C H A P T E R - V

SUMMARY AND CONCLUSION

Dry farming assumes a strategic position in the overall Indian context as only 27 per cent of the cropped area enjoy irrigation while in remaining 73 per cent area (about 105 million hectares) crop fortunes are closely linked to the behaviour of the monsoon. These areas not only provide much of our millet and pulses but also are major suppliers of industrial raw materials like cotton and groundnut.

In Gujarat State, only about 21 per cent of the net cropped area enjoy irrigation and in remaining 79 per cent of area (76.25 lakh hectares) agricultural prospects are governed by South-west monsoon rains (mid June - September) which are not only inadequate but also extremely uncertain over large tracts of the state and highly fluctuating from year to year. The coefficient

of variation of annual rainfall (1960-1981) has been observed more than 40 per cent in almost all the districts except in the districts of Vadodara, Surat, Dangs and Valsad.

Predominently, Dry Farming areas in Gujarat State is confined to Saurashtra and Kutch region, which receive inadequate and erractic rainfall. Rajkot district located in the centre of peninsular Saurashtra possesses all the characteristic features of the typical dry farming area. Hence, this study is undertaken in the context of Rajkot district which is also the representative of North-Saurashtra agro-climatic region. Incidently, the main dry farming research station of the state and the All India Co-ordinated Research Project for Dryland Agriculture (AICRPDA) have been instituted at Targhadia Village of Rajkot taluka. Moreover, Integrated Dryland Agricultural Development Pilot Project has been implemented in Rajkot taluka. Therefore, this study on 'Economics of Dry Farming - A Case Study of Gujarat' is undertaken in

Rajkot taluka of the district with the following objectives:

(1) To examine agro-economic profile of dryland farmers, nature and degree of instability in rainfed farming.

(2) To findout the resource utilization pattern among the selected dryland farmers.

(3) To examine the extent of adoption of dry farming technology among different size-groups of land holding.

(4) To examine the economics of crop production in dry farming areas with respect to important crops.

(5) To identify the constraints restricting the farmers in the adoption of recommended technology.

(6) To study the resource use efficiency in dryland agriculture.

METHODOLOGY

A list of villages of Rajkot taluka, which have less than 25 per cent of the net sown area under irrigation was prepared and 9 villages from this list were selected

randomly for this study. For each of the selected villages, a list of operational holdings having less than 25 per cent of its area under irrigation was prepared and they were stratified into four size-groups, namely, 0-2 hectares, 2-4 hectares, 4-8 hectares and 8 hectares and above. A sample of 20 farmers were selected from each of the selected villages in proportion to the number of holdings in each size group of land holdings. Thus, in all 160 farmers, comprising of 32 of size-group 0-2 hectares, 62 of size-group 2-4 hectares, 59 of size-group 4-8 hectares and 27 of size-group of 8 hectares and above were selected using random sampling method.

DATA COLLECTION

The primary data regarding various aspects, namely land use, farm inventory, crop yields and cost structure, adoption level of input use, reasons for non-adoption of different practices and other ancillary details about farm families having influence on farm management decision were collected by visiting each of the selected farmers personally

and interviewing them with a set of questionnaires through frequent visits. The primary data collected pertains to the agricultural year 1982-83. The crop considered for this study are Groundnut, Pearlmillet, Sorghum and Cotton which occupies roughly 84 per cent of the cropped area in the selected district.

CONCEPTS OF COST

Concepts of costs used in Indian Farm Management Studies have been used in analysing the data.

To determine the impact of the important variables like seeds, fertilizers, labour etc. the production functions for the three selected crops, namely, Groundnut, Pearlmillet and Sorghum are estimated using Cobb-Douglass type of production function. Cotton crop has been excluded from the production function analysis because of very small number of farmers growing this crop, particularly in size-groups 0 - 2 hectares and 2 - 4 hectares.

FINDINGS

The important findings emerging from different aspects from this study are presented below in nutshell.

