Agri-land irrigation by farmers in Karnataka

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Abstract

Agriculture being the main occupation of the state, Irrigation place utmost significant part in obtaining increased yields from the land. The development of Irrigation in the state was slow and unsystematic during the pre independence era. However, there were some notable Irrigation works undertaken and completed during the pre-independence, such as Krishnaraja Sagar (which was the only major project completed prior to independence), Vijayanagar canals, Cauvery anicut Channels, Gokak canal, Vanivilasa Sagar, Markonahalli and Anjanapura. Though major projects like Tungabhadra, Bhadra and Ghataprabha stage-I were commenced prior to the plan period, their progress was slow and they got impetus only after their inclusion in the first five year plan.

There were more than 25,000 tanks scattered over erstwhile Mysore state. But in Bombay Karnataka and Hyderabad Karnataka areas, the number of such minor irrigation works are meager.Agriculture is the nerve of any country as it is needed for survival of living beings. For growing crops, irrigation is major process. Irrigation is described as the artificial application of water to the land or soil. It is the substitute or supplement of rainwater with another source of water.

It is used in dry areas and during periods of insufficient rainfall. It is considered as basic infrastructure and vital input required for agricultural production (Mamata Swain, 1999). Major aim of irrigation systems is to help out in the growing of agricultural crops and vegetation by maintaining with the minimum amount of water required, maintenance of landscapes, and re-vegetation of disturbed soils. Irrigation systems are also used for dust repression, removal of sewage, and in mining. Irrigation is often studied together with drainage, which is the natural or artificial removal of surface and sub-surface water from a given region. Agricultural scientists stated that irrigation also has a few other uses in crop production, which include protecting plants against frost, suppressing wild plant growing in grain fields and helping to avert soil consolidation. On the contrary, agriculture that relies only on direct rainfall is referred to as rain-fed or dry-land farming. Hence the other component of the water cycle. Water percolates into the soil and forms an extensive grid of underground streams. This is known as ground water. This is a natural way of storage and hedge against drought. Ground water can be tapped by means of wells and bores. We may draw water manually or by means of a mechanised pump. Let us now look at the irrigation situation in Karnataka.

Key words: mechanised pump, Ground water, streams, Irrigation, agriculture, water management system

Introduction

Agriculture is still a major activity in developing countries like India. Basic needs of human beings - food and energy - are met from agriculture. It forms a major part of the state domestic product. For example the share of agriculture in the State's domestic product was 37% in 1984- 87. Table 1 shows that the agricultural population was 62.5% for India and 71.1% for Karnataka in 1981. Agriculture accounted for only 45.5% of population in the world in 1981 and is decreasing

at a slow rate. A reduction of 2 to 3% can be seen for India and Karnataka. Agriculture needs several inputs - Water is considered an essential input. Initially, small tanks and canals were used for irrigation. New technologies in civil engineering brought in giant irrigation projects. Large dams impounded waters in rivers thereby creating large reservoirs. Canals from these dams are taken through long distances to fields in command areas. These reservoirs normally submerge large prime forest areas. Secondly, if the canals are not constructed properly, water leaks from the canals resulting in water logging of agricultural land near the dam. Salinity of soils is becoming a serious problem now. Agricultural implements and fertilizer production need industrialization. Industries imply use of natural resources. Industries consume energy. Energy has to come from coal, firewood, oil or electricity. Again electricity may come from large hydro projects which destroy forest areas. Use of pesticides leads to pollution of different kinds - sickness amongst people, generation of new DDT resistant strains of mosquitoes and insects, etc.

Water is an essential ingredient for food production. Initially, natural rains provided water supply to agriculture in forest areas. There was no conscious effort to tap water resources. As the population increased, civilizations came up on the banks of rivers. Rain water is available only on the day of rain, but river water is available for a longer duration. Hence dependability increases with river water. In the case of perennial rivers, one can say that production is assured. Further increase in population led to the growth of communities away from riverside also. Then we have the situation of one set of communities depending on rain water only for its agriculture and another on rivers. The first one had an unpredictable situation - if rains were delayed or rainfall was poor in a particular year, the resultant droughts caused major short falls in production and occasional famines.

