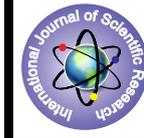


## Impact of Irrigation on Agricultural Development in Dharwad District of Karnataka State



### Geography

**KEYWORDS :** Irrigation, intensity, agricultural, productivity, water, resources.

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### ABSTRACT

*Irrigation is very important input of agriculture and most of the successful green revolution areas in India also concede with high irrigation intensity areas, since adequate and timely moisture supply is a sine-qua-non in the new agriculture its success is linked very closely with the development of irrigation. The problem of low agricultural productivity can be tackled by improving farm facility irrigational facilities. Differences in the provisions of irrigation facilities account for a substantial amount of variation in agricultural output between regions. If constant supply of water is ensured transformation and expansion of agriculture can take place. Without irrigation very little can be expected from extensive cultivation. Besides, irrigation helps greatly in raising the yield of land. In the foregoing analysis an evaluation of the aspects of irrigation in Dharwad district, has been made in detail in order to understand the role and impact of irrigation in the development of agriculture and its efficiency.*

**Introduction:** Irrigation is an age old art. Historically, civilizations have followed the development of irrigation. Most men who are well-informed of irrigation are certain of its perpetuity, as it is intelligently practiced. Others think that a civilization based on agriculture under irrigation is destined to declined sooner are later with disappearance of water resources. Civilizations have evolved on irrigated lands; they have also decayed and disintegrated in irrigated regions. Most ancient cultures depending upon irrigated agriculture declined because of the lack of political and community stability, essential to sustain agriculture. The duration of civilization depend on many factors, of which permanently profitable agriculture is vitally important. Some of the principles and practices essential for permanent and profitable agriculture under irrigation have been considered in this paper.

Agriculture without irrigation in areas having less than fifteen centimeters rainfall, is a suicidal uneconomic venture. The increasing demand of water for agriculture may be met by intensive and extensive use of the available water resources. Thus, one of the major purposes of enquiry of the available water resources is to define the regional pattern of their quality, quantity and utilization. In fact there are three sources of water available to men i.e. surface water, ground water and ocean water. Thus, the surface water in the form of rivers, streams, and lakes are the most important sources to be used for irrigation purpose. The uses of irrigation are conditioned by several variables. "While low rain fall and its variable nature necessities the development of artificial means of moisture supply, the increasing use of fertilizers and to some extent of improved variety of seed make timely needs of water prerequisite."

There is little wonder that, most of the successful green revolution areas in India are of the high intensity irrigation, adequate and timely moisture supply is a sine-qua-non in the new agriculture and its success is linked closely with the development of irrigation. The problem of low agricultural productivity can be tackled by improving farm facilities and irrigation facilities. Irrigation disparity accounts for a substantial amount of variation in agricultural output between regions. If constant supply of water is ensured, transformation and expansion of agriculture can take place. Without irrigation very little can be expected from extensive cultivation. Besides, irrigation helps greatly in raising the yield of land. Besides this enables the application of other modern inputs like fertilizers, high yielding varieties of seeds and other insecticides and pesticides. This aspect is of more significant in case of Dharwad district.

In the foregoing analysis, an evaluation of the aspects of irrigation in Dharwad district has been made in detail, in order to understand the role and impact of irrigation in the development of agriculture.

**Study area:** Dharwad district is located in the western sector of the Northern half of Karnataka state. The district encompasses an area of 4263 sq km laying between the latitudinal parallels of 15°-01 N to 15°-451 North and longitudes of 74°-451 to

75°-301 East. The district is bound on the north by the district of Belgaum, on the east by the district of Gadag, on the south Haveri and on the west by Uttar Kannada district. All these districts, which surround Dharwad district, belong to Karnataka state itself (Fig 1). The district lies approximately about 800 meters above the Mean Sea Level that is why it enjoys a moderate and healthy climate. The district may be divided into 3 natural regions, viz., the Malnad, Semi-Malnad and Maidan. These regions, on an average, receive moderate to heavy rain fall and have dense vegetation. Kalghatagi taluk and Alnavar of Dharwad taluk in particular receive more rain fall than other taluks of the district. Administratively it consists of 5 taluks viz. Dharwad, Hubli, Kalghatgi, Kundgol and Navalgund, 6 urban agglomerations, 127 village panchayats, and 372 inhabited villages As per the 2011 census the total population of the district is 1846993, out of which 939127 male and 907866 is the female population, while 45.02% of rural and 54.97% urban population, the density of the population of Dharwad district is 434 persons/per sq km. The literacy rate in Dharwad district is 80.30%, while sex ratio is 967 females per 1000 males. The district is a place for people belonging to various religions like Hinduism, Islam, Jainism and Christianity. The study area is distributed in three important river basins viz. the Bennihalla basin which covers Navalgund and Hubli taluks, and Bedti and Tatti hall covers Dharwad and Kalghatgi taluks. These three tributaries drain about 27 per cent of the total area under study, and play an important role in the irrigation facilities of the area. On the agricultural front, the presence of black soil helps in raising crops like cotton, wheat, ragi, jowar and oilseeds and that of red soil is more suitable for paddy.