Agricultural Characteristics of the Selected District

The climate of the selected area is characterised by general dryness except during South-West monsoon season. The average annual rainfall is 612 mm with a coefficient of variation of 40.76 per cent.

The topography of the soil is undulating as a result much of the rain water is lost through run-off causes heavy soil errosion. Thus, these areas have less percolation of water through soils resulting in moisture stress conditions frequently during the crop growth period.

Soils of this region are generally medium black having soil depth from few cms to 60 cm. Soils are low in the availability of nitrogen, medium in the availability of phosphorus and rich in potash.

Major source of irrigation are wells commanding 84 per cent of the total irrigation. Canal irrigation commands

only 13 per cent.

Net sown area in the selected district is 64.2 per cent with cropping intensity of only about 110.69.

Cropping pattern in the selected district is more or less stable. Groundnut, Pearlmillet, Sorghum and cotton are the important Kharif crops, and each accounts for 52.37 per cent, 8.32 per cent, 6.32 per cent and 16.46 per cent, respectively of the total cropped area (1981-82). Wheat is an important rabi crop which accounts 7.11 per cent.

Agro-Economic Aspects of Sample Farms

The average size of the holding varies from 1.46 hectares for the size group 0-2 hectares to 11.25 hectares for the size-group 8 hectares and above and it is being 4.90 hectares for all size-groups of farm.

Highest cropping intensity (111.45) was observed in the largest size-group of holdings, whereas it was lowest (104.59) in the case of smallest size group of holding, average being 109.04. Percentage of irrigated area is

highest (15.19%) in the case of size-group 2-4 hectares followed by size-group 4-8 hectares (12.97%), whereas it is lowest (6.88%) in case of smallest size group of farms.

Area under cash crops (Ground-nut and Cotton) increases with the increase in the size of farm. In contrast to this area under food crops, (pearlmillet and sorghum) decreases with the increase in the size of farm.

Sole cropping is the normal cropping system of this region. On an average nearly 55 per cent of the family members are working in their own farms, regularly or casually. Number of family workers per cultivated unit area declines with the increase in farm size, from 2.34 in the smallest size group to 0.40 in the largest size group.

Each household maintained on an average, one or more milch animals.

Availability of bullock per household increases with the increase in the size of farm. The lowest availability of bullock being 0.78 for the smallest size group of farms and the highest 2.56 for the largest-size-group.

Use of improved implements like multipurpose implements and iron plough have become more popular in the selected region, its use is more popular among large farmers as compared to small farmers.

Land constitutes more than 75 per cent of the total asset value in all the size-groups of farms. It is lowest (75.92%) for the smallest size group, which increases as the size of farm increases, whereas value of livestock, on an average, constitutes 10.64 per cent of the total assets. Per household value of livestock have shown inverse relationship with the size of farm.

Literacy percentage, on an average is 52.8 per cent.

On an average 41 per cent of the farmers have subsidiary occupations in addition to cultivation. Agricultural labour constitutes the major source of subsidiary occupation and found more prevalent in small size groups as compared to large size groups.

Financial liabilities have been found increasing with the increase in the size of farm.

Adoption of Improved Dryland Technology

Adoption of recommended variety seeds has been found to the extent of cent per cent in the case of groundnut and cotton, 87.8 per cent in case of pearlmillet and only 16.5 per cent in the case of sorghum.

Most of the farmers have used less seed quantity than the recommended quantity in case of Groundnut and Pearlmillet but used more quantity of seeds than the recommended for sorghum and cotton.

41.10 per cent of the farmers treated their groundnut seeds before sowing, whereas cent per cent farmers have used delinted seeds of cotton. 88 per cent of the pearl-millet growers used certified seeds which are available duly treated in standard packings whereas only 16 per cent of the sorghum growers used certified seeds, and rest of the farmers used traditional variety seeds without giving seed treatment.

