Of Canals, Tanks and Wells

Different Sources of Irrigation: A Case Study of the Telangana Region
by Sanjeeva Reddy, Manak Publications, New Delhi, 1997, pp xxi+258, Rs 280.

K Sivasubramaniyam

In India, about three-fourths of the population are dependent on agriculture for their livelihood and more than 30 per cent of the gross national product is contributed by agriculture. Although agriculture is the mainstay of the population, only a third of the gross cropped area is under irrigation and the remaining area is still dependent on the vagaries of rainfall. That productivity of irrigated land is considerably more than that of unirrigated one is an accepted fact. Under Indian climatic conditions, the productivity of irrigated land can be increased from four to six times than that of unirrigated land. Despite the green revolution the per hectare yield of (irrigated) rice in India (1.8 tonnes) is much less than that of China (3.7 tonnes) and Japan (5.5 tonnes). However, the production of foodgrains in India increased from 60 million tonnes during the early 1950s to over 190 million tonnes during the mid-1990s. This increase in output has been possible primarily due to increasing irrigation facilities. Though major and medium irrigation projects serve more area under cultivation, the smaller irrigation projects such as tanks and wells also serve a considerable extent of cultivated area. In fact, there has been considerable difference in output per hectare of land under different sources of irrigation such as canals, tanks and wells. This is the core aspect elaborated in the book under review in the context of the Telangana region in Andhra Pradesh.

The book under review, is based on the author's PhD work. In the introductory chapter, using available surveys the author has brought out an important fact that in Indian agriculture there is little scope for increasing productivity by new agricultural technology and the only alternative strategy for increasing the total output is expending the proportion of irrigable area in the total cropped area. While describing the relative position of different sources of irrigation the author's contention is that major and medium irrigation projects (such as canals) have better prosperity compared to smaller (tank) irrigation projects. This is because of state intervention and the government's policy to provide irrigation facilities to larger cropped areas with subsidised irrigation charges. In the major and medium irrigation projects the modernisation process of the canal system by the government helps the farmers to benefit more without spending money or more efforts, which certainly created regional imbalance in agricultural sector especially when compared with the farmers who use other forms of irrigation such as tanks and wells. At the same time, the vagaries of monsoon, poor maintenance of irrigation structures and meagre allocation of funds to tanks have reduced the tank irrigation's share in the total irrigated area. In both canal and tank irrigation the investment made on the part of beneficiary farmers is very limited. However, in well irrigation the entire cost of wells is borne by the individual farmers. The author stresses the fact that as each source has its own advantages and disadvantages, only the conjunctive use of surface and subsurface water can make a sustainable pattern of water use in agriculture.

In chapter two, a detailed analysis of investment made on the major, medium and minor irrigation projects in India over a period of four decades is presented. This is followed by the relative position of irrigation in terms of ultimate irrigation potential, potential created and potential utilised among different sources of irrigation in the states of India has been discussed in greater detail. After independence, India's agriculture has developed considerably facilitating self-reliance in foodgrains production especially after the mid-1960s. The overall analysis indicates that major and medium irrigation sources have been receiving a better share of investment than the minor irrigation sources in almost all the plan periods including the Eighth Plan (more than 5 per cent of the total plan outlays or Rs 22,400 crore). Minor irrigation accounts for a small share, of only 1.38 per cent or Rs 5,977 crore of the total Eighth Plan outlay. However, the total irrigation potential created in the major and medium irrigation sources was only 37.9 million hectares but for minor irrigation it was 61 million hectares. Moreover, 56 per cent of the ultimate irrigation potential under major and medium irrigation projects have been tapped (up to 1991-92) but for minor irrigation the percentage share being 91.4. On the basis of the above data the author has observed that minor irrigation sources have been more efficiently utilised than major and medium irrigation sources.

The findings of the analysis of investments on irrigation as well as the potential created and utilised for major medium and minor irrigation projects at the all-India level is mirrored for Andhra Pradesh. Over the past four decades (1951-92) in Andhra Pradesh the major and medium irrigation projects attracted an investment of about one-fourth of the total plan outlays but for minor irrigation the investment is merely 5 per cent. However, the percentage share of utilised potential for major and medium irrigation projects is 74 per cent and minor irrigation is 85 per cent. But the development of groundwater use is not satisfactory. As the author points out, though the groundwater potential available in Andhra Pradesh is 41.82 lakh hectares, only a small percentage (16.2) has been utilised up to 1985.

