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## Accessibility of Hemavati Irrigation Project: A Study of Hassan District of Karnataka

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### **Abstract:**

*Agriculture is the mainstay of Indian economy with more than 53.75 percent of the population depending on it for livelihood and employment. Population and economic growth in developing countries posed serious challenges for humanity in simultaneously meeting food requirements and water demands. Water is the vital resource to support all forms life on earth. The primary benefit of dams and reservoirs in the world is water supply which includes; Irrigation for Agriculture (food supply), Flood control, Hydropower, Inland Navigation and Recreation. Irrigation is one of the key factors in agricultural development and its impact on cropping pattern. The current study focuses to identify the impact of irrigation and its accessibility. An investigation pertaining to Accessibility of Hemavati Irrigation project – A Study of Hassan District of Karnataka.*

**Keywords:** Irrigation, Livelihood, Agriculture, cropping pattern

### **1. Introduction**

Irrigation is one of the key factors in agricultural development and has an impact on cropping pattern. The importance of water has been recognized from primitive days. The largest use of water in the world is for irrigating lands, as an agricultural input, especially for the production of food grains. Population and economic growth in developing countries posed serious challenges for humanity in simultaneously meeting food requirements and water demands. Competition for limited water resources increasingly occurs between different stakeholders and at different levels: between farmers within an irrigation system; between irrigation systems in the same river basin; between the agricultural sector and other rural uses such as; fisheries, domestic water supply. More usage of water is between agricultural, urban industrial users and uses and environmental uses. Agriculture still accounts for the majority of global water withdrawals and is often responsible for more of total withdrawals for consumptive uses in India. Irrigation development in the past had mostly taken place as a measure of famine, gave birth to the idea of artificial irrigation. Now with the population multiplying rapidly irrigation has assumed greatest importance for augmenting water for agricultural production.

The importance of irrigation may be viewed from two aspects; Protective aspect - to make up the moisture deficiency in soils, during the cropping season so as to ensure proper and sustained growth of crops grown. Additional land use aspect - to enable second or third crop being raised on the land provided with irrigation on which otherwise uncultivable efficiently, particularly during the post or pre monsoon period. While the protective aspect helps in stabilizing agricultural production against droughts, the second aspect cannot be neglected by an alert agriculturist, irrigation has also a third aspect it helps in augmenting and preserving the properties of soils by application of adequate supply of water. Irrigation studies in India are confined to relatively narrow issues in production economics. But, irrigation when viewed as an input rural development and not merely as agricultural production other points of contact with development economics as the irrigation in Indian rural economy begins to move from the wings towards the centre of the stage. Wide distribution of the irrigation water implies a strategy of dispersing the development thrust of irrigation; it has to treat irrigation as only a component in a broader design for Agricultural and Rural Development. The role of irrigation in expanding crop output, in reducing output instability and in providing considerable protection to the farm sector against periodic drought cannot be sidelined. The benefits of irrigation have resulted in lower food prices, higher employment and a more rapid agricultural and economic development. Agriculture is the mainstay of Indian economy with more than 53.75 percent of the population depending on it for livelihood.

### **2. Evolution of Irrigation in India**

Indian government felt the need for irrigation project as water is one of the most precious and finite agricultural input essential for the growth of plants, it is a prime component of cytoplasm. Further, in the drought years of 1965 and 1966 & famine in large

tracts of the country was averted only by massive administrative efforts and huge imports of food grains. These years brought into sharp focus the importance of irrigation. Based on the recommendations of the Irrigation Commission and the National Commission on Agriculture, the issue of fuller and better utilization of water for irrigation has gained the momentum. There after, government of India decided to establish command area development authorities for irrigation projects. Irrigation became a prerequisite for growing second and third crop in a year. This enhances the agricultural production and has an input on food consumption basket. Irrigation farming is a way of improving agricultural production both in subsistence and commercial farming. Large scale irrigation schemes comparatively are more profitable and have socio-economic advantages than small ones. Canals are the most important means of irrigation in the country. Some canals were constructed by the early Hindu and Mohammedan kings. Most of the canals, however, are the product of the British rule. At present, canals irrigate about 39 percent of total irrigated area of India.

