services of project owned oil engines on subsidised hire charges. The remaining nine have obtained the same from the private owners on hire basis. The total expenditure on operating these 15 engines (hire charges, fuel and other expenses) during the year works out to Rs. 637/- at an average of Rs. 42.5 per pond. The individual expenditure varies from as low as Rs. 32/- in the case of project hired engine to as high as Rs. 75/- incurred in the case of privately hired service. However, those hiring privately as well as, using own engines have increased considerable expenditure on fuel as the pumping operation has lasted longer in their case. The average expenditure on pumping water works out to Rs. 14 per acre.

The performance of the area irrigated by ponds, in terms of crop production and gross value of returns may be seen from the following:

Crop	Area (acres)	Total production (kg)	Average per acre (kgs)	Total value (Rs.)	Average per acre (Rs.)
Jowar	26.50	7,100	268	7,100	268
Gram	11.00	2,800	255	4,500	409
Hy.Jowar	2.00	500	250	500	250
Bajra	2.00	300	150	375	183
Safflower	2.00	600	300	900	450
Total	43.50	11,300	260	13,375	308

The farm ponds are designed in such a way that they invariably get silted up every year. This necessitates the pond owners to dig up the silt which involves certain expenses. However, in the process the pond owners also collect the top soil or silt for the use in their farms, and thereby partly offset the expense on maintenance of the ponds. Furthermore, some farmers also take advantage of this situation to increase the depth much more than what was initially designed. Actually, it is carried out clandestinely as it is contrary to the instructions of the project authorities. The scheme does not allow deepening, paving or lining or any such alteration. According to the reporting farmers, the expenditure on desilting operation varies from Rs. 50 to Rs. 200 per pond and the quantity of useful silt thus obtained ranges from 10 to 20 cart loads. In terms of average per acre of command area, the expenditure works out to Rs. 26 and that of market value of silt amounts to Rs. 2 1/2-.

Farmers' opinion

Asked to state the opinion on the basis of personal experience regarding the usefulness of the farm pond, many a farmer appears dissatisfied with this scheme. The highlights of the informants' reaction are briefly mentioned in the following.

One participant stated that the pond in his farm has been dug up without his consent and during his absence. Three pond owners have rejected it outrightly and want their ponds to be filled up to reclaim their valuable lands. Several farmers in the small and medium size holdings complain that the quantity of water is

thoroughly inadequate, often no water at all especially, when the crops really need it most. That the ponds collect more silt than water when needed. Almost all of them feel that in its present form the pond is not quite useful and that it can be really effective only when it is further deepened and paved to retain enough water for protective irrigation. That whatever the irrigation presently possible is not enough to contribute to the incremental production that can offset the loss of yield from the land now gone to pond and spill over of earth. Besides, some farmers are of the opinion that the standing crops not served by pond water have not fared badly to justify the claim that ponds are meant for saving the crops that would otherwise wither away. On the whole, the great majority is of the opinion that the ponds are not serving them as much as the project authorities make them to believe. In the other hand, only two pond owners have stated that the ponds are useful and that they are satisfied. However, these are the ones who have also carried at out deepening operation on their own.

Apart from the pond owners the general opinion among the rest of the sample farmers is not in favour of this particular scheme. Several of them feel that a community well could have irrigated larger area and served the purpose better.

In sum, the farm pond technique 'prima facie' does not appear to be a profitable proposition to the farmers even after the capital cost coming as a gift. By and large, the value of incremental yield may not make good the loss of gross value of production on account of area already lost to the pond and the necessary

additional expenditure on pumping out water, as well as, maintenance of pond with due allowance made for the value of silt used on the farm.

4. Minor Irrigation

The project aid for minor irrigation scheme comprises subsidies for sinking new well, renovation of old well, electric pumping set, oil engine, pipe line and cement tank. The information available from the selected farmers is presented here. Prior to the introduction of the scheme, almost all the owners of the irrigation wells had been using bullock drawn mota for lifting water. The extent of average area commanded by a well had been 4.31 acres during the three seasons of a year. Of this, ~~2/3~~, the kharif and rabi seasons used to account for 44.4 and 47.3 per cent of areas respectively. The area irrigable during summer season formed just about 8.3 per cent of gross irrigated area. Among the crops raised by well irrigation, kharif bajra (44%) rabi jowar (38%) and summer cotton (6%) were prominent and together formed 83 per cent of the total area.

Presently, the selected farmers under the scheme have opted for mainly the pumpsets and renovation of old wells. This has contributed to the remarkable extent of increasing the average irrigable area per well by nearly 46 per cent. The information pertaining to 32 sample farmers who have availed of the aid reveals that only nine of them, mostly from small holdings, share the well water with one or two others. The beneficiaries from the large holding groups are quite prominent in obtaining the project aid mainly for new wells, pumpsets and joint benefit of new

wells with pump sets. The small and medium farmers, on the other hand, have secured the aid mostly for renovation of old wells and only pump sets to replace their motes. In all, 32 informants have received assistance in the form of single aid for eight wells and 13 pump sets and combined aid for eleven wells with pump sets. The following gives the distribution in respect of broad size groups of the informants.

Size group (acres)	Only wells		Aid Received for			Total No. re- porting
	New	Old	Only pump- set	New well + pump- set	Old well + pump- set	
Upto 10.00	-	4	4	1	1	10
10.01-25.00	-	2	4	-	4	10
25.01 and above	2	-	5	3	2	12
Total	2	6	13	4	7	32

The eight farmers securing aid for only wells have their own arrangements for lifting device. Among these, one small farmer hires oil engine whenever the need arises. Two farmers continue with their old motes. Four farmers have purchased the equipment on their own, three pump-sets and the one oil engine. One of the wells remains incomplete and hence no lifting device as yet. However, only 30 wells are presently operational, as one is still incomplete and the other one remains dried up for several years.

Regarding the command area of wells, the gross cropped area has increased appreciably and the average now works out to 6.29 acres per well. The seasonwise utilisation shows 43.7% in kharif, 41.6 per cent in rabi and 14.7% of the

gross cropped area in summer. However, the cropping pattern continues to be largely the one that had been followed before the introduction of the scheme. The miscellaneous crops like vegetables, groundnut and wheat show some marginal increase. The three major crops, namely, kharif bajra, rabi jowar and summer cotton still dominate the scene with 82.3 per cent of the gross cropped area. The proportion of the area under minor crops is relatively higher in the larger holdings. It forms just about 15 per cent in the small holdings (up to 10 acres) 17 per cent in medium size holdings (10.1 to 25 acres) and nearly 20 per cent of the gross cropped area of large holdings. The details pertaining to 30 operational wells are shown in the following: (see table on next page)

The cost of renovating the old well varies from Rs. 400 to Rs. 4500 each. The average investment in new well is around Rs. 6000. The value of electric pump set ranges from Rs. 1000 to Rs. 5000. The oil engine varies from Rs. 750 to Rs. 1200 each.

Opinion of the Participants

No adverse reaction has been expressed in regard to the minor irrigation scheme. The reaction of the participants is generally in the nature of additional facilities for further improvement. Most of the farmers are of the opinion that the wells need deep boring to trap more water and to realise this, they want the drilling rigs made available to them on hire basis.

5. Farm Machinery and Implements

Among the sample cultivators, 27 have obtained one or more items of improved farm equipment through the

Size of Holding (in acres)	Area under								Gross cropped Area	
	Kharif			Rabi			Summer			
	Bajra	Minor crops	Total	Jowar	Minor crops	Total	Cotton	Other crops		Total
Upto 1000 (as % of total)	18.00	3.00	21.00 (42.5)	21.00	1.95	22.95 (46.5)	2.95	2.50	5.45 (11.0)	49.40 (100.00)
10.01-25.00 (as % of total)	21.50	5.00	26.50 (46.1)	19.50	3.50	23.00 (40.0)	6.50	1.50	8.00 (13.9)	87.50 (100.00)
25.01 and above (as % of total)	26.50	6.50	33.00 (42.8)	25.50	7.00	32.50 (39.8)	15.75	0.50	14.25 (17.4)	81.75 (100.00)
All size groups (As % of total)	66.00 (33.00)	16.50 (8.7)	82.50 (43.7)	66.00 (33.00)	12.45 (6.6)	78.45 (41.6)	23.20 (12.3)	4.50 (2.4)	27.70 (14.7)	186.65 (100.00)

project aid. None of these farmers has had owned or used the modern implements before the project came into being. However, before participating in the subsidised scheme of purchasing the equipment, most of these beneficiary farmers have had the advantage of hiring those from the project stores and being convinced about the efficacy of the same. In all, 59 pieces from nine items of implements have been purchased by the reporting farmers. Among the 27 reporting farmers, as many as ten are the buyers of only one type of implement (mostly ploughs). Another ten have bought two types of implements. Those buying three and four types of machinery number five and two respectively and, all these seven belong to large holding groups (above 25 acres).

The data set in Table 5.3 reveal that one half of the total number of implements purchased is made up by ploughs of three types. In terms of amount invested, these ploughs account for nearly 56 per cent of the total value of all the equipment purchased under the scheme. The smaller holding groups (upto 10 acres) have invested greater proportion of amount in the purchase of these ploughs rather than other implements. However, the medium and large holding groups too show the similar preference to ploughs. The spraying equipment is the next important item and relatively the large holdings are prominent in purchasing greater number. The drilling equipment for seeds and fertilizers are reported in almost all size groups, but in terms of both number and value the large holdings are quite conspicuous. Considering all size groups together, the average investment per reporting farmer and per acre of operational area work out to Rs. 421.67

Table 5.3: Acquisition of Farm Implements and Machinery by the Sample Participants under the Project Aid

Size of cultivated holding (Acres)	Reporting Farmers		Type of Farm Implement under Project Aid									
	No.	Area operated (acres)	Kirloskar plough No. Value	Balaram plough No. Value	Iron plough No. Value	Seed and fertilizer drills No. Value	Sprayer No. Value	Duster No. Value	Roller No. Value	Thresher No. Value	Other equipments No. Value	All equipments No. Amount
Upto 5 Acres	1	3.00	1 310	- -	- -	- -	- -	- -	- -	- -	- -	1 310
5.01-10.00	6	51.78	1 325	2 240	2 290	2 130	1 200	1 150	- -	- -	- -	9 1335
10.01-15.00	3	38.65	1 310	1 150	- -	2 120	1 200	- -	- -	- -	- -	5 780
15.01-25.00	6	118.95	4 1240	1 160	1 200	3 145	1 540	- -	1 100	1 1200	12 3585	
25.01-50.00	9	338.95	5 1310	5 610	1 300	8 625	5 1080	- -	- -	1 150	25 4075	
50.01 and above	2	133.00	3 720	1 180	- -	2 250	1 150	- -	- -	- -	- -	7 1300
Total	27	681.33	15 4215	10 1340	4 790	17 1270	9 2170	1 150	1 100	1 1350	59 11385	
(As percent of total value)			(37.02)	(11.77)	(6.94)	(11.15)	(19.06)	(1.32)	(0.88)	(11.86)	(100.00)	

and Rs. 16.71 respectively. In view of fairly high cost of the improved equipment, especially the ploughs, the average per acre investment works out to a considerably higher sum in the smaller holdings than is the case in the larger holdings. On the other hand, the average investment per farmer is generally greater in respect of larger holdings.