The author's analysis, on the development of sourcewise irrigation for the period 1956-60 and 1990-94 in Andhra Pradesh, shows that canal irrigation has stabilised, tank irrigation is on the decline, with a substantial reduction in the percentage of area under it from 41 to 19 and well irrigation has almost trebled (from 12 per cent to 35 per cent) over the same period.

In chapter three, the methodology adopted for estimation of productivity and efficiency of crop enterprise under different sources of irrigation is discussed. The study is strengthened by both the secondary and primary sources of data. The 225 farm households (each 75 from canal, tank and well irrigation sources) selected for primary survey was filtered from districts to mandals to villages to households.

In chapter four, to cross-check the hypotheses formulated in chapter one of the study, the author has examined some aspects of social and agro-economic conditions of the selected sample households. Analysis of socio-economic data covering population, levels of literacy, economic status of farmers and occupational structure of workers under the sample households reveal some interesting results: canal irrigation, considered as an assured source

of irrigation appears to limit family size; the percentage of literacy level is decreasing from canal to tank and further to well irrigated areas; the higher educated persons are found more in canal irrigation areas and large farmer category under different sources of irrigation. It is also inferred that the canal irrigation reduces the dependency ratio of males and increases the female ratio. The result also shows that the percentage of female agricultural workers is more than that of males in all the three sources of irrigation.

Regarding the distribution of different sources of irrigated area the author has observed that the average irrigated area per farm is found to be increasing with the size of operational holdings. The discussion on cropping pattern pertains to only on major crops such as paddy, groundnut, sugarcane, cotton and chillies. Paddy is the predominant crop in both the rabi and kharif seasons followed by groundnut in canal irrigated areas and cotton in tank and well irrigated areas. Irrigation intensity is the highest in canal areas followed by well and tank irrigated areas. However, the difference in irrigation intensity is negligible in the latter category of sources.

The main purpose of providing irrigation is to acquire more profits by achieving maximum productivity. Since the quantum of supply available to farmers differs considerably from source to source, the productivity and profits accrued from them also vary significantly. Apart from different sources of irrigation, the type of inputs used by different categories of farmers (large, medium and small) is also a major factor which affects the productivity and profitability substantially. This core aspect is dealt with in chapter five. The overall analysis indicates that farm size and productivity are positively related in canal and tank irrigated areas, whereas medium farmers' category is the highest producing category in well irrigation. Regarding crop-wise analysis it is found that groundnut crop is more profitable than paddy under different sources of irrigation. The author's observation on the benefits accrued by large farmers is notable: "due to higher investment in the form of hired human labour, fertiliser, tractorisation, etc, the LF category is getting higher returns per acre than other categories in canal and well irrigated areas. This implication also holds good for MF category in tank irrigation" (pp 178-79).

In chapter six, the author has estimated the efficiency of farm economy through per acre input costs for paddy, groundnut and all the five selected crops put together separately. The analysis reveals that when compared with tank and well irrigation, canal irrigation is the most efficient; and that the intra-size comparison shows that efficiency is inversely related to farm-size in all the three sources of irrigation.

To evaluate the economic efficiency of farmers to achieve maximum productivity by using their resources under different sources of irrigation the author has used the Cobb-Douglas production function analysis for selected crops (paddy and groundnut) and found some interesting results. The results of the sourcewise efficiency ratios of marginal value productivity to marginal cost show that utilisation of fertiliser in tank irrigation, human labour in canal and well irrigation, and irrigation charges under all the three sources of irrigation has been less than optimal level; and hence there is possibility for increasing their inputs to get more income.

The author's analysis and the results for the use of organic manure and pesticides application does not in conform to general expectations. For instance, under tank irrigation farmers apply more organic manure and also relatively spend more money for pesticides application. But the farmers under canal and well irrigated area use less manure and apply less pesticides. As the author thus: "Pesticides consumption is highest in tank irrigation, which claims more than three times that of well and double the percentage of canal irrigation. This is due to the use of higher dose of granules, which kill the insects and weeds" (p 199). However, most studies indicate that, wherever organic manure is used the pest attack is very little, and thus reduce the application of pesticides. This is not clearly brought out in the this study.

The book is useful and informative for planners and researchers, especially in the field of irrigation and water management. However, the book needs drastic editing. There are several printing errors mostly in the text part and in some of the tables that could have been avoided. EPW