It is not always possible to use river water effectively. When water is needed - during non monsoon season -, it may not be available in a river in requisite quantities. When river water is not required for agriculture - during rainy seasons -, rivers may overflow causing floods and most of the flood water will flow into the seas. In order to even out the demand-supply function, minor irrigation through tanks was conceived. Many tanks and reservoirs were built to harvest rainwater. It was also possible to have a sequence of tanks connected by canals and waters going to rivers were diverted to these tanks. Tank based irrigation brought in stability in agricultural production. Tank water was used for other purposes as well - bathing, washing etc. Even now, tanks play a significant role in irrigation. Technology brought in construction of large dams impounding large waters in a reservoir. Krishnarajasagar on Cauvery is an early example. Our five year plans emphasized this mode of irrigation so as to exploit the maximum amount of water in a river system.

A major irrigation project, today, consists of a large/very large dam normally constructed in hilly areas so as to take into account volume efficiency available in valleys, submerging thousands of hectares of mostly forest lands and taking the reservoir water to fields over hundreds of miles by means of canals. Since the activity can be coordinated in a project mode, this is becoming the main mechanism of irrigation in our country. Since monsoon is not uniform and the tanks and dams tap only rain water, it is possible not to have water for irrigation during drought years.

Objective:

This paper seeks to study the scope of the land irrigation by farmers in Karnataka

TRENDS IN AREA IRRIGATED BY DIFFERENT SOURCES IN KARNATAKA:

Several ingenious methods are used for harnessing surface and groundwater for irrigation in Karnataka depending on the water availability, terrain and soil conditions of the area, farmers' capacity to invest, economic returns from the crops to be raised and irrigated, and often even the Government policies and programmes. These sources are traditionally grouped into four broad types as Canals, Tanks, Wells and other sources. Trends shown in Table.3.3 below indicate a sharp rise in the area under irrigation by canals, wells and other sources, which have all contributed massively to the rise in the net and gross irrigated area. On the other hand, tank irrigated area has declined and slipped by now to a fourth rank from a prime position till 1950s. Among the different sources of irrigation, the performance of canal irrigation is noteworthy. The total area irrigated by canal in 1950-51 was 146 thousand hectares which increased to 772 thousand hectares in 2002-03, showing an increase by five (5) times. Next to canal irrigation, area covered under other sources of irrigation has increased from 55 thousand hectares in 1950-51 to 1047 thousand hectares in 2002-03. Next to other sources of irrigation, area covered under well irrigation has consideraoly increased i.e., from 123 thousand hectares to 447 thousand hectares during the said period. Wells are a private source of irrigation, and are generally owned by big farmers. In recent years, there has teen a tremendous increase in financial assistance to this source of irrigation by the Government and banking institutions in the country. In a majority of the cases assistance is taken by big farmers and not by small farmers. The performance of tank irrigation is not satisfactory in recent years. At one time, this was a main source of irrigation in the state. In the past, tanks were managed by rural communities as a community resource. Unfortunately, in recent years, they are neglected and their maintenance has been considerably deteriorated. In a nut shell, the area under irrigation by canals and wells has recorded constant increase. As against this, the area irrigated by tanks has been decreased from 47.10 percent in 1950-51 to 7.43 percent in 2002-03. Canal irrigation is dominant in seven districts viz, Raichur, Gulbarga, Belgaum, Bellary, Mysore and Mandya. Tanks are predominant in Shimoga, Tumkur, Hassan, and Haveri. Wells are dominant in Belgaum, Bijapur, Gulbarga, Bagalkot, Bidar and Dakshina Kannada. This reveals the difference in the growth rate of different types of irrigation in different parts of the state with changing shares in total irrigated area.

CLASSIFICATION OF IRRIGATION PROJECTS:

Broadly speaking irrigation projects are classified into three groups Viz,

1) Major

2) Medium and

3) Minor Irrigation Projects.

1) Major Irrigation Projects: Since 1951, or upto 1978, major irrigation projects have been defined as those which cost more than Rs 5/- crores. But from 1978-79, Planning Commission recommended a new criterion and it has been adopted it on the basis of a number of hectares for which a project would provide irrigation. Accordingly to the new criterion, a major project should have culturable command area of more than 10,000 hectares. These projects require more investment and take a long period for completion. They have high capacity and can benefit large areas.

2) Medium Irrigation Projects: These projects cost between Rs 25 lakhs and Rs 5.00 crores as Medium Irrigation Projects. But according to a new criterion, these irrigation works should have culturable command area between 2000 hectares and 10,000 hectares.