Reaction of the Participants

At the outset, it may be stated that all the participants excepting one, who have used these implements (by owning or hiring) are fully convinced of the enormous benefits accruing to them. The lone dissenter, however, has placed the blame not so much on implements as on the type of land he operates. Several beneficiaries have even gone to the length of ascribing the cause of increased yields almost entirely to the credit of modern implements, especially the ploughs and seed-cum-fertilizer drills. Suffice it to say that the scheme has made a very good impression on the farmers. If anything, all the complaints refer to the non-availability of certain implements for outright purchase or hiring service not being made available in some village sites and Lamani localities.

Some small and medium farmers have not come to own modern ploughs only because they feel the costs are rather prohibitive despite the subsidy being available. In the case of some other small farmers they cannot own certain implements as they do not possess bullocks. However, these farmers manage to get the necessary operations done by the hire units.

Regarding the awareness of operation of this scheme and the facility of project machinery available on hire,

only four out of 63 sample farmers have remained ignorant. Three of these are Iamanis residing in their 'Tandas' and one staying in his fara house. However, the villages to which they belong do not have the project facility of hire service. In point of fact, many informants from three villages, namely, Arakeri, Gunaki and Maknapur have complained that the Project has failed to provide the hiring services in their villages. Apart from this sour note, a few have complained that the project officials are not helping them to acquire new implements. Even those who have not tried the implements have come to know of the superior efficiency of the ploughs, especially, the 'Balaram' variety, which is lighter than other iron ploughs, and does not tire the bullocks. Nevertheless, the available implements are too few in number to satisfy the demands of many farmers.

6. Agricultural Inputs

Among the 63 sample farmers, 23 have availed of the project aid of subsidised agricultural inputs - seeds, fertilizers and plant protection chemicals (P.P.C.). For eight of these 23 farmers, this category of aid (inputs) happens to be the only direct project benefit they have obtained so far. Besides these eight, most others coming under this aid are the cultivators of small and medium size holdings.

Even though the scheme allows lifting of all the three kinds of inputs, only nine sample farmers have done so in getting seeds, fertilizers and P.P.chemicals. Among the rest, eleven have availed of both seeds and fertilizers and three farmers, all cultivating medium

size holdings, have opted for only seeds. Regarding the utilisation of these inputs, 12 have done it exclusively for irrigated crops, five for only dry land crops and the remaining six for both irrigated and dry land crops. Except in a negligible number of cases, the inputs are used in both kharif and rabi seasons.

The data showing the receipt of inputs (in money terms) for irrigated and dry lands in respect of each size of operational holding groups are set in Table 5.4. It may be seen that at the overall sample level the inputs utilised for irrigated area accounts for 76 per cent of the total value. The use of P.F.Chemicals is very meagre and whatever the extent of aid received is mostly utilised for irrigated crops. The per acre average in respect of fertilizer use shows that medium size holdings (III and IV) are quite prominent for irrigated crops and large holdings in that of dry land crops. The average value of aid per reporting farmer works out to Rs. 502 at the aggregate level.

Opinion of the Farmers

The direct participants as well as other sample farmers are of the opinion that the timely supply of fertilizers at a considerably cheaper rate or at 50 per cent subsidy must be ensured for all those willing to seek the aid more than once. It is also stressed that a massive fertilization programme should be undertaken as the lands lack soil nutrients and also on the grounds that lack of fertilizer may render other techniques ineffective.

Table 5.4: Receipt of Agricultural Inputs by Reporting Farmers According to Size of Cultivated Holdings

Size of cultivated holding (Acres)	No. of Reporting Farmers	Value of Agricultural Inputs Received (in Rs.)										Grand Total (irrigated and dry)	Average per Reporting Farmer
		IRRIGATED					UNIRRIGATED						
		Area reported (acres)	Seeds	Fertili- sers	P.P.C.	Total value (Rs.)	Area reported (acres)	Seeds	Fertili- sers	P.P.C.	Total value		
Upto 5 Acres	3	7.60	63 (8.3)	292 (38.4)	-	355 (46.7)	0.75	3 (4.0)	16 (21.3)	-	19 (25.3)	374	125
5.01-10.00	7	39.00	165 (4.7)	1429 (36.6)	18 (0.5)	1632 (41.8)	10.70	34 (3.8)	112 (10.5)	-	146 (13.6)	1772	254
10.01-15.00	4	18.50	205 (11.1)	947 (51.2)	17 (0.9)	1169 (63.2)	30.28	79 (2.6)	-	-	79 (2.6)	1249	312
15.01-25.00	4	46.50	231 (5.0)	3128 (67.3)	73 (1.6)	3432 (73.8)	28.00	160 (5.7)	25 (0.9)	-	185 (6.6)	3617	904
25.01-50.00	4	40.50	406 (10.0)	1459 (36.0)	44 (1.1)	1909 (47.1)	34.00	229 (6.7)	563 (16.6)	15 (0.4)	807 (23.7)	2716	679
50.01 and above	1	6.25	22 (3.4)	270 (41.5)	-	292 (44.9)	65.00	252 (3.9)	1263 (19.4)	12 (0.2)	1527 (23.5)	1819	1819
Total	23	158.35	1112 (7.0)	7525 (47.5)	152 (1.0)	8789 (55.5)	168.73	757 (4.5)	1979 (11.7)	27 (0.2)	2763 (16.4)	11552	502

(Figures in brackets represent average per acre)

7. Crop Selection and Crop Production Techniques

Hitherto, we have discussed the direct participation of sample farmers in the specific schemes for which project assistance being made available. Presently, we are dealing with the remaining area of project activities which is mainly in the nature of promotion and extension work. This area includes promotion of suitable crops and crop mix (high yielding varieties), newly devised techniques concerning agronomic practices and cultural operations and demonstration work. However, the benefit takes the form of technical advice and general guidance, and only a little tangible to those few who are favoured with demonstration plots. In the following we attempt to give some idea about these activities in so far as these have affected or influenced the sample farmers. Much of the information is based on the opinions of the informants.

Promotion of H.Y.V. and Other Crops

Regarding the acceptance of suitable crops on the part of the sample farmers, there appears to be only a limited success. Several crops and crop mix have been disregarded by most of the project farmers as only minor crops without much significance. Whatever the partial success that has been achieved is only in respect of some major cereals and cotton. Thus, we find H.Y. bajra, to

Continued/..

some extent, in kharif season, Mexican wheat and Mugati jowar, an improved variety, in rabi and irrigated Suyodhara cotton (improved) in summer. It is only in respect of improved varieties of rabi jowar and cotton, very high proportion of acceptance is reported. Almost all the sample farmers have taken to raise Mugati jowar in irrigated as well as dry lands.

In the case of high yielding varieties, 37 out of 63 sample farmers have taken to raising one or more of these crops in some parts of their lands. Among the 37 adapters, 19 figure in raising Hy. bajra and 13 that of Mexican wheat. There is, however, only a small number that has tried raising two or more varieties of high yielding crops during the year. In the case of bajra, the high yielding variety accounts for nearly 44 percent of total area under irrigated bajra and only 19 percent of total dry land under bajra. Similar proportions for Mexican wheat work out to nearly 73 per cent of irrigated and 74 per cent of dry areas of the respective total acres under wheat. The areas under Hy. jowar and Hybrid maize are too meagre to deserve any mention. Actually Hy. bajra and Mexican wheat together account for 93 per cent of the total area under all the high yielding crops. About 63 per cent of total area under high yielding varieties is devoted to dry land cultivation especially, it is the case with regard to bajra and wheat. The data on cropwise area under H.Y.V. crops in different size groups (project sample farms) are set in Table 5.5.

Apart from high yielding and improved varieties of major cereal and cotton crops, the responses of sample farmers to the suggested crop plan and crop rotation

Table 5.5: Area of Project Sample Farms under H.Y.V. Crops

Size of operated holding (Acres)	(Area in Acres)														
	Kharif Season						Rabi Season					All Seasons			
	Hy. Bajra			Hy. Jowar			Hy. Maize total	Maxicon Wheat			Hy. Jowar irriga- ted	Hy. Maize irri- gated	All Crops		
	Irriga- ted	Dry	Total	Irriga- ted	Dry	Total	irriga- ted	Irriga- ted	Dry	Total	ted	gated	Irri- gated	Dry	Total
Upto 5 Acres	4.25	-	4.25	-	-	-	-	1.55	-	1.55	-	-	5.80	-	5.80
5.01-10.00	9.75	6.00	15.75	2.00	-	2.00	1.50	3.50	-	3.50	-	-	16.75	6.00	22.75
10.01-15.00	7.00	6.00	13.00	2.00	-	2.00	-	3.00	3.00	6.00	-	-	12.00	9.00	21.00
15.01-25.00	12.00	23.00	35.00	-	6.00	6.00	-	1.50	4.00	5.50	-	-	13.50	33.00	46.90
25.01-50.00	15.00	50.00	65.00	2.00	-	2.00	-	5.50	27.75	33.25	4.00	2.00	28.50	77.75	106.25
50.01 and above	4.00	-	4.00	-	-	-	-	-	-	-	-	-	4.00	-	4.00
All Size Groups	52.00	85.00	137.00	6.00	6.00	12.00	1.50	15.05	34.75	49.80	4.00	2.00	84.55	125.75	206.30

based on rain fall and soil types are quite lukewarm. About 21 per cent of the informants have pleaded ignorance, that is, they have not been aware of such plans or advice to be rendered by the project personnel. It is needless to add that all these ignorant farmers belong to size groups below 15 acre holdings. However, the small and medium farmers are aware of the same but most of them have not tried it at all, some for the reason of cost of innovation being very high and some others fearing such ventures might be risky. In all, just four of the 23 small farmers (upto 15.00 acres) have tried it and of which only one has found it useful. The other three have given it up as being a risky proposition. Among the medium and large farmers, most are aware of the advisory facility but very few have tried and found it useful. The responses of all the 63 sample farmers may be distributed broadly as under:-

<u>Experience/Opinion</u>	<u>Percentage</u>
(1) Not aware of the plan/advice	21
(2) Aware but prefer old method	10
(3) Aware but not tried at all	31
(4) Risky/very expensive	13
(5) Tried and found useless	4
(6) Useful for only minor crops	9
(7) Quite useful/beneficial	<u>12</u> <u>100</u>

Improved Farming Techniques and Agronomic Practices

The extent of adoption and opinions of sample farmers with regard to various techniques, some of which are specially devised for dry farming, are taken up here. In regard to advanced date of sowing recommended by the project, only about four percent of sample farmers have

stated that they are not aware of such a practice. Those who have tried and found it satisfactory form only 33 per cent of the total informants. However, the majority, constituting 59 per cent, is opposed to the experiment for such reasons as it being against the tradition and nature, unhealthy growth of crop and uncertainty of rainfall rendering the venture very risky. Apart from this negative attitude by the majority, just one farmer (2 per cent) has stated that he has incurred loss after giving it a try.