Recommended distance of sowing is not acceptable to farmers in this region for crops like groundnut, pearlmillet and sorghum, whereas recommended spacing of 90 cm is followed

by 61.1 per cent of the cotton farmers. According to these farmers, plants suffers due to moisture stress conditions in the year of low rainfall when closer spacing i.e. recommended spacing (45-60 cm) is followed. Closer spacing also increases weed problems and increases labour cost. Set row cultivation is more common in this region and in about 60 per cent of the area this system is followed.

Majority of the farmers used organic manures (F.Y.M) for almost all the crops.

Majority of the farmers are under using chemical fertilizers in terms of recommended quantity. However, high dose of fertilizers are applied to cash crops than the food crops. In the case of sorghum as many as 50 per cent of the farmers have not applied chemical fertilizers whereas in the case of pearlmillet about one fourth of the farmers have not applied chemical fertilizers. In case of cotton, about 38 per cent of the farmers applied nitrogen as well as phosphorus fertilizers in excess quantity.

39.6 per cent of the farmers followed plant protection practices in cotton covering, 43.1 per cent of the area under

the crop whereas 21.5 per cent farmers followed this practice in Groundnut in 17.8 per cent of the area. None of the farmers have adopted this practice in pearlmillet and sorghum.

Interculturing and weeding practices have made considerable headway in the adoption.

In general, none of the farmers have adopted the complete recommended practices as a package in the four crops under study.

Constraints in Adoption of Technologies

Variety :

In the case of pearlmillet, poor cooking quality and taste of hybrid varieties is found to be the major reason for non-adoption of recommended varieties.

In the case of sorghum, poor cooking quality and taste, high cost of seeds and fear of farmers that the recommended varieties are more susceptible to pests and diseases are the important reasons for non-adoption which can be attributed to economic and risk factors. About

40 per cent of the sorghum growers did not find recommended varieties suitable for fodder purpose.

Fertilizers:

Fear of heavy losses in case of failure of rainfall, high cost of fertilizers and shortage of capital are the major reasons for non-use or partial use of chemical fertilizers for groundnut, pearlmillet and sorghum crops. Returns being not remunerative due to very high doses of fertilizers particularly for low rainfall area is also one of the important reasons for non-adoption of this practice as per the recommendation. In case of cotton heavy losses in case of failure of rainfall has been found major reason for non/partial adoption of chemical fertilizers. Lack of awareness about the recommendations and merit of use of fertilizers, fear of deterioration of soils due to excess and continuous use of chemical fertilizers are the other reasons for non-adoption or partial adoption of recommended fertilizers. Economic

and risk factors as constraints to adoption of this practice are more prominent in case of small farmers.

Plant Protection:

High cost of inputs and shortage of capital are the major reason for non-adoption of plant protection measures in cotton and groundnut. Lack of awareness about appropriate measures and lack of plant protection of appliances were the other reasons, seen more prominently in the small size groups of farms.

Economic Assessment

Major component of cost in all the four selected crops is human labour and is conspicuously high in small size group of farms. The main source of human labour input is farmers' family itself. Share of family labour in the total labour use is also found higher for small farms as compared to large farms.

In the case of groundnut, seed is another major item of costs which accounts on an average, 18.4 per cent

of the total cost whereas per hectare cost of seed in other crops are comparatively low. Cost of bullock labour as percentage to the total costs is almost equal for groundnut and cotton and less than that of for sorghum and pearlmillet.

Cost-A i.e. paidout cost constitutes about 70 per cent of the total cost of production for groundnut which is highest amongst the selected crops indicating that for groundnut cultivation cash credit is highly required as compared to other crops.

Returns over cost-C and cost-B are negative for all the size groups of farms in the case of groundnut and sorghum except size group 0 - 2 hectares in case of sorghum. In case of pearlmillet, return per hectare has been found negative with respect to cost-C. In case of cotton, returns per hectare over all the three costs have been found positive indicating that cotton is the most profitable crop in this region.

The returns look fairly good when only operating cost is taken into account in selected crops.