### 3. Review of Literature

- **Thakur and Associates (2000)** assessed the impact of irrigation on production and economic level of farmers. Study was conducted in command area flow irrigation scheme of Hurla in Kullu district of Himachal Pradesh. The data for the study were collected before and after construction of the project. Results show that per cent increase in the seed rate for various crops ranged between 1.18 to 53.09 before & after project installation respectively. Also increase in the per cent application of FYM ranged between 1.59 to 120.02. The average number of total livestock possessed by the sample farms had increased by about 125 per cent after the project. About 60 per cent change in household earning was observed after the installation of the project.
- **Dr. Rajendra Poddar (2007)**, studied the impact of Performance Evaluation Of Minor Lift Irrigation Schemes (MLIS) in Northern Karnataka. Objectives of the investigation were estimation of growth of MLIS in terms of numbers and area irrigated and financial feasibility. Major findings of the study are – Growth rate of Government MLIS increased during 1990-2005 at a compound rate of 1.40 per cent. In the erstwhile Bijapur district, about 61 percent of MLIS were non-working. With respect to the performance of MLIS in terms of expected and actual irrigation only 31.65 per cent of the expected area was under irrigation, which reflected upon irrigation inefficiency. At 12 percent rate of discount, NPV was Rs. 10, 94, 18,283; BC ratio was 1.57; IRR was 70.5 per cent. Based on these it was concluded that investments made in the MLIS were economically feasible. Constraints like scarcity of water, electricity and input supply and water charges fell in the severe category.
- **Navaneeth B. (2007)** In His Study Performance of ‘Minor Irrigation in Krishna Basin of Karnataka- An Economic perspective’ stressed that Minor irrigation is gradually becoming more important because of several advantages like small investment, simple components, quicker rewards and easier management. Present study was conducted with the objective of documenting the temporal growth in irrigated area investment, potential created, utilization identifying the constraints and evaluating the performance of minor irrigation schemes in Krishna basin of Karnataka. The study shows that, there is a constant increase in Minor Irrigation Schemes leading to the increase in potential thereby enhancing the crop output. Small farmers formed a majority of beneficiaries reflecting upon social equity dimension. Encroachment and siltation of tank bed, poor maintenance and inadequate power supply, declining rainfall, inadequate funds and lack of institutional support were identified as major constraints for minor irrigation development in basin through the study. The researcher suggests construction of farmer managed minor irrigation schemes with participatory approach.
- **Savita (2008)** - The study entitled ‘Impact of community based tank management project on socio-economic status of beneficiary farmers in Bidar district’ was carried out during 2007-08. Totally 150 respondents were selected by random sampling method from ten villages and data were collected by personal interview method. The results of the study revealed that, the community based tank management project has resulted in significant increase in socio-economic status ; ‘agriculture occupation’ from 90.66 to 97.34%, ‘Business’ from 14.0 to 26.0%, ‘owning of two houses’ increased from zero to 10.66 per cent, in case ‘type of house’ ‘tiled roofed house’ increased from 44.0 to 56.0 per cent and in case of ‘concrete house’ increased from 1.34 to 4.66%. There was increase in medium land holding from 33.34 to 40.67%, source of irrigation from ‘wells’ increased from 23.34 to 42.0%. Further, there was increase in medium level of participation from 16.0 to 47.34%. The shows the positive impact of tank based management by increasing ; land productivity there by increase in annual income resulting in better education, organizational participation, risk orientation, achievement motivation, innovativeness. Therefore, the study revealed positive impact on its beneficiaries and hence, the financial assistance may be coupled with technical guidance for increasing the standard of living of rural people.

### 4. Research Gap

After much deliberations and outcomes, still there looms problem of inter-state water disputes, shortage of rain water. In this regard government has been implementing various irrigation development programmes in rain fed areas, in this connection several studies have been conducted in different irrigation projects in the state in connection with the contribution made by irrigation development in agriculture .However, there are no other studies on the “Accessibility of Hemavati Irrigation project – A Study of Hassan District of Karnataka” conducted at the district level. In this view, there is a need for this kind of research at district level, which would be very useful for changing or increase agriculture development and also increase the potentiality of irrigation development in that particular district.

### 5. Objectives of the Study

- To Analyze the District wise water availability (accessibility) from Hemavati Reservoir
- To analyze the canal network of Hemavati reservoir

### 6. Methodology

The proposed study is based on secondary data. The secondary data are collected from various departments such as Agricultural Department, Department of Economics and Statistics, District Statistical Office of Hassan and various Government Departments, concerned organization, Journals, Magazines, Research Papers, Seminar Papers, Published Books, various news dailies and internet.