The technique of mid-season correction involving substitution of small duration crop in place of unhealthy standing crop and other necessary corrective measures to improve the situation has not made much impression on the sample farmers. However, in several cases there has not been any need at all to consider adopting this technique. Nevertheless, those not in favour or not inclined to try the method if the need arises form as much as 53 per cent of the total informants. Besides, the farmers not being aware of the technique constitute 27 per cent. In the case of 15 per cent farmers, the need has not arisen at all to decide one way or other. In all, only six farmers (3.00 per cent) have had the occasion to try the technique and only three of them reported success, the other three reporting loss.

The bunch of miscellaneous practices like proper spacing, the use of treated seeds, intercultural operations, mulching, spraying, etc., has evoked equally mixed response. Here too, about a fifth (21 per cent) of the sample farmers has remained ignorant about any of these techniques. Those who are aware but not able

to adopt the practices for the reason of the operational holding being too small (very small holders) form six per cent. Those not adopting on the ground that the techniques require very expensive operations constitute 35 per cent of the total informants. The farmers who are aware of the advantages but not tried the techniques yet form 18 per cent. Another seven per cent of the farmers have stated that they are not convinced about the usefulness. It is only 19 per cent of farmers who have tried several of these practices and are convinced about the advantages. The general feeling among the farmers is that such techniques or improved practices yield benefits only when fertilizers are used in considerable quantities.

Demonstration Plots

The demonstration on the cultivators' farms provides direct benefits to the recipients in the form of free inputs (worth Rs. 100 or even more) and other assistance by the project in the nature of technical advice, supervision and the use of project owned implements and machinery. During the last six years, 20 of the 68 sample farmers have been allotted the benefits of demonstration plots. These beneficiaries have received 33 plots in all. Ten farmers have received the assistance once each, seven have been benefitted twice each and three have been endowed the benefits three times each. Half the number of beneficiaries belong to one village, namely, Kannal.

The scheme has been quite successful and for the reason there is a popular clamour for the allotment of demonstration plots. However, only about 30 per cent of the sample farmers have been favoured with this

benefit. The reaction of 35 per cent of farmers is that they have not been favoured with the plots even once though they have not made any efforts to get the same. The remaining 24 farmers (about 35 per cent) have complained that they have not been given the demonstration plots despite their efforts to get the same. Several farmers have mentioned that the allotment is not made only because their farms are not on the road side. Besides, in the matter of allotment of plots, the small farmers (up to 10.00 acres) have received lesser attention than the others. The following gives a broad idea about the allotment or otherwise of the plots in each size of holding.

Size of Holding	Percentage of farmers			Total (actual)
	Receiv- ing allot- ment	Not yet received	Not allotted despite asking	
Small (upto 10 acres)	10.7	32.1	57.2	100(22)
Medium (10.01- 25.00 acres)	36.4	45.4	18.2	100(22)
Large (25.01 and above)	50.0	27.8	22.2	100(18)
All holdings	29.4	35.3	35.3	100(68)

8. The Overall Opinions of Sample Farms

In the following are given the overall opinions of the sample farmers regarding the usefulness or otherwise of the I.D.L.A.D. Project as a whole. Although many an informant has varied experiences with regard to his direct participation in different schemes and, whether or not aware of all the programmes and activities

of the project, his overall opinion is supposed to give expression to his general reaction and total impression.

Among the 12 farmers belonging to the smallest size group (upto five acre holding) only two are of the firm opinion that the project is good and another five, however, are of the opinion that the pilot experiment is quite encouraging and needs to be continued. On the contrary, the remaining five, forming 42 per cent in the group, hold the opinion that there is no proper help from the project. In the 5.01-10.00 acre holding, out of 16 farmers eight share the opinion that it is encouraging, two are of the view that no proper help is available from the project and another two are bitter about the discrimination practised by the project authorities. The remaining two farmers in the group do not have any definite opinion about the project as a whole.

In the size group of 10-15 acre holding, 10 out of 12 farmers, constituting 83 per cent, have expressed the opinion that the project is good and useful. The remaining farmers are of the view that no proper help is rendered by the project. Among the ten farmers in the next higher size holding (15-25 acre group) 60 per cent is of the view that the project is sound and useful; 20 per cent is of the opinion that the project is good in some respects and the rest dubs it as good for only educated and influential farmers.

In the case of 14 farmers in the 25-50 acre size group, eight informants representing 57 per cent have stated that the good and useful work of the project must be continued longer. Those stating that the project is good only in some respects form 14 per cent in the group. Another 14 per cent feels that the help is

also against some of those residing secured to some extent only after persistent efforts. The remaining per cent is of the critical view that there is a good deal of discrimination resulting in unfair treatment and unequal benefits. Finally in the largest size group (50 acres and above) three of the four farmers feel satisfied about the useful role of the project particularly with regard to the new technique and the remaining one too gives the same opinion but qualifies it by saying that it discriminates against his village.

By and large, at the aggregate level, about 60 per cent of the sample farmers are appreciative of the project saying it is good and useful and also encouraging. Another seven per cent are of the view that it is good and useful in several respects. About three percent has no definite impression either way about the project. The remaining 30 per cent of the farmers are positively critical about the way the project is administered, and their complaints mainly refer to proper help not being rendered and discrimination against the poorer and smaller farmers as also against some of those residing in certain villages and localities. The following gives the summary view of the overall opinions.

Broad category of opinion	No. of farmers	As per cent of total
1. Good and useful	23	41.2
2. Encouraging and improving	13	19.1
3. Good in several respects	5	7.4
4. No proper help	11	16.2
5. Discrimination	9	13.2
6. No definite opinion	2	2.9
All	63	100.0

CHAPTER VI

ASSESSMENT OF ECONOMIC VIABILITY OF THE PROJECT SCHEMES

The present chapter takes up the crucial aspect of the study, that is, the economic viability of the dry land technology. In order to evaluate the economic benefits accruing to farmers adopting various schemes and techniques, the performance of the control farmers (non-participants from outside the project) is taken as the basis for the comparative assessment. The viability of each scheme is assessed in terms of somewhat a simple tool of analysis, namely, the cost-yield ratio. The cost-yield ratio for each of the major crops raised by the participants under different schemes, as well as, for crops grown by the non-participants will also facilitate comparative assessment. Besides, the surplus value of output over the net cost of inputs is also used as an indicator to give a rough idea about the extent of ^{profit} profitability of the given technique. In short, the data on input-output relationship with the indicators like yield rates, cost-yield ratio and surplus value of output will facilitate not only the assessment of the viability of each scheme but also the relative superiority of techniques or measures to that of control farms where no specific dry land technology is available.

The crops separately considered for the analysis of input-output relationship are local variety of irrigated bajra and unirrigated bajra in kharif season, improved variety of jowar (Mugati) irrigated and unirrigated during rabi season and the suyodhara variety of irrigated cotton in summer season. All the five crops (counting irrigated and unirrigated separately) feature in respect of non-participant control farmers and the project sample under the land improvement scheme. The three irrigated crops are considered for

minor irrigation scheme as only these crops are raised in the command area of wells benefited by the scheme. All but summer cotton are covered in the case of project assistance under farm implements and machinery scheme. Only irrigated bajra and both jowar crops (irrigated and dry) come under the scheme of supply of agricultural inputs. Finally, only hy. bajra, both irrigated and unirrigated, are available for inclusion under general H.I.V. programme, even though it is not a specifically subsidised measure or direct scheme. It is to be considered for general comparison as the control farmers too have been raising hy. bajra in their farms in sufficient number. However, all the crops do not feature in the analysis in respect of each and every scheme for want of sufficient number of observations in most of the size of holdings or even at the aggregate level. Nevertheless, the above five crops considered for the present analysis, cover well over 75 per cent of the crop production activities of the sample farmers.

Regarding the data on cost of cultivation, all the variable costs, both paid out and imputed costs, are taken into consideration. The paid out costs take into account both cash and kind components and imputed costs on inputs, including the family labour and owned bullocks, labour, are based on the rates prevailing locally for different operations in different seasons. However, owing to some inadequacy of data, it has not been possible to include the fixed costs like land revenue, traditional payments to village artisans, depreciation and so forth. Though family labour and owned bullocks are fixed assets from the point of view of the farm family, these elements of cost have been treated as variable from the point of view of individual crops.

For the sake of convenience, the total cost of cultivation is broadly divided into major items, viz., seed, farm yard manure (FYM), fertiliser, bullock labour (owned and

hired), human labour (family and wage) and irrigation charges in the case of irrigated crops. The expenditure on pesticides being very meagre and that too reported only by a negligible number of cases, this inconsequential cost is included in the fertiliser itself.

Regarding the output, the data give both quantity (in kilograms) and the value of main product based on farm harvest prices. It does not, however, include the value of by-product i.e., fodder, as the informants could not furnish satisfactory information on the same. Nevertheless, some rough estimate, based on official data on yield accounts of demonstration plots in the project area, indicates that the value of by-product is more than sufficient to off-set the fixed cost component that has not featured in the total cost of cultivation.