3) Minor Irrigation Projects: Those which cost less than Rs 25.00 lakhs are regarded as Minor Irrigation Projects. But according to a new criterion, the works which have a culturable command area of 2000 hectares, are regarded as Minor Irrigation Projects.

DEVELOPMENT OF IRRIGATION BEFORE INDEPENDENCE:

The development of irrigation in Karnataka state before independence was neither systematic nor adequate. It is estimated that out of 76.80 lakh hectares of cultivated area, only about 5 lakh hectares was under irrigation in the state in the year 1901 (Government of India 1972). Tanks we~e the main source of irrigation and the only major irrigation scheme before 1947 was Krishnarajasagar Dam. A few other schemes then existing were much smaller. They included Vijayanagar Canals on the Tungabhadra, the Cauvery Anicut Channels, the Gokak Canal on the Ghataprabha and the Vanivilas Sagar on the Vedavati. The Famine Commission of 1878-80 and the first irrigation commission of 1901-03 underlined the need for large scale protective irrigation as a measure to combat droughts and famines. But there was no follow-up acdon for long and when it came, it was too little. Only one of the several recommended schemes i.e, reservoirs on all rivers with catehmerr.s in the Western Ghats, was undertaken. Another was Krishnarajas agar Project on the Cauveiy in 1924. It is estimated that between 1901 and 1951 only about 1.80 lakh hectares was added to the irrigated area in the state and with only about 7 percent of the net sown area came under irrigation in the latter year. The state was only marginally better placed than it was 50 years before. With the states' reorganization in 1956 and the consequent merger with the erstwhile Mysore State of the Kannada majority areas of Bombay, Madras and Hyderabad provinces with almost no irrigation development, the situation grew worse.

IRRIGATION DEVELOPMENT DURING PLAN PERIODS IN KARNATAKA:

After the formation of Karnataka state, the Government started developing canal, tank and well irrigation projects in all parts of the state. Investment on irrigation during plan periods in Karnataka: The State Government has been giving priority to the development of irrigational facilities in the state since the beginning of five year plans The increase in investment on irrigation in the various plan periods reflects the importance attached to this vital sector by our planners. The total expenditure for irrigation development during the First Five Year Plan was Rs 41.42 crores and it was increased to Rs.6,000 crores during the Ninth Five Year Plan period. The outlay anticipated for the Tenth Plan period (2002-2007) is- Rs. 16,339.77 crores. The average annual plan expenditure during the First Five Year was Rs 8.28 crores but it is Rs 634.18 crores during the Eighth Five Year Plan. It is more than 76 times o:' the First Plan average annual expenditure. The average annual expenditure during the. Tenth Plan is higher than the Eighth Plan period.

PRESENT STATE OF IRRIGATION:

Since 2002, Karnataka's irrigation allocation has steadily increased from a little over ₹ 1,600 crore to around ₹ 16,000 crore in the current fiscal, showing an average annual increase of around 6%. But this rise has not translated into a higher irrigated area, which the government believes holds the key to the problems faced by farmers reeling under persistent droughts and failing monsoons. The area under irrigation increased from around 2.45 million hectares in 2002 to around 3.1 million ha in 2016-17 from all sources, including canals, tanks, lift irrigation, tube and borewells. But this is still below 30% of the total agricultural area of around 10.7 million ha, which leaves most of the state's farmers to the mercy of unpredictable rainfall.

Karnataka, home to the second most arid region in the country, has pumped in funds for the development of mega projects whilst neglecting traditional methods that researchers and experts say are a better bet. The slow rate at which fresh areas are being brought under irrigation is deepening growing agrarian distress and intensifying the demand for farm loan waivers and increased minimum support prices—a campaign that is gaining traction ahead of the forthcoming general elections. The H.D. Kumaraswamy-led coalition government in Karnataka has announced a ₹ 45,000 crore farm loan waiver, along with a fat allocation to irrigation with promises to complete several big ticket projects. The slow pace of infrastructure work that successive governments have attributed to delays in land acquisition, forest and environment clearances, is not helping matters. "Instead of pumping in mega billion dollars on big projects, importance should be given to traditional water harvesting systems," Devinder Sharma, agricultural expert and analyst said.