### 7. Profile of the Study Area

Hassan district is located in the south-western portion of Karnataka state and is surrounded by many as seven districts. It is of an irregular shape and is bounded on the north-west and North by Chikkamagalur district, on the east and south-east by the district of Tumkur and Mandya, on the south and south-west by the districts of Mysore and Kodagu, and on the west by Dakshina Kannada district. The district spreads across a geographical area of 6814 sq.km and lies between the latitudinal parallels of 12<sup>o</sup>31 'N and 13<sup>o</sup>33 'N and longitudinal parallels of 75<sup>o</sup>33 'E and 76<sup>o</sup>38 'E. The greatest length of the district from North to South is about 80 miles or 129 kms and its greatest breadth from east to west is about 72 miles or 116 km. Hassan district consists of eight taluks namely, Alur, Arkalagud, Channarayapatana, Hassan, Holenarshipura, Arsikere, Belur & Sakaleshpura.

From the point of view of natural division, Hassan district lies partly in the southern Malnad region and partly in the southern Maidan region of the state. It also contains a transaction zone termed as semi Malnad region. The Maidan is much larger in extent than the other two which has all along been reckoned as Malnad district of the state. The semi-Malnad zone consists of the central part of Arkalagud taluk, the western portion of Alur taluk and the eastern portion of Alur taluk and the Holenarasipura and Channarayapatna as well as the east and southern east part of the taluk of Arasikere, Malnad is a forest hilly region which is characterized by a heavy rainfall. The Southern maidan is bounded by 650 meters contour and is characterized by a higher degree of slope. As per the 2011 census the population of Hassan district is 17, 21,669. Out of which 14, 16,996 is the rural population and 3,04,673 is urban population. The percentage of rural and urban population to the total population of the district is 82.31 and 17.69 respectively

### 8. Analysis and Discussion

The Hemavathy is an important tributary of the Kaveri. It originates in the Western Ghats at an elevation of about 1,219 meters near Ballala Rayana Durga in the Chikkamagalur District of the state of Karnataka, in Southern India, and flows through Chikkamagalur, Hassan, Mandya, District and Mysore district before joining the Kaveri near Krishnarajasagara. It is approximately 245 km long and has a drainage area of about 5,410 km .A large reservoir has been built on the river at Gorur in the Hassan district with the capacity of 6 TMC, can irrigate 6,50,000 acres of land in command area. Water is the vital resource to support all forms life on earth. The primary benefit of dams and reservoirs in the world is water supply. Purposes and benefits include, Irrigation for agriculture (food supply), Flood control, Hydropower, Inland navigation, Recreation.

Sl. no	District	By Canals	By lift Irrigation	Total
1	Hassan	43,495	18,571	62,012
2	Tumkur	1,27,069	-----	1,27,069
3	Mysore	2,266	-----	2,266
4	Mandya	92,234	-----	92,234
Total		2,65,064	18,571	2,83,581

Table 1: District Wise Water Accessibility by the Hemavati Irrigation project (in acres).

Source: Chief Engineer, Hemavati Reservoir Project, Gorur

Above tables indicates the actual water distribution and accessibility from the Hemavati irrigation project. Net irrigated area in this project is 2,83,581 acres which includes, lift irrigation and canal irrigation. Most of the water is been distributed via canals. Tumkur district has obtained most water, for agriculture and drinking purpose followed by Mandya district with 92,234 acres . Hassan district has nearly 13% access to water through canal and lift irrigation. Mysore district access very low water through canal irrigation for primary activities. In all the project contributes more for canal irrigation. Its share of lift irrigation especially, in Hassan district is measurable. When compared to other districts, Hassan is the only district with lift irrigation facilities as other districts have sufficient canal network.

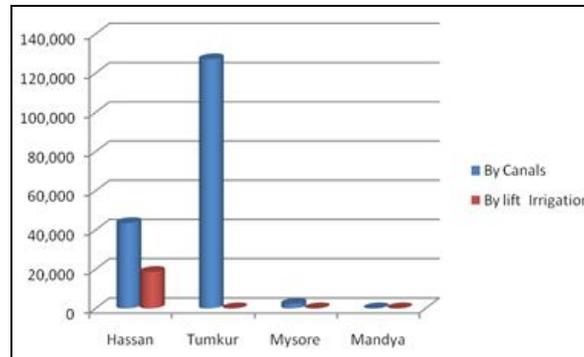


Figure 1: Water accessibility by the Hemavati Irrigation project

Above graph shows the accessibility of water from Hemavati irrigation project. Here Hassan, Mysore, Mandya access low percentage of water because, this region has many rivers and also tanks are adequately situated, therefore percentage of water access through project is low. When it comes to the Tumkur district it has more access and highest percent through canal irrigation as depicted in the graph. Lift irrigation can only be seen in Hassan district because of technical and economical issues.