In regard to scheme-wise analysis, it may be made clear that the participant farmers under each scheme are not mutually exclusive. In other words, in view of the multiplicity of benefits several farmers invariably feature in the cost-yield analysis of more than one scheme. All the same, it gives a broad idea about the role played by a particular measure to a considerable extent even though it may not be possible to ascribe the entire credit or otherwise to the given measure.

1. General Pattern of Costs and Yields

Before we proceed with the comparative analysis on the basis of indicators like cost-yield ratio, it may be necessary to give a brief account on broad pattern of costs and yields, in respect of crops raised by the non-participants (control) and participants of each of the schemes. The data in respect of per acre costs of various material inputs, bullock and human labour and per acre quantity and value of yield for each of the major crops are sent in

Tables. The holdingwise details for each crop under control as well as each scheme are presented in separate tables.

(A) Non-participant Control Group :

The farmers from the control village, thirnaia, have truly remained untouched by the modern farm techniques except for the adoption of H.Y.V. Crops like bajra to some extent. None of the farmers possesses any modern farm implements and machinery. All of them carry out their tilling operations with the help of conventional wooden implements. The water lifting device is still the 'mot' in all the cases except a solitary farmer reporting oil engine. Rarely fertilizers and pesticides are applied even for the irrigated H.Y.V. crops. The relevant data concerning the holdingwise details for each crop raised by the control farmers are set in Tables 6.1 to 6.6.

By and large, the data reveal that the major costs of cultivation are incurred in respect of bullock labour, human labour and irrigation charges in the case of irrigated crops. In the case of dry crops (local bajra, jowar and hy. bajra) the cost of bullock labour (owned and hired together) itself accounts for 60 to 70 per cent of the total cost. The irrigated crops are more labour intensive than the dry crops. However, in both cases as well as in all size groups, the employment of family labour is more prominent than the wage labour. In almost all the cases, the family labour accounts for roughly two-thirds of the total cost on human labour. Similar is the case with the bullock employment where the farm owned bullocks account for a little over 70 per cent of the total cost on bullock labour at the aggregate level. In several cases, the small and medium holdings report a considerable proportion of hired bullock labour as some farmers do not own any bullocks at all.

Category : Non-participants (control)

Crop : Hy. Bajra (irrigated)

Size of Holding (in acres)	Seed	Manure		Bullock Labour		Labour Charges		Irriga- tion Charges	Total Cost	Yield		Cost- Yield Ratio	Surplus
		FYM	Ferti- liser	Own	Hired	Family	Hired			Qty (kg)	Value		
Upto 5.00	2	13	-	67	-	80	-	133	295	166	166	0.56	-129
5.01 to 10.00	3	8	-	23	16	18	9	36	112	250	250	2.23	138
(upto 10.00)	(3)	(9)	-	(31)	(13)	(30)	(7)	(54)	(147)	(235)	(235)	(1.60)	(88)
10.01 to 15.00	-	-	-	-	-	-	-	-	-	-	-	-	-
15.01 to 25.00	3	16	-	51	6	45	14	49	184	167	167	0.91	-17
25.01 and above	3	16	-	44	1	37	24	55	180	286	286	1.59	106
Total	3	14	-	44	6	36	17	52	172	232	232	1.35	60

(Figures in brackets represent averages for broader size groups)

Table 6.2: Cost of Cultivation and Input-Output Relationship

Category : Non-participant (Control Village)

Crop : Bajra (dry)

(Rs./acre)

Size of Holding (in acres)	Seeds	Manure		Bullock Labour		Human Labour		Total Cost	Yield		Cost-Yield Ratio	Surplus
		F.Y.M.	Fertiliser	Own	Hired	Family	Hired		Qty. (kg)	Value		
Upto 5.00	-	-	-	-	-	-	-	-	-	-	-	-
5.01 to 10.00	2	2	-	15	18	6	4	47	88	88	1.87	41
10.01 to 15.00	1	2	-	39	7	9	1	59	59	59	1.00	-
15.01 to 25.00	1	1	-	27	9	9	2	49	38	38	0.77	-11
(10.01 to 25.00)	(1)	(1)	-	(31)	(8)	(9)	(2)	(52)	(45)	(45)	(0.86)	(-7)
25.01 and above	1	2	-	33	7	8	3	54	51	51	0.94	-3
All Size Groups	1	1	-	30	9	8	3	52	53	53	1.02	1

(Figures in brackets represent averages for broader size groups)

Table 6.1: Cost of Cultivation and Input-Output Relationship

Category : Control Farms (Non-participants)

Crop : Jowar (irrigated)

(Rs./acre)

Size of Holding (acres)	Seeds	Manure		Bullock Labour		Human Labour		Irrigation Charges	Total Cost	Yield		Cost-yield Ratio	Surplus
		F.Y.M.	Fertiliser	Own	Hired	Family	Hired			Cty (kg)	Value		
Upto 5.00	2	-	-	44	-	39	2	76	163	105	116	0.71	-47
5.01 to 10.00	2	-	-	22	9	18	14	36	101	80	88	0.87	-13
(upto 10.00)	(2)	-	-	(28)	(7)	(24)	(11)	(47)	(119)	(87)	(96)	(0.81)	(-23)
10.01 to 15.00	11	-	50	-	160	50	40	240	551	500	550	1.00	-1
15.01 to 25.00	2	-	-	26	3	33	13	56	133	156	172	1.29	39
(10.01-25.00)	(3)	-	(4)	(24)	(16)	(35)	(15)	(70)	(167)	(183)	(201)	(1.20)	(34)
25.01 and above	2	-	-	35	2	30	14	64	147	232	255	1.73	108
All Size Groups	2	-	2	28	9	30	14	63	148	176	194	1.31	46

(Figures in brackets show per acre averages for broader size groups)

Table 6.4: Cost of Cultivation and Input-Output Relationship

Category : Non-participants (control village)

Crop : Jowar (dry)

Size of Holding (in acres)	(Rs./acre)											
	Seeds	Manure		Bullock Labour		Human Labour		Total Cost	Yield Qty. (kg)	Yield Value	Cost-Yield Ratio	Surplus
		F.Y.M.	Ferti-liser	Own	Hired	Family	Hired					
Upto 5.00	1	-	-	16	5	7	2	31	54	59	1.90	28
5.01 to 10.00	1	-	-	11	10	6	5	33	49	54	1.64	21
(upto 10.00)	(1)	-	-	(12)	(9)	(6)	(5)	(33)	(50)	(55)	(1.67)	(22)
10.01 to 15.00	2	-	-	38	3	10	1	54	74	81	1.50	27
15.01 to 25.00	1	-	-	8	8	5	3	25	27	30	1.20	5
(10.01-25.00)	(1)	-	-	(16)	(7)	(6)	(2)	(32)	(40)	(44)	(1.38)	12
25.01 and above	1	-	-	16	6	5	3	31	53	58	1.57	27
All Size Groups	1	-	-	15	7	6	3	32	47	52	1.63	20

(Figures in brackets represent averages for broader size groups)

Table 6.5: Cost of Cultivation and Input-Output Relationship

Category : Non-participants (control village)

Crop : Summer Cotton (irrigated)

(Rs./acre)

Size of Holding (in acres)	Seed	Manure		Bullock Own	Labour		Irrigation Charges	Total Cost	Yield		Cost-Yield Ratio	Surplus	
		F.Y.M.	Fertiliser		Hired	Family Hired			Qty. (kg)	Value			
Upto 10.00	3	-	-	19	4	36	28	85	175	125	450	2.57	275
10.01-25.00	9	-	51	37	58	91	49	131	426	161	580	1.36	154
25.01 and above	5	-	-	35	-	99	24	133	296	100	360	1.22	64
All Size Groups	5	-	12	26	15	61	32	105	256	128	461	1.80	205

Table 6.6: Cost of Cultivation and Input-Output Relationship

Category : Non-participants (control village)

Crop : Hy. Bajra (dry)

Size of Holding (in acres)	Seeds	Manure		Bullock Labour		Human Labour		Total Cost	Yield		(Rs./acre)	
		F.Y.M.	Ferti- liser	Own	Hired	Family	Hired		Qty. (kg)	Value	Cost- Yield Ratio	Surplus
Upto 5.00	3	5	-	9	27	6	6	56	104	104	1.86	48
10.01 to 25.00	3	1	-	23	23	8	2	60	78	78	1.30	18
25.01 and above	3	5	-	35	2	10	2	57	62	62	1.09	5
All Size Groups	3	3	-	25	16	8	3	58	77	77	1.33	19

In regard to the use of material inputs, the control farms report a little expenditure on F.Y.M. and virtually less on fertilizers. Out of five major crops and hy. bajra (dry) the use of fertilizer is reported only in the case of irrigated jowar and summer cotton and, that too, by the medium group holdings (10 - 25 acre size group) in both cases. What is worth noting is that in both cases of hy. bajra, irrigated and dry, no fertilizer has been applied in any size of holding. The organic manure (FYM) is applied only to a small extent in respect of bajra crops in kharif season. In the case of unirrigated bajra, the per acre cost works out to just a rupee, at the aggregate level.

Broadly speaking, the overall pattern reveals that the component of imputed costs on owned inputs, bullock and family labour is greater than the paid-out costs. Even in respect of irrigation, the operation of bullock-drawn nets is done mainly by the family owned bullocks and family labour.

In terms of yield, obviously the irrigated crops have fared better. It is quite remarkable in the case of summer cotton. As there is no local variety of irrigated bajra raised by the control farmers, any comparison is possible only between local variety of dry bajra and hy. bajra grown in dry farms. In this regard, hy. bajra shows nearly 45 per cent increase in the yield over that of local variety (at the aggregate level), with greater cost-yield ratio and surplus value. In respect of irrigated crops of bajra and jowar (Tables 6.1 and 6.3) and local variety of dry bajra (Table 6.2) some size groups show less than 1.0 cost-yield ratio and negative surplus value. However, at the aggregate level (all size groups together) all the six crops record positive surplus, the highest by summer cotton (Rs. 205) and the lowest by local variety of dry bajra (i.e. one).