He said states argue that lack of irrigation leads to lower agricultural productivity which in turn is fuelling suicides among farmers. "Why do farmers kill themselves in Punjab then," Sharma asked. Though successive governments, at least in Karnataka, have pledged to pursue long-term sustainable agricultural practices, allocations continue to favour large projects, which have already consumed several thousands of crores of rupees and decades of work. This year, Karnataka declared 156 of the 176 talukas as drought-hit, forcing farmers to intensify demands for short- term interventions like loan waivers. Our irrigation potential is around 4 million ha, said a senior official of the Karnataka water resources department. He was referring only to major and medium irrigation schemes. If minor, micro and all other forms of irrigation were introduced, about 60% of area could be brought under irrigation.

Investment on Irrigation

(Rs. in Crores)

Sl. No.	Plan Periods	Major & Medium	Minor	Total
1	First (1951-56)	37.27 (89.98)	4.15 (10.02)	41.42 (100.00)
2	Second (1956-61)	29.82 (85.44)	5.08 (14.56)	34.90 (100.00)
3	Third (1961-66)	33.99 (68.28)	15.79 (31.72)	49.78 (100.00)
4	Annual (1966-69)	33.74 (72.00)	13.18 (28.00)	46.92 (100.00)
5	Fourth (1969-74)	139.00 (85.78)	23.03 (14.22)	162.03 (100.00)
6	Fifth (1974-78)	188.36 (83.50)	37.21 (16.50)	225.57 (100.00)
7	Annual (1978-80)	190.97 (85.97)	31.17 (14.03)	222.14 (100.00)
8	Sixth (1980-85)	683.37 (91.04)	67.29 (8.96)	750.66 (100.00)
9	Seventh (1985-90)	839.59 (85.5)	142.77 (14.5)	982.36 (100.00)
10	Annual (1990-92)	595.07 (94.03)	37.77 (5.97)	632.84 (100.00)
11	Eighth (1992-97)	2,863.13 (90.3)	307.80 (9.7)	3,170.93 (100.00)
12	Ninth (1997-2002)	5,500.00 (91.7)	500.00 (8.3)	6,000.00 (100.00)
13	Tenth Plan (2002-2007)	15,500.00 (94.86)	839.77 (5.14)	16,339.77 (100.00)
	TOTAL	**26,634.31 (92.93)**	**2,025.01 (7.07)**	**28,659.32 (100.00)**

Note: Figures in parentheses indicate percentages.

Source:

1) Sixth Five Year Plan Draft, Karnataka Government Planning Commission, (from first plan to annual plan 1979-80)
2) From Sixth Plan to Second Year of 8th Plan (1993-94) computed on the basis of expenditure on capital account. Economic Services, Headwise expenditure of Government of Karnataka (1960-61 to 1993-94).
3) Planning Commissions–Ninth Five Year Plan Govt. of India, Vol. II, P.522-25.
4) Draft Tenth Plan 2002-2007 and annual plan 2002-03 Vol. No. II. Planning, Statistics and Science and Technology Department, Government of Karnataka, February 2002. pp.3.

Conclusion

Land and Water are the two most important natural resources in the development of Agriculture. The success of the agriculture mainly depends on proper and scientific utilisation of these resources.

Crop productivity can be best optimised on watershed basis when these resources interact in a synergetic manner. In this paper, we discuss the food production activity in Karnataka. Particularly, from the point of view of water usage. The impact of large irrigation projects is also discussed. The preliminary analysis shows that water and fertilizer play an important role in agricultural production. But addition of irrigation has not resulted in any increase in overall food grains production. This means that we need to look at microlevel practices. Trend and regression analysis also show that effects due to these factors are marginal.

The preliminary analysis shows that water and fertilizer play an important role in agricultural production. But addition of irrigation has not resulted in any increase in overall food grains production. This means that we need to look at microlevel practices. Trend and regression analysis also show that effects due to these factors are marginal. These statements can lead to decision conclusions only after detailed studies based on data at the level of a taluk or district. Such a study will reveal the requirements and limits. Microlevel experimentations by individual farmers have shown increased yields through proper application of water and organic fertilizers. Emphasis should be towards total land use and corresponding land developments in dryland areas; conserved use of water through efficient water management techniques; proper localised recharging; and use of proper drainage facilities and cropping patterns.

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