Chapter 1

Introduction

India ranks seventh in the World in terms of geographical area but population wise it ranks second with nearly a billion people. So far, food production has a step ahead of population growth especially after the introduction of green revolution technology proving Malthusian Cassandras wrong. The Green Revolution technology in the form of improved seed, water and chemical fertiliser has enabled thus far to avert large scale food crisis. The per capita availability of food has increased from 405 grams to 474 grams per day an improvement of 18.5 per cent. Despite such an achievement only the effective demand of the population has been met as there are widespread under and malnutrition especially among the poor. The increasing population on the one hand and near saturation of cultivable land on the other call for increasing production through existing resources. Continuous improvement in seed of various crops, extending irrigation schemes, optimal use of available water and some of the steps that need to be pursued. The judicious use of various inputs also would help to increase yield thereby production.

Irrigation is a vital component of green revolution technology without which the potential of seed and benefits of chemical fertiliser cannot be realized. Even before the advent of Green Revolution in mid 60s the
Government of India gave lot of emphasis on major and minor irrigation projects through its five year plans. The strategy was to protect Indian Agriculture from the vagaries of monsoon and bring stability to agricultural production.

Table 1.1 : Development of Irrigation in Gujarat

<table>
<thead>
<tr>
<th>Plan Period</th>
<th>Major &amp; Medium Schemes</th>
<th>Minor Schemes</th>
<th>Wells and Tube Wells</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Potential Utilise</td>
<td>Potential Utilise</td>
<td>Potential Utilise</td>
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</tr>
<tr>
<td>1951-56</td>
<td>0.23 0.00</td>
<td>0.93 0.78</td>
<td>0.11 0.02</td>
<td>1.27 0.80</td>
</tr>
<tr>
<td>1956-61</td>
<td>2.48 0.66</td>
<td>1.26 0.89</td>
<td>0.30 0.22</td>
<td>4.04 1.77</td>
</tr>
<tr>
<td>1961-66</td>
<td>4.91 1.90</td>
<td>1.41 1.06</td>
<td>0.448 0.28</td>
<td>8.00 3.24</td>
</tr>
<tr>
<td>1966-69</td>
<td>4.39 3.11</td>
<td>1.56 1.08</td>
<td>0.63 0.41</td>
<td>6.58 4.60</td>
</tr>
<tr>
<td>1969-74</td>
<td>6.22 4.01</td>
<td>1.67 0.43</td>
<td>0.81 0.54</td>
<td>8.70 4.98</td>
</tr>
<tr>
<td>1974-78</td>
<td>9.24 5.01</td>
<td>1.17 0.72</td>
<td>1.00 0.65</td>
<td>11.41 6.38</td>
</tr>
<tr>
<td>1978-80</td>
<td>10.12 5.29</td>
<td>1.29 0.80</td>
<td>1.24 0.65</td>
<td>12.65 6.74</td>
</tr>
<tr>
<td>1980-85</td>
<td>10.61 6.63</td>
<td>1.62 0.93</td>
<td>2.28 1.12</td>
<td>14.51 8.68</td>
</tr>
<tr>
<td>1985-90</td>
<td>12.00 8.72</td>
<td>1.82 0.99</td>
<td>19.04 16.38</td>
<td>32.86 26.09</td>
</tr>
<tr>
<td>1990-92</td>
<td>12.46 9.76</td>
<td>1.93 1.01</td>
<td>19.16 16.48</td>
<td>33.63 27.25</td>
</tr>
<tr>
<td>1992-98</td>
<td>13.50 11.90</td>
<td>2.22 1.31</td>
<td>20.13 17.11</td>
<td>36.85 30.32</td>
</tr>
</tbody>
</table>

Source Department of Irrigation, Government of Gujarat, Gandhinagar.

In most of Gujarat, especially its northern part, Saurashtra and Kutch rainfed agriculture was followed. The emphasis since Independence quite rightly has been to provide more and more area with assured irrigation facilities. As can be seen from Table 1.1 the area under irrigation in the state has been increasing under successive plans. From a mere 5000 hectares in 1951 the area under irrigation had gone up to 358 thousand hectares in 1998. This phenomenal increase has brought about stability to agricultural production which in turn helped in raising the rural income. However, canal irrigation had brought about a lop sided
development. While the farmers who got the irrigation benefited immensely others languished thus bringing in a new class of haves and have-nots in rural society. Even among the farmers who got the irrigation facilities the benefits had been uneven. Farmers who got their farm in the head section of a canal or distributary benefited more compared to farmers at the middle or tail sections.

This study was initiated to understand the inputs use and productivity among the farmers of a distributary of the Dantiwada Command Area.

1.1 Objectives

More specifically the major objectives of the study are:

i) To examine the cropping pattern of the farmers along the distributary.

ii) To study the inputs use among the farmers and compare it with the location.

iii) To understand the productivity of the farmers.

iv) To examine the profitability of farmers located at different locations.

1.2 Hypothesis

The study proposes to test the following hypotheses.
i) Farmers at the head portion of the canal grow more water intensive crops compared to middle and tail end farmers. Similarly, farmers at the tail section grow crops that are less water intensive.

ii) Large farmers grow more commercial crops whereas the marginal and small farmers grow food grains and fodder crops.

iii) The level of input used and output produced have a positive relationship to farm size but have a negative relation to the location of the farm.

iv) Profitability is positively related to farm size and negatively related to location of the farm.

v) Economies of scale have positive relation to farm size but negative relation to crops.