(B) Land Improvement Schemes :

The broad pattern in regard to project farmers participating in land improvement schemes may be seen in cropwise data set in Tables 6.7 to 6.11. The highlights reveal that all the crops have been given both organic manure and fertilizer. Obviously the irrigated crops have received greater attention than the unirrigated ones. The cost on material inputs (seed, FYM and fertilizer) form around 20 per cent of total cost in dry crops and 33 per cent in irrigated crops. The relative proportion of cost on hired bullock labour is considerably higher only in respect of smaller holdings, as most of them depend on hired services. At the aggregate level, imputed cost on bullock employment works out to 92 per cent and 87 per cent of the total cost on bullock labour in irrigated and dry farms respectively. Similar proportions in respect of family labour works out to 37 per cent for irrigated crops and 31 per cent for dry crops. On the whole, the dry crops are relatively more bullock labour intensive and irrigated crops are more human labour intensive.

In regard to yield performance the small holdings have recorded higher per acre output than the medium and large holdings in respect of unirrigated bajra, dry jowar and summer cotton crops. However, in terms of cost-yield ratio, this record holds good only in respect of unirrigated bajra. Similarly, the large holding group (over 25 acres) has done well in the case of irrigated bajra and jowar crops. The medium size group has performed relatively better in respect of summer cotton with the higher cost-yield ratio than the other two size groups. At the aggregate level the per acre surplus value of main product over cost has ranged from Rs. 58 in the case of dry bajra to as high as Rs. 298 in summer cotton. In the case of all the size groups for all crops, the cost-yield ratio works out to more than one.

Table 6.7: Cost of Cultivation and Input-Output Relationship by the Size of Holdings

Category : Participants in Land Improvement Scheme

Crop : Bajra (irrigated)

(Rs./acre)

Size of Holding (in acres)	Seed	Manure		Bullock Own	Labour			Irrigation charges	Total Cost	Yield		Cost-Yield Ratio	Surplus
		F.Y.M.	Fertiliser		Hired	Family	Hired			Qty. (kg)	Value		
Upto 5.00	5	22	3	14	37	24	22	23	150	265	265	1.77	115
5.01 to 10.00	7	11	23	75	7	18	44	60	265	347	347	1.31	82
(upto 10.00)	(6)	(17)	(13)	(44)	(22)	(22)	(33)	(51)	(208)	(308)	(339)	(1.63)	(131)
10.01 to 15.00	7	15	30	79	2	10	19	38	200	371	371	1.86	171
15.01 to 25.00	6	15	34	61	4	15	34	24	193	313	313	1.62	120
(10.01-25.00)	(7)	(15)	(32)	(70)	(3)	(13)	(27)	(31)	(198)	(342)	(342)	(1.73)	(144)
25.01 and above	4	13	69	39	2	19	29	33	208	362	362	1.74	154
All Size Groups	6	15	40	56	6	16	29	35	203	341	341	1.68	138

(Figures in brackets show per acre averages for broader size groups)

Table 6.8: Cost of Cultivation and Input-Output Relationship

Category : Land Improvement Scheme

Crop : Bajra (dry)

(Rs./acre)

Size of Holding (in acres)	Seeds	Manure		Bullock Labour		Human Labour		Total Cost	Yield		Cost-Yield Ratio	Surplus
		F.Y.M.	Fertiliser	Own	Hired	Family	Hired		Qty. (kg)	Value		
Upto 5.00	4	-	-	5	24	8	8	49	143	143	2.92	94
5.01 to 10.00	2	4	2	25	6	3	3	45	115	115	2.56	70
(upto 10.00)	(2)	(4)	(1)	(21)	(9)	(4)	(4)	(45)	(121)	(121)	(2.69)	(76)
10.01 to 15.00	3	1	-	31	6	3	5	49	120	120	2.45	71
15.01 to 25.00	2	6	-	40	1	4	8	61	114	114	1.87	53
(10.01 to 25.00)	(2)	(4)	-	(36)	(3)	(4)	(7)	(56)	(117)	(117)	(2.09)	(58)
25.01 and above	1	2	3	29	3	6	9	53	106	106	2.00	53
All Size Groups	2	3	2	31	4	5	7	54	112	112	2.07	58

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(Figures in brackets show per acre averages for broader size groups)

Table 6.9: Cost of Cultivation and Input-Output Relationship

Category : Land Improvement Scheme

Crop : Jowar (irrigated)

(Rs./acre)

Size of holding (in acres)	Seeds	Manure		Bullock Labour		Human Labour		Irrigation charges	Total Cost	Yield		Cost-Yield Ratio	Surplus
		F.Y.M.	Fertiliser	Own	Hired	Family	Hired			Qty. (kg)	Value		
Upto 5.00	5	-	5	22	21	20	16	28	117	297	327	2.79	210
5.01 to 10.00	5	8	50	78	3	18	25	67	254	391	430	1.69	176
(upto 10.00)	(5)	(4)	(32)	(55)	(10)	(19)	(21)	(51)	(197)	(352)	(387)	(1.97)	(190)
10.01 to 15.00	4	-	18	39	3	9	12	37	122	276	304	2.49	182
15.01 to 25.00	4	2	73	34	4	12	27	31	187	320	352	1.68	155
(10.01-25.00)	(4)	(1)	(50)	(36)	(3)	(11)	(21)	(34)	(160)	(301)	(331)	(2.07)	(171)
25.01 and above	4	-	51	41	3	14	30	25	168	353	380	2.26	212
All Size Groups	4	2	47	42	5	14	24	34	172	329	362	2.11	190

Table 6.10: Cost of Cultivation and Input-Output Relationship

Category : Land Improvement Scheme

Crop : Jowar (dry)

Size of Holding (in acres)	Seeds	Manure		Bullock Labour		Human Labour		Total Cost	Yield		(Rs./acre)	
		F.Y.M.	Fertiliser	Own	Hired	Family	Hired		Qty. (kg)	Value	Cost-Yield Ratio	Surplus
Upto 5.00	2	-	2	6	23	30	5	68	186	205	3.01	137
5.01 to 10.00	4	5	8	45	4	9	11	86	185	204	2.37	118
(upto 10.00)	(4)	(4)	(8)	(41)	(5)	(11)	(11)	(84)	(185)	(204)	(2.43)	(120)
10.01 to 15.00	4	5	-	32	4	3	7	55	139	153	2.78	98
15.01 to 25.00	2	2	4	33	8	3	10	62	172	197	3.18	135
(10.01 to 25.00)	(3)	(3)	(2)	(32)	(6)	(3)	(9)	(58)	(161)	(177)	(3.05)	(119)
25.01 and above	3	4	12	27	4	2	12	64	178	196	3.06	132
All Size Groups	3	4	9	30	5	3	11	65	164	180	2.77	115

(Figures in brackets show per acre averages for broader size groups)

Table 6.11: Cost of Cultivation and Input-Output Relationship

Category : Land Improvement Scheme

Crop : Summer Cotton (irrigated)

(Rs./acre)

Size of Holding (in acres)	Seeds	Manure		Bullock Labour		Human Labour		Irrigation Charges	Total Cost	Yield		Cost- Yield Ratio	Surplus
		F.Y.M.	Fertiliser	Own	Hired	Family	Hired			Qty. (kg)	Value		
Upto 5.00	13	67	11	87	10	46	81	42	357	176	634	1.78	277
(10.01-25.00)	11	-	85	42	-	52	47	69	306	172	619	2.02	313
(25 and above)	12	4	106	44	-	27	83	34	310	164	590	1.90	280
All Size Groups	12	16	76	48	2	42	68	50	314	170	612	1.95	298

(C) Minor Irrigation Scheme :

For the obvious reason, only the irrigated crops are considered under this scheme. The holdingwise data in respect of kharif bajra, rabi jowar and summer cotton feature in Tables 6.12, 6.13 and 6.14 respectively. It may be seen that the material inputs comprising seed, organic manure and fertilizer together account for roughly 23 per cent of the total cost of cultivation of bajra, 18 per cent in that of jowar and 29 per cent of cotton crop at the aggregate level. The cost of F.I.M. input is relatively greater than fertilizer in respect of small holding group (up to 10 acres) in bajra and cotton crops. However, the size of FIM is very meagre for jowar crop and it is reported only by the size group, 5-10 acres. At the aggregate level, the outlay on fertilizer far exceeds that of FIM for all the three crops. The cost on bullock labour forms the single largest item in all the broader size groups with 35 per cent of the total cost in the case of bajra. However, imputed cost on owned bullock labour overwhelmingly dominates the total outlay on bullock employment with over 90 per cent in the case of all the crops. In regard to expenditure on human labour, the paid-out cost on hired labour is greater than imputed cost on family labour in all the three crops at the aggregate level and all the size groups excepting the medium size group in the case of cotton. The paid-out cost on wages is generally around two-thirds of the total labour costs. The labour intensity is the highest in cotton cultivation (Rs. 99 per acre). Apart from irrigation expenditure, the total imputed costs exceed the paid-out costs in all the crops except cotton. The expenditure on irrigation averages around Rs. 50 per acre.