For the groundnut crop, input - output ratio reveals a loss of Re.0.08 and Re.0.23 over Cost-B and Cost-C, respectively, for pearlmillet it reveals a loss of Re.0.18 over Cost-C, for sorghum loss of Re. 0.04 and Re.0.30 over cost B and cost-C, respectively. In contrast to this input-output ratio over Cost-A, Cost-B and Cost-C shows a profit of Re.0.83, Re.0.40 and Re.0.14 respectively, at the aggregate level, on per rupee invested.

Results of production functions reveals that soil depth and time of sowing are the most significant variables in the production of crops in dry farming tracts. Elasticity of coefficients with respect to these variables have been found positive and statistically significant almost for all the size groups as well as for combined. This indicates that deep soils are more important for increasing production of dryland crops in rainfed areas, as deep soils are having more moisture holding capacity which is of more importance in dryland agriculture.

Similarly, timely sowing of crops in dry farming regions assumes great importance.

Use of F.Y.M. raises the moisture absorbing and moisture retentive capacity of soils and it is therefore, more important in low rainfall areas. For this reason, the positive and statistically significant coefficients of this variable in the production functions for groundnut, pearlmillet and sorghum are of great significance.

Coefficient of irrigation variable is found positive and almost of equal values in all the cases and bears very high statistical significance in case of pearlmillet. Pearlmillet is a staple food of the farmers in this region and as such to save the crop from moisture stress conditions, protective irrigation is given wherever it is feasible. This reveals the rationality and resource allocation efficiency of dryland farmers.

Dryland farmers devotes most of bheir land to the commercial crop of groundnut where the return to scale is highest. In the case of groundnut, there are increasing returns to scale for all the size groups except 0 - 2 size group.

In contrast to this diminishing returns to scale have been observed for all the size groups of farms of pearlmillet. In case of sorghum increasing returns to scale have been observed in medium size groups of farm.

Policy Implications

For policy measures and feed-back to agricultural researchers a few suggestions are highlighted in the following paragraphs.

The non-adoption/partial adoption of recommended technology may be inherently incapable of spreading and it may be beyond the reach of the small farmers. Technology should be designed on the basis of resource limitations in different size of farms. Also recommendations should be location specific so as to increase its adoption.

Instead of a package of practice, a graded technology has to be evolved so that the farmer - the end user of the technology - can make appropriate choice depending on his economic level and needs.

The use of more fertilizers plant protection practices and adoption of improved varieties particularly of sorghum are some of the areas in which more efforts should be made to motivate the farmers through result demonstrations on farmers' fields, to speed up the level of adoption.

The farm sizes are dwindling rapidly. It is high time to look at the optimum size of farm so that the cost per unit can be minimised. The farm scientists and government agencies with institutional support should actively be involved to mobilise the dryland resources for optimum production so that needed reward to the farmers for their land, labour and capital could be awarded. For this agricultural and social scientists should join their hands to over-come dryland constraints during the process of change rather than at postmortum stage.

LIMITATION OF THE STUDY

The variations in output in agriculture are very common. Apart from vagaries of nature, the characteristics of agriculture is determined by the changing price structure which greately influence production decisions on farms in the short-run. Due to limited time and resources available with the investigator, the study confined to 180 farmers of the Rajkot district. The study on such a small scale may not represent the entire dryland tracts of the state.

Lack of maintenance of records relating to input and output by the farmers is a serious limitation particularly when survey method of investigation is used. Though every effort were made to extract the correct information by careful probing, it would be presumptuous to assume that lapses of memory on the part of respondents in regard to details about farm operations and resource utilization could be completely overcome. It is well-known that the dry farming recommendations are location-specific, even then, some of the practices, one may find,

are commonly followed in dryland tracts. In extending these findings to other areas, due care has to be taken.

One apparent limitation of the study is that the reference year for the survey unfortunately turned out to be a drought year. But it can be advantage in the sense that we can evaluate the performance of the dry farming technology in terms of the adoption and the constraints of dryland farmers in a bad year and if it passes this crucial test then chances of its acceptance by the farmers may be greater when it fares well only in good year.