1.3 Review of Literature

AL (1981) observed that as one goes along the distributaries, minors or field channels less water was supplied for the middle and tail farms. He found that in the New Sarda Sahayak Command Area farmers at the top end got five irrigation while farmers in the lower reaches hardly got one. Anil Shah (1987) called for an improved and equitable distribution of water which should be reliable for enhancing productivity. He
emphasised that good management of the existing irrigation facilities was more important than more investment in newer irrigation projects.

In a study of Bhakra, Reidinger (1971) observed that farmers closest to the head of the water course were often having larger holdings and were powerful.

Chambers R (1988) was of the opinion that the farms at the tail sections whether it was main canal or distributories or field water courses suffer due to lack of adequate water. Whatever little water these farms received was unpredictable and often late.

Daniel Thoner (1981) in his study of Sarda canal in western Uttar Pradesh found two standards of water service. A small minority of rich farmers got as much water as they wanted and were able to adopt profitable irrigated crops whereas the vast majority of small farmers had to adopt rain fed cropping pattern. For these small and marginal farmers canal water was “an intermittent blessing to be welcomed when it comes but not to be relied upon”.

Gurjar and Shukla (1991) in their study found 60 per cent farmers in the head portion of the field channel were using improved varieties of seeds, fertilisers and agricultural machines. As one moved down the channel the usage of these inputs decreased. It was 40 per cent for the middle and 20 per cent for the tail section.
Jayaraman and Sitaraman (1976) in their study found that assured water supply was an important factor in determining the cropping pattern of the farmer. They observed more area under high value crops such as sugarcane, banana, paddy, vegetables, wheat, cotton and groundnut in areas where there was assured water supply.

Jayasankar and Shetty (1982) found that after initial good water supply in the early years of the Tungabhadra command area project the tail end farmers were deprived of timely irrigation by the more powerful at the upper end. Malhotra et al. (1987) found cropping intensity of 119 per cent, 72 per cent and 68 per cent for the farmers at the head, middle and tail section of a Salawa distributary of the upper Ganga canal.

Naik (1989) reported that on minors in the Hirakund project it was found that 70 per cent of water went to the head valves and 30 per cent to tail valves. On the Pardhiapali sub minor the head reach irrigation intensity was 93 per cent but it was 46 and 24 per cent in the middle and tail sections. Deprivation of water for tail end farmers was observed by many studies.

Patel (1994) found that cropping pattern in the Kavitha command changed according to the quantity of water available. His study found that the head reach farmers had been taking more water and benefited at the cost of the tail enders. There were a host of problems related to adequacy, maintenance, local power structures etc in the supply of water. Head reach
farmers even go to the extent of breaching the channels to harass downstream.

Rathis (1993) in her study revealed that the Sarda canal was designed for 32 per cent annual irrigation overall but over time the intensity of water supply went up to 42 per cent while it went down to 19 per cent for the tail end farms.

Saini et al found that the cropping pattern of the farms at the head, middle and tail section showed a considerable difference. While the farmers at the upper ends benefited by growing such crops like paddy, maize and wheat farmers at the lower end of the channel tried to grow crops that require less water. They found the cropping intensity was more in head section (184.69) followed by the middle (177.07) and tail (122.61).

Farmers at the lower end of the channel used more seed per acre compared to farmers at the upper end to ensure proper germination and thereby adequate plant population due to uncertain water supply whereas farmers in the head section used more fertilisers compared to farmers at the middle and tail sections of the minor. With regard to productivity, it was maximum in the head reach rather than in the tail section. However, yield was inversely related to size of holding in all crops except sugarcane which was positively related. The observation was true for all the crops. Saini et al found that the influential farmers mostly with large holdings at the head
section of the channel did not allow sufficient water to small and marginal farmers at the tail section.

Shukla and Gurjar came up with two startling revelations, one the irrigators prone to quarrel among themselves over the distribution of water. Second better irrigation and better income lead farmers to evils of liquor. They found more people with habit of alcohol consumption at the upper end of the channels compared to tail end farmers.

Thorner in his study of 68 villages of the Sarda canal found inequitable distribution of water, delay in getting the water and poor maintenance of the canal system resulting in leakage and waste.

The problem of farmers at the head section, especially farmers with large holdings, of a canal getting undue advantage over others is not new. For example, Vander Velde an economic geographer in his study of spatial water distribution in a part of Bhakra canal in mid 1960s found that land holdings closer to the canal outlet had a better standard of water service and among them farmers with large holdings received more water per acre compared to small and marginal farmers.

1.4 Organisation of the Study

The study is organised in eight chapters. Second chapter covers the methodology followed in selection of the channel and the farmers. The
characteristics of the Dantiwada command area is also briefly described in the chapter. The profile of the selected farmers forms part of chapter 3 and the cropping pattern, cropping intensity is also analysed in the chapter. The impact of location of the farm with regard to inputs used and output produced is covered in chapter 4. A comparative analysis of profits among the farmers with regard to location as well as size forms chapter five. In chapter 6 production function of four major crops are calculated taking location of the farm into consideration but ignoring size, returns to scale is also examined for all major crops. Chapter 7 covers the major findings of the study and policy suggestions.