The per acre output averages well over 300 kgs. in all the broader size groups in respect of bajra and jowar and

Table 6.12: Cost of Cultivation and Input-Output Relationship by the Size of Holdings

Category : Minor Irrigation Scheme

Crop : Bajra (irrigated)

Size of Holding (in acres)	Seeds	Manure		Bullock Labour		Human Labour		Irrigation charges	Total Cost	Yield		Cost-Yield Ratio	Surplus
		F.Y.M.	Fertiliser	Own	Hired	Family	Hired			Qty. (kg)	Value		
Upto 5.00	7	19	10	3	49	27	35	36	186	304	304	1.63	118
5.01 to 10.00	5	10	12	78	-	17	24	73	219	328	328	1.50	109
(upto 10.00)	(5)	(13)	(11)	(54)	(16)	(21)	(28)	(61)	(209)	(321)	(321)	(1.54)	(112)
10.01 to 15.00	7	15	32	105	2	9	20	47	237	333	333	1.41	96
15.01 to 25.00	2	-	-	77	15	-	61	50	205	310	310	1.51	105
(10.01 to 25.00)	(7)	(14)	(29)	(99)	(3)	(9)	(21)	(45)	(227)	(331)	(331)	(1.46)	(104)
25.01 and above	5	19	48	56	2	19	36	46	231	379	379	1.64	148
All Size Groups	6	16	32	75	6	16	30	50	231	348	348	1.51	117

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(Figures in brackets show per acre averages for broader groups)

Table 6.1): Cost of Cultivation and Input-Output Relationship

Category : Kinner Irrigation Scheme

Crop : Jowar (irrigated)

(Rs./acre)

Size of Holding (in acres)	Seed	Manure		Bullock Labour		Human Labour		Irrigation Charges	Total Cost	Yield		Cost-Yield Ratio	Surplus
		F.Y.M.	Fertiliser	Own	Hired	Family	Hired			Qty. (kg)	Value		
Upto 5.00	5	-	7	6	37	21	26	31	133	278	306	2.30	173
5.01 to 10.00	4	4	29	65	-	9	18	66	195	319	351	1.80	156
(upto 10.00)	(4)	(3)	(23)	(49)	(10)	(12)	(20)	(57)	(178)	(308)	(339)	(1.90)	(161)
10.01 to 15.00	5	-	25	44	4	10	15	53	158	303	333	2.11	175
15.01 to 25.00	3	-	-	76	-	9	26	75	189	307	338	1.79	149
(10.01-25.00)	(5)	-	(21)	(49)	(3)	(9)	(17)	(58)	(162)	(304)	(334)	(2.06)	(172)
25.01 and above	3	-	28	42	-	18	23	41	155	353	383	2.50	233
All Size Groups	4	1	24	46	4	13	20	51	163	324	356	2.18	193

(Figures in brackets represent per acre averages for broader groups)

Table 6.14: Cost of Cultivation and Input-Output Relationship

Category : Minor Irrigation Scheme

Crop : Summer Cotton (Irrigated)

Size of Holding (in acres)	Seeds	Manure		Bullock Labour		Human Labour		Irrigation Charges	Total Cost	Yield		Cost-Yield Ratio	Surplus
		F.Y.M.	Fertilizer	Own	Hired	Family	Hired			Qty. (kg)	Value		
Upto 10.00	12	27	15	97	14	42	88	53	348	192	691	1.99	343
10.01 to 25.00	13	-	70	48	-	57	47	62	297	200	720	2.42	423
25.01 and above	12	2	67	36	-	22	70	37	246	149	536	2.18	290
All Size Groups	12	5	61	47	2	34	65	46	272	169	608	2.24	336

ranges from 150-200 kgs. for cotton. The cost-yield ratio is around 1.50 for bajra and around 2.0 for jowar and cotton. In terms of surplus value, cotton $\frac{1}{4}$ nets the maximum return of over Rs. 300 per acre, followed by jowar with nearly Rs. 200 and bajra with well over Rs. 100.

(D) Farm Implements and Machinery Scheme :

The four crops featuring under this scheme are (a) irrigated bajra, (b) dry bajra, (c) irrigated jowar and (d) dry jowar. The relevant details are presented in respective Tables 6.15 to 6.18. It may be seen that at the aggregate level the material inputs, viz., seeds, FIM and fertilisers together account for about 32 per cent of the total cost of cultivation of the two irrigated crops, 87 per cent in the case of dry jowar and only nine per cent in that of dry bajra, as no fertiliser is used in this case. Regarding the total expenditure on manure inputs it is overwhelmingly in the form of fertiliser in the case of all crops excepting the dry bajra.

In view of the possession of improved farm equipment like iron ploughs and seed and fertiliser drills, which requires ownership of bullocks, the farmers have obviously carried out almost entire operations with the help of owned bullocks. It is supplemented by the hired services to a very small extent. Thus, the cost of bullock labour is overwhelmingly in the form of imputed cost (over 95 per cent). Relatively speaking, the cost pattern is more bullock labour intensive than human labour intensive. The human labour intensity is in the range of Rs. 46 to 90 in the case of irrigated crops and around Rs. 12 in that of dry crops. The wage labour dominates the labour input by accounting for well over 70 per cent of the total labour costs. However, apart from the irrigation expenditure, the total imputed costs are greater than the paid-out costs for all the crops

Table 6.15: Cost of Cultivation and Input-Output Relationship by the Size of Holdings

Category : Farm Implements and Machinery Scheme

Crop : Bajra (irrigated)

(Rs./acre)

Size of Holding (acres)	Seeds	Manure		Bullock Labour	Human Labour		Irrigation Charges	Total Cost	Yield		Cost-Yield Ratio	Surplus	
		F.Y.M.	Fertiliser	Own	Hired	Family			Hired	Qty. (kg)			Value
Upto 10.00	7	11	20	85	-	18	41	81	263	359	359	1.37	96
10.01 to 25.00	11	15	78	75	3	17	39	46	284	371	371	1.31	87
25.01 and above	4	13	40	43	2	12	32	30	176	290	290	1.65	114
All Size Groups	7	14	48	59	2	14	36	43	223	323	323	1.46	102

Table 6.16: Cost of Cultivation and Input-Output Relationship

Category : Farm Implements and Machinery

Crop : Bajra (dry)

(Rs./acre)

Size of Holding (in acres)	Seed\$	Manure		Bullock Labour		Human Labour		Total Cost	Yield		Cost- Yield Ratio	Surplus
		F.Y.M.	Ferti- liser	Own	Hired	Family	Hired		Qty. (kg)	Value		
Upto 10.00	2	4	-	46	-	5	4	61	133	133	2.18	72
10.01 to 25.00	2	5	-	53	-	3	5	68	132	132	1.94	64
25.01 and above	2	2	-	36	-	3	10	53	105	105	1.98	52
All Size Groups	2	3	-	43	-	3	8	59	116	116	1.97	57

Table 6.17: Cost of Cultivation and Input-Output Relationship

Category : Farm Implements and Machinery

Crop : Jowar (irrigated)

(Rs./acre)

Size of Holding (in acres)	Seeds	Manure		Bullock Labour		Human Labour		Irrigation Charges	Total Cost	Yield		Cost-Yield Ratio	Surplus
		F.Y.M.	Fertiliser	Own	Hired	Family	Hired			Qty. (kg)	Value		
Upto 10.00	6	7	58	89	-	22	24	65	271	406	447	1.65	176
10.01 to 25.00	5	3	66	33	3	13	32	59	214	363	399	1.86	185
25.01 and above	4	-	56	38	3	10	36	26	173	360	396	2.29	223
All Size Groups	5	2	59	47	3	13	33	43	205	370	407	1.99	202

Table 6.18: Cost of Cultivation and Input-Output Relationship

Category : Farm Implements and Machinery

Crop : Jowar (dry)

(Rs./acre)

Size of Holding (in acres)	Seeds	Manure		Bullock Labour		Human Labour		Total Cost	Yield		Cost-Yield Ratio	Surplus
		F.Y.M.	Ferti-liser	Own	Hired	Family	Hired		Qty. (kg)	Value		
Upto 10.00	4	7	6	60	1	11	14	103	171	168	1.83	85
10.01 to 25.00	3	4	8	33	5	2	6	61	139	153	2.51	92
25.01 and above	3	4	13	35	3	1	12	72	156	172	2.39	100
All Size Groups	3	5	12	37	3	2	11	73	154	162	2.32	96

except the irrigated jowar. Also, at the aggregate level, the irrigation cost averages at Rs. 43 per acre. However, the small and medium holding groups have incurred higher expenditure on irrigation than that of the large holdings. The per acre cost of irrigation declines with the increase in the size of holding.

The output of bajra is well over 300 kgs. for irrigated farms and over 100 kgs. for dry farms. In both the cases, the small and medium groups have obtained greater yields than the largest size group. However, the cost-yield ratio indicates better performance on the part of the latter size group for irrigated bajra and former groups for dry bajra. In regard to jowar crops, the yield rates are greater in small holding group but the cost-yield ratios are higher in medium and large holding groups. At the aggregate level, the per acre surplus value ranges around Rs. 60 for dry bajra to Rs. 100 for irrigated bajra and a little under Rs. 100 for dry jowar to Rs. 200 for irrigated jowar.

(L) Scheme for supply of Agricultural Inputs :

Under this scheme, the participants have raised only irrigated ^{bajra} and dry ^{both} jowar crops. The data for these three crops are presented in Tables 6.19 to 6.21. Broadly speaking, the use of fertilizer is quite considerable in the two irrigated crops and somewhat moderate in the case of dry jowar, where the medium size group has relied only on farm yard manure. At the aggregate level, the cost of fertilizer forms 20-26 per cent of the total cost in the case of irrigated crops and 16 per cent of that of dry jowar. Proportionately it is lower in the case of small holding groups with less than 20 per cent of the total cost of cultivation. The FYM is totally absent in the case of irrigated jowar and rather quite meagre in the case of dry jowar. The expenditure on bullock employment is greater

Table 6.19: Cost of Cultivation and Input-Output Relationship

Category : Agri. Inputs Scheme

Crop : Bajra (irrigated)

(Rs./acre)

Size of Holding (in acres)	Seeds	Manure		Bullock Labour		Human Labour		Irrigation Charges	Total Cost	Yield		Cost-Yield Ratio	Surplus
		F.Y.M.	Fertiliser	Own	Hired	Family	Hired			Qty. (kg)	Value		
Upto 10.00	4	7	21	53	4	17	14	24	144	284	284	1.97	140
10.01 to 25.00	6	11	38	78	1	8	24	25	191	310	310	1.62	119
25.01 and above	4	23	42	56	-	26	23	28	202	327	327	1.62	125
All Size Groups	5	12	34	65	2	15	20	26	179	306	306	1.71	127

Table 6.20: Cost of Cultivation and Input-Output Relationship

Category : Agri. Inputs

Crop : Jowar (irrigated)

Size of Holding (in acres)	Seeds	Manure		Bullock Labour		Human Labour		Irrigation Charges	Total Cost	Yield		Cost-Yield Ratio	Surplus
		F.Y.M.	Fertiliser	Own	Hired	Family	Hired			Cty. Value (kg)	Value		
Upto 10.00	3	-	26	48	8	12	12	26	135	261	287	2.13	152
10.01 to 25.00	4	-	64	46	3	9	22	39	187	289	318	1.70	131
25.01 and above	3	-	32	48	3	18	18	31	153	277	305	1.99	152
All Size Groups	3	-	42	47	4	13	18	32	159	277	305	1.92	146

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Table 6.21: Cost of Cultivation and Input-Output Relationship

Category : Agri. Input Scheme

Crop : Jowar (dry)

(Rs./acre)

Size of Holding (in acres)	Seeds	Manure		Bullock Own	Labour		Total Cost	Yield		Cost-Yield Ratio	Surplus	
		F.Y.M.	Ferti- liser		Hired	Family Hired		Cty. (kg)	Value			
Upto 10.00	4	2	17	36	9	15	11	94	175	193	2.05	99
10.01 to 25.00	3	6	-	40	2	9	24	84	171	188	2.24	104
25.01 and above	3	-	13	24	4	5	9	58	142	156	2.69	98
All Size Groups	3	1	11	29	5	7	11	67	152	167	2.49	100

than human labour and in the case of former it is overwhelmingly in the nature of imputed cost on owned bullocks (about 90 per cent), and in the latter case, the greater proportion (nearly 60 per cent) is in the form of paid out cost on hired labour. The irrigation cost ranges from 15 to 20 per cent of the total cost of cultivation.