Utilization of Irrigation under canals	In Hectares
Kharriff paddy	5,261
Kharriff Semidry	1,53,980
Rabi Semidry	1,05,823
Total	2,65,064
By lift irrigation (Under Canal and Reservoir)	
Kharriff	18,517 Ha

Table 2: Cropping Pattern in the Study Area.  
Source: Chief Engineer, Hemavati Reservoir Project, Gorur.

Table 2 discuss the Cropping pattern of the study area of Hemavati irrigation project , the project was initiated during 1990’s and was completed in the year 1995-96. After this Hassan district is benefited via canal and lift irrigation network. After 1996 whole cropping pattern has under gone a change. After the irrigation project, paddy and semi dry crops have been grown in the area where it was characterized by non – irrigated crops like Ragi, Jowar and others. In Kharriff season paddy counts 5,261 Hectares and semi dry crops accounts 1,53,980 , Hectares . In other season dry crops accounts 1,05,823, through lift irrigation in Kharriff season 18,517 Ha dry crops are grown. This pattern of growing paddy and semi dry crop for first six months and dry crops for next depends on water inflow from the irrigation project. Thanks to this irrigation project, the region which was totally into dry crops is able to grow semi dry and water needy crops too.

8.1. Quantum of Irrigation Development in Hemavati Region

Total utilization of this project is 1.52.28 TMC –via direct *Acchukattu* of 6.55 lakhs acres by flow irrigation. It covers gross command area of 4, 04,678 Hectares (10,000Acres) and Net irrigable area by flow irrigation is 2, 65,064 Hectares (6, 55000Acres) and by lift irrigation on canals 14,470 Hectares (35,756 acres) and also by lift irrigation on foreshore of Reservoir 4,047 Hectares (10,000Acres). The reservoir provides 70% irrigation in the command area. It has three main canals and two branch canals. It covers Hassan, Tumkur, Mysore, Mandya Districts. This project provides lot of socio-economic development in command area. Before construction of this reservoir their economic condition was very poor and they did not have any kind of infrastructure facilities, after construction of this reservoir they were able to get basic facilities and their cropping pattern also improved, now the command area of this reservoir is seeing a lot of developmental works because irrigation with it brings a lot of improvements and economically well position to the farmers. Most dams are built for several purposes. Thus, a construction of a single reservoir produces a broad range of domestic and economic benefits from a single investment.

Sl. No	Name of Canal	Length	Discharging capacity at Head in Cusecs / Cusecs	Atchkat in HA. / Acres
1	Left bank Canal (0 to 73Km.A.G. Ramachandra Rao canal) ( 73 to 214 Km.Sahukar Channaiah Canal)	214	10.91 ( 4,000 )	78,912 ( 1,95,000)
2	Right Bank Canal (GorurRamaswamy Iyengar Canal)	91	10.91(385)	8,094 (20,000)
3	Right Bank High Level Canal (Boranna Gowda Canal)	106	25.68 (907)	22,662 ( 56,000)
4	Nagamangala Branch Canal (T.Mariappa Canal)	71	24.35 (860)	59,485 ( 1,47,000)
5	Tumkur Branch Canal (Subramanya Canal)	240	40.46 ( 1,429)	95,908 ( 2,37,000)
<b>Total</b>				2,65,06 (6,55,000)

Table 3: Canal Network of Hemavati Reservoir

Source: Chief Engineer office, Hemavathy Reservoir Project, Gorur

Above table shows the canal net work and their reach. It has five main canals, which are the distribution canal of Hemavati reservoir. One of the important branch canal provides water for irrigation and drinking purpose for Tumkur, nearly 2,37,000 acres gets benefited and in this region it can be seen that the farmers economic conditions have improved over a period of time. On the other side Nagmangala branch canals accounts 1,47,000 acres. Hence, branch canal are key player in accessing irrigation facilities via canal network. The net area irrigated through canals accounts nearly 3,80,000 acres in a season. In such way the right and lift bank canals are the other two important source for agriculture through irrigation via water distribution .wide distribution of water from right and lift banks canals ,flows approximately 420 kms in the command area of the reservoir. With both right & left canals 4,00,000 acres in the region are provided with irrigation facilities.

## 9. Conclusion

Hemavati River is one of the important water sources for southern districts' of Karnataka like Hassan, Mandya, Mysore & Tumkur. After the implementation of this project, agriculture has seen a change in its cropping pattern. Irrigation is a key player in agricultural and their allied activities. Irrigation plays a vital role in development of a region in form of agricultural development and thereby, enchaining the quality of life for farmers which directly effect their economic conditions. The project has turned a dry land (*Maidan*) region into a semi aired land. Thus, it can be said that, irrigation through reservoirs is a cycle where, the flow of water bring in prosperity to framers and augment their access to good income paving way for good health, good education.

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