At the aggregate level, the average yield per acre is 306 kgs. for irrigated bajra, 277 kgs. for irrigated jowar and 152 kgs. for dry jowar. The yield rates of both irrigated crops are generally higher in the medium and large holding groups than in the small size group and the other way round in the case of dry jowar. However, in terms of cost-yield ratio the small holding group has fared better than the other two size groups in respect of both the irrigated crops. On the other hand, the ratio increased with the size of holding in the case of dry jowar. The per acre surplus value of grains over the cost is well over Rs.100 for all the size groups in the case of irrigated crops and just around Rs.100 in the case of dry jowar.

(F) Voluntary Participation in H.Y.V. Programme :

The adoption of high yielding variety of crops does not form part of any direct scheme in the project area. The farmers have not been the beneficiaries of any project assistance whatsoever for raising such crops. However, in order to obtain a broad idea about the impact of general crop promotion activities undertaken by the project authorities, we have considered the hy. bajra (irrigated and dry) grown by the reporting sample farmers irrespective of the specific schemes in which they have participated. The present analysis may facilitate somewhat a general evaluation of one of the extension activities in the project area.

Moreover, it will help the comparison of performance with that of control sample which also cultivates hy. bajra crop.

For want of sufficient number of farmers in all the size groups, wheat and other hy. crops could not be considered for the purpose of analysis. However, irrigated and dry bajra crops suffice the purpose of obtaining some general idea as well as comparison with the control farmers at a later stage. Besides, several sample farmers who have participated in different schemes and techniques feature together in the present analysis, though it is restricted to only those who have raised hy. jowar. The relevant data concerning irrigated and dry bajra are presented in Tables 6.22 and 6.23 respectively.

Although irrigated farms report considerable expenditure on fertilizer, the dry farms have used no fertilizer at all and very little organic manure. It is almost entirely seed based high yielding crop in the case of dry farms. In the irrigated farms, it is more bullock intensive than human labour in small and medium size groups. The expenditure on bullock labour forms the single largest item, accounting for 30 per cent of the total cost in small holding and 41 per cent in that of medium size group. In the case of the large size group, manure forms the single largest item with 40 per cent of the total cost, followed by human labour and bullock labour with 22 per cent and 18 per cent respectively. The imputed cost works out to 91 per cent of the total cost on bullock labour, while it is only 31 per cent in the case of human labour.

In regard to bajra output, the irrigated farms have yielded over 250 kgs. per acre. In the largest size

Table 6.22: Cost of Cultivation and Input-Output Relationship

Category : Project Sample

Crop : Hy. Bajra (irrigated)

(Rs./acre)

Size of Holding (in acres)	Seeds	Manure		Bullock Labour		Human Labour		Irrigation Charges	Total Cost	Yield		Cost-Yield Ratio	Surplus
		F.Y.M.	Fertiliser	Own	Hired	Family	Hired			Qty. (kg)	Value		
Upto 10.00	6	9	19	49	11	22	27	55	198	293	283	1.48	95
10.01 to 25.00	4	14	20	58	2	9	21	17	145	258	258	1.78	113
25.01 and above	6	9	109	50	3	15	50	51	293	405	405	1.38	112
All Size Groups	5	11	52	52	5	15	33	40	213	321	321	1.51	108

Table 6.21: Cost of Cultivation and Input-Output Relationship

Category : Project Participants

Crop : Hy. Bajra (dry)

(Rs./acre)

Size of Holding (in acres)	Seeds	Manure		Bullock Labour Own	Human Labour		Total Cost	Yield		Cost- Yield Ratio	Surplus	
		F.Y.M.	Ferti- liser		Hired	Family Hired		Cty. (kg)	Value			
Upto 10.00	4	-	-	43	5	2	3	57	108	108	1.89	51
10.01 to 25.00	2	3	-	39	1	5	12	62	117	117	1.89	55
25.01 and above	4	3	-	42	3	11	15	78	120	120	1.54	42
All Size Groups	3	3	-	41	3	8	13	71	118	118	1.66	47

group it touches 400 kg. mark mainly owing to heavy fertiliser and water inputs. The small size group has nearly reached 300 kg. level whereas the medium group returns the lowest average. However, in terms of cost-yield ratio the situation is quite the reverse. Owing to lower cultivation costs, the medium size group tops the list with the ratio at 1.78 followed by small group with 1.48 and the largest group with 1.38. In terms of surplus value, both medium and large groups are nearly equal with over Rs.110 and the small size group obtaining a little under Rs.100. In the case of dry bajra all the size groups have crossed 100 kg. yield level and over 1.50 cost-yield ratio. The small and medium groups have fared better than the large holding with surplus value per acre being more than Rs.50.

2. Cropwise Comparative Assessment

Hitherto, we have seen the holdingwise performance of the non-participants from control village and participants from project area under each specific scheme as well as general H.T.V. programme. Presently, we shall attempt to give a comparative assessment of the performance of the project farmers participating in each category of project assistance or technique. However, the comparison is mainly between the performance of the non-participants and that of the participants under each scheme in regard to each crop or variety of crop, separately for irrigated and dry farms. As we already have seen the various patterns in regard to size of holdings, the following analysis would take into consideration only the per acre averages at the aggregate level for each of the major crops. In a way, the analysis gives a summary pattern with the accent on comparative assessment based on yield

rates, cost-yield ratio and surplus of value over cost. The relevant data are presented in Tables 6.24 to 6.28.

(a) Irrigated Bajra

It may be pointed out that the control farms have raised only the hy. bajra under irrigation as against local variety grown under each of the four project assisted schemes. Nevertheless, comparison is still possible as the control group has used only hy. seed at a lesser rate and no fertilizer at all. In point of fact, except for slightly higher expenditure on irrigation and family labour component, the control group does not show any intensity in cultivation as compared to project group.

The four categories of project farms show much better performance with fertilizer use and greater intensity of wage labour. All these four as well as the general F.I.V. farms have obtained the yields of over 300 kgs. The absolute yield rate of the project farms shows considerable improvement, the increased output ranging from 74 to 116 kgs, representing 32-50 per cent increase over the level of control farms. In terms of cost-yield ratio, even at higher level of cost, it is also greater than control group in all the categories of project farms.

The project groups have obtained increased surplus value ranging from Rs.42 to Rs.78, representing 70 per cent in the case of farm implements and machinery category to 130 per cent in that of minor irrigation. In regard to H.Y.V. performance, the project farms raising hy. bajra show 38 per cent increase in yield and with better cost-yield ratio, 80 per cent increase in surplus value over the control farms (raising hy. bajra).

In short, each and every category of project participants has fared much better than control group. Despite

Table 6.24: Schemewise Input-Output Relationship at the Aggregate Level

Crop : Bajra (irrigated)

Category of Benefit/Scheme	No. of Sample Farmers	Seed	Manure		Bullock Labour		Human Labour		Irrigation Charges	Total Cost	Yield		Cost-Yield Ratio	Surplus
			F.Y.M.	Fertiliser	Own	Hired	Family	Hired			Qty.	Value		
Non-Participant (Control)	12	3	14	-	44	6	36	17	52	172	232	232	1.35	60
Land Improvement	30	6	15	40	56	6	16	29	35	203	341	341	1.68	138
Minor Irrigation	25	6	16	32	75	6	16	30	50	231	348	348	1.51	117
Farm. Imp. & Machinery	16	7	14	48	59	2	14	36	43	223	325	325	1.46	102
Agri. Inputs	15	5	12	34	65	2	15	20	26	179	306	306	1.71	127
R.Y.V. Programme	17	5	11	52	52	5	15	33	40	213	321	321	1.51	108

Table 6.25: Schemewise Input-Output Relationship at the Aggregate Level

Crop : Bajra (dry)

Category of Benefit/Scheme	No. of Farmers	Seed	Manure		Bullock Labour		Human Labour		Total Cost	Yield		Cost-Yield Ratio	Surplus
			F.Y.K. Fertilizer	Own	Hired	Family	Hired	Qty. (kg)		Value (Rs./acre)			
Control (Non-Project)	24	1	1	-	30	3	8	3	52	53	53	1.02	1
Land Improvement	33	2	3	2	31	4	5	7	54	112	112	2.07	58
Farm Implements & Machinery	15	2	3	-	43	-	3	8	59	116	116	1.97	57
Agri. Inputs	NIL	-	-	-	-	-	-	-	-	-	-	-	-
H.Y.V. (Control)	10	3	3	-	25	16	8	3	58	77	77	1.33	19
H.Y.V. (Project)	8	3	3	-	41	3	8	13	71	118	118	1.66	47

Table 6.26: Schemewise Input-Output Relationship at the Aggregate Level

Crop : Jowar (irrigated)

Category of Benefit/Scheme	No. of Sample Farmers	Seed	Manure		Bullock Labour		Human Labour		Irrigation Charges	Total Cost	(Rs./acre)		Surplus	
			F.Y.M.	Fertiliser	Own	Hired	Family	Hired			Yield Qty. (kg)	Cost-Yield Ratio		
Control (Non-Project)	12	2	-	2	28	9	30	14	63	148	176	194	1.31	46
Land Improvement	32	4	2	47	42	5	14	24	34	172	329	362	2.11	190
Minor Irrigation	25	4	1	24	46	4	13	20	51	163	324	356	2.18	193
Farm Implement & Machinery	21	5	2	59	47	3	13	33	43	205	370	407	1.99	202
Agri. Inputs	15	3	-	42	47	4	13	18	32	159	277	305	1.92	146

Table 6.27: Schemewise Input-Output Relationship at the Aggregate Level

Crop : Jowar (dry)

(Rs./acre)

Category of Benefit/Scheme	No. of Farmers	Seed	Mannure F.Y.M. Fertiliser	Bullock Own	Labour Hired	Human Family	Labour Hired	Total Cost	Yield Qty. (kg)	Yield Value	Cost-Yield Ratio	Surplus	
Control (Non-Project)	18	1	-	15	7	6	3	32	47	52	1.63	20	
Land Improvement	37	3	4	9	30	5	3	11	65	164	160	2.77	115
Farm Implement & Machinery	22	3	5	12	37	3	2	11	73	154	169	2.32	96
Agricultural Inputs	17	3	1	11	29	5	7	11	67	152	167	2.49	100

Table 6.25: Schemewise Input-Output Relationship at the Aggregate Level

Crop : Summer Cotton (irrigated)

Category of Benefit/Scheme	No. of Sample Farmers	Seed	Manure		Bullock Labour		Human Labour		Irrigation Charges	Total Cost	Yield		Cost-Yield Ratio	Surplus
			F.Y.M.	Fertiliser	Own	Hired	Family	Hired			Qty.	Value (kg)		
Control (Non-Project)	12	5	-	12	26	15	61	32	105	256	128	461	1.80	205
Land Improvement	18	12	16	76	48	2	42	68	50	314	170	612	1.95	298
Minor Irrigation	17	12	5	61	47	2	34	65	46	272	159	608	2.24	336

greater cost of production, the higher cost-yield ratios and the resultant surplus value over cost indicate the probability of the schemes in the project area (See Table 6.24 for irrigated bajra).

(b) Unirrigated Bajra

Unlike irrigated bajra, the dry bajra cultivation is in a very low key and is mainly bullock labour intensive in all the categories. There is not much difference in the cost of cultivation between project and control farms as the level of input use being nearly same and practically no fertilizer is applied in almost all categories of the project farms. Even with regard to the hy. bajra variety, the pattern is more or less same except that the project farms show higher outlay on wage labour (Table 6.25).

It is in regard to output that we find vast difference between the control and the project groups. In the case of local variety, the yields of the project farms have more than doubled in land improvement (111 per cent) as well as farm implements and machinery (119 per cent) schemes. In the case of hy. bajra output, the project farms have recorded nearly 53 per cent over that of control farms. Even at a slightly higher level of cost, the cost-yield ratio is vastly greater in this case. While the control group just breaks even in respect of local variety and shows marginal gain in H.Y. variety, the project groups have performed very well to record surplus worth around Rs.50 per acre in either variety.

(c) Irrigated Jowar

The control group raising irrigated jowar is mainly human and bullock labour intensive with very negligible cost on manure. On the other hand, all the four project

schemes report considerable outlays on fertilizer and relatively greater proportion of cost on bullock labour and hired human labour. The latter groups have incurred greater costs on cultivation, the range of difference over control being Rs.11 to Rs.57.

As compared to the yield rate of the control group, each of the project categories has obtained increased yield to the tune of not less than 100 kgs. The yield difference is the highest in respect of farm implements and machinery scheme with 194 kgs. (110 per cent increase) and the least in that of agricultural inputs with 101 kgs. (57 per cent increase). In the case of all the project schemes, even at the higher level of cost, the cost-yield ratios are also vastly greater than that of control. While the ratio is only 1.31 for control farms, it ranges from 1.92 to 2.18 in the case of project schemes. The surplus value over the cost too indicates the vastly superior profit potentiality of the project schemes, generally it being not less than Rs.100/- per acre. The details in respect of irrigated jowar are shown in Table 6.26.

(d) Unirrigated Jowar

The cost of cultivation of jowar under dry condition in project farms is twice that of the control farms. In all the three schemes, the outlay on seed is greater and, unlike control, moderate expenditure is reported on manure inputs and intensity on bullock and human labour employment is considerably greater than that of control group. All the same, the output for project farms in all the schemes is a little over three times that of the control group. This has given a considerably greater cost-yield ratio in favour of project schemes, even at the higher level of costs. The cost-yield ratio varies from 2.32 in respect of

farm implements and machinery scheme to 2.77 in the case of land improvement category. On the other hand, the cost-yield ratio for the control farms works out to 1.63.

The surplus value over cost being just Rs.20 for the control group, the same is around five times in respect of each of the project categories. Broadly this indicates the superiority of the project schemes, especially the land improvement measures. The details may be seen in Table 6.27.

(e) Summer Cotton (Irrigated)

Among the commercial crops, irrigated cotton grown in summer season is the only major crop cultivated in the project area as well as in the nearby villages to a considerable extent. However, not all the well owners are inclined to take the risk as the water level in the wells is very crucial in the hot season. Besides, the cultivation is considerably labour intensive and overall cost of cultivation is generally greater than it is for any other crop. The project farms have incurred greater costs mainly on account of manure and wage labour inputs (Table 6.28).

The yield rates are positively higher in respect of project farms and, even at higher level of costs, the cost-yield ratio is greater than that of control farms. Farms under both land improvement and minor irrigation schemes have performed far better than the control group in showing surplus value varying from Rs.93 to Rs.131 per acre.

Summary

It may be concluded that the project farms coming under each and every scheme have achieved considerable increase in the output of all the major crops over the

level of the non-participant control farms that still remain largely outside the influence of modernisation of agriculture. The very significant difference obtained in the yield rates is due largely to the various measures and techniques adopted to a varying extent by the project farmers. The participant farms have incurred higher cost of cultivation to obtain the better yield levels, obviously the new techniques of crop production requiring better types of inputs in greater amounts and higher intensity of cultural operations.

Nevertheless, even at the higher level of costs, the project farms under all the schemes and in respect of every crop have obtained greater cost-yield ratios. The ratios clearly indicate the superiority of the project measures. In almost all cases of the crops, the project farms under different schemes have exceeded the cost-yield ratio of 1.5 and, in great majority of cases, the ratio is near about two and above. Especially in the case of dry farms, where fertiliser use is very negligible, the land improvement measures and farm implement scheme have fared significantly well.

However, it is not possible to isolate the factors and attribute the incremental value of output over the control farms wholly to a given scheme.

CHAPTER VII

CONCLUSION

It is needless to stress here the too well known problems of dry farming which are characterised by low productivity and stagnant economic conditions. The integrated approach to the development of several dry areas in the semi-arid zones in the country through the pilot projects is indeed a welcome break through on the agricultural front. In most respects, the measures devised for increasing the resource-base, the techniques specially evolved for improving the cultural practices to suit the local conditions, promotion of use of modern tools and improved inputs to boost the productivity and extension activities through training and demonstration are all quite well conceived to remove the economic stagnation in the specific dry areas.

It is in regard to the implementation of the programmes and the extent of impact on farmers that become more crucial to the success or otherwise of any well conceived development project. In many a respect the experiment at Bijapur may be regarded as moderately successful. However, this should not lead to a sense of complacency on the part of the project authorities as there are several areas in which there exists considerable scope for improvement in the project management.

The experiment of farm pond scheme provides the glaring example of misplaced emphasis in forcing it on often unwilling and unsuspecting farmers at a considerable cost to the project and much inconvenience to the recipients. Although the well meaning experts have recommended it to the project, the implementing agency could have sensed

the reaction of the farmers and, at the most, ought to have given it a fair trial in a few cases for a couple of years. Instead, it has been pushed on a large scale (44 pounds in all) before it could be mercifully discontinued. Even the so-called beneficiaries have been very critical about the scheme and have felt that some community wells or tube wells might have served the purpose better. Apart from providing some employment in the initial stage and indeterminate percolation effect, the farm pond scheme has largely failed to realise the desired objective.

All the other schemes that are undertaken by the project have met with fair success, not only in respect of acceptance level, but also in proving beneficial to a varying degree. However, a considerable number of farmers, especially those residing away from main village sites and interior villages, are still unaware of some dry farming techniques relating to agronomic practices and crop production strategies. It is quite significant that complaints are heard about the unequal and discriminatory treatment against the weaker sections in regard to making available the project facilities like hiring out the modern implements. Even more serious is the complaint that some farmers are denied of the benefit of demonstration plots purely on the ground that their farms are not on the road sides.

By and large, it is apparent that some field assistants, who provide vital liaison between the farmers and the project headquarters, are either unable to establish proper rapport with all the farmers for want of time or, woefully lacking in the urge and initiative to discharge their duties. Even after seven years, if some farmers

in the project jurisdiction are still ignorant of several techniques and are discriminated against the project assistance, it is time the project management done something to obviate the difficulties. Perhaps, the system of frequent transfers of the personnel at all levels seems to be one of the main reasons for this state of affair.

Some of the suggestions emanating from the informants themselves are worth considerations as they indicate the areas in which greater attention need be given. It also underlines their enthusiasm and involvement in the development project. Farmers in large numbers have felt that the most effective way to inculcate them with new techniques and agronomic and other practices is through audio-visual publicity. In other words, slides and films would be more effective than the handbills and occasional visits by the Field Assistants. Also it is felt that the project official should contact the farmers at least once a month. Several farmers have strongly pleaded for follow up actions on the part of the project. Many a farmer has felt that the supply of inputs and improved implements should be on a greater scale and the bottlenecks in the supply promptly eliminated. A considerable number of well owners are of the opinion that the project must arrange to get the deep boring rigs to the project area and the same be hired out to the farmers for deepening the wells. Some suggestions also refer to the frustrating experience of the farmers whenever they deal with some agencies like Land Development Bank and Electricity Board. All these things stress the need for follow up actions on the part of the project authorities.

In short, most of the subsidised schemes have evoked adequate response from the cultivators. The performance

by the farmers has proved the efficacy of the various measures. All the schemes, except the farm pond, have proved their economic viability in showing increased productivity, larger surplus over the cost on account of higher cost-yield ratio over the control farms. Besides, the greater labour intensity in cultivation indicates additional employment generation in the area. In point of fact, the economy of the control village clearly indicates the considerable difference existing at present. The glaring contrast would not have been there if it were not for the considerable success arising out of the I.D.L.A.D. project. However, there is still scope for involving the farmers to accept multiple schemes as a package deal to a greater extent, so that the integrated approach would be more meaningful. It is a moot point whether the present pace will continue once the subsidy programme is withdrawn or the Project ceases to operate in the area. Suffice it to say that the efforts of the Project has been largely beneficial to the local farmers and need to be continued for a longer period.