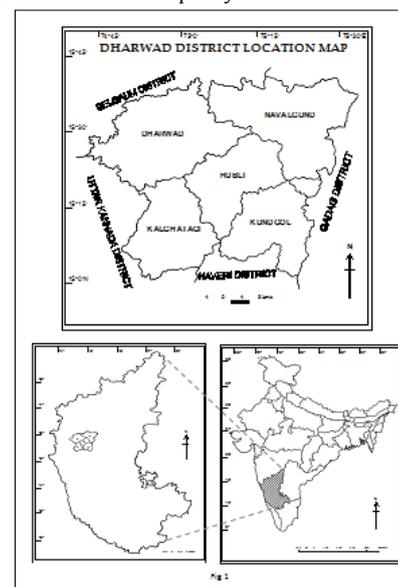


Fig 1

**Objectives:**

- 1) The main aim of the study has been to portray the spatial and temporal distribution of irrigation and its impact on taluka wise development agriculture in the study area.
- 2) To locate the areas logging in irrigation facilities and the causes thereof.

**Methodology and Data Base:**

Secondary data has been collected for the district, for the year 1999-2000 and 2009-10. Simple techniques have been used to analyzed secondary data and based on the results, maps and diagrams are shown.

**Discussion:**

In Dharwad district, the irrigation varies from one taluk to another. As per the figure made available by Bureau of Economics and Statistics, the district has a Geographical area of 427329 hectares. The net sown area of the district during 2009-10 is 296484 hectares and net irrigated area is 50995 hectares. During 1999-2000, the net sown area was 331471 hectares and 43569 hectares of land under irrigation, this constituted 17.19% and 13.14% of the net sown area respectively. The net irrigated area has increased to 7426 (17.04%) hectares during study period i.e.2009-10 to the base year i.e. 1999-2000. The increase in net irrigated area over a decade is not uniform in all the taluks of the district have increased their land under irrigation. However, the increase in the net irrigated area in the district is a positive feature for the agricultural development.

**Canal Irrigation:**

Canal is the major irrigation system in the district (Table 1). During 1999-2000 the area under canal irrigation was 25832 hectares (59.28%) which rose to 35362 hectares (69.34%) in 2009-10. The net increase of area under canal irrigation is 9560 hectares (37.00%). The Malaprabha is major project, which have a resulted in the increase in area under canal irrigation.

**Tank Irrigation:**

In the year 1999-2000, tank irrigation was 2893 hectares (6.64%) and this reduced to 383 hectares (0.75%) by 2009-10, due to the silting up of tank development of irrigation by wells and tube wells.

**Well Irrigation:**

Well Irrigation is the negligible source of irrigation in the district, in 1999-2000 the area under well irrigation was 552 hectares (1.26%), but in 2009-10 the well irrigation is absent, because insufficient of rain fall, the ground water table is goes on decreasing. At present (i.e. 2009-10) the wells irrigation is not practiced by the farmers in the district.

**Table 1 AREA IRRIGATED BY DIFFERENT SOURCES IN DHARWAD DISTRICT-1999-2000****Area in hectares (In bracket indicates percentages to the district total)**

Sl No	Name of the Taluks	Canal	Tanks	Wells	Tube-Wells	Others	Net-Area Irrigated
1	Dharwad	---	1036 (11.11)	435 (7.18)	4309 (71.17)	274 (4.52)	6054
2	Hubli	1212 (38.94)	---	13 (0.41)	1801 (57.87)	86 (2.76)	3112
3	Kalghatagi	---	1852 (33.61)	---	3596 (65.27)	61 (1.10)	5509
4	Kundagol	---	5 (5.26)	---	90 (94.73)	---	95
5	Navalagund	24620 (85.48)	---	104 (0.36)	207 (0.71)	3868 (13.43)	28799
	District Total	25832 (59.28)	2893 (6.64)	552 (1.26)	10003 (22.95)	4289 (9.84)	43569

Source -District at a Glance 1999-10

**Tube Well Irrigation:**

During 1999-2000 the area under tube well irrigation was 10003 hectares (22.95%) which rises to 15237 hectares (29.87%) in 2009-10. The net increase of area under tube well irrigation is 5234 hectares (52.32%). This high figure is mainly

due to extension of financial assistance to small and marginal farmers to make use of irrigation through tube wells.

**Irrigation by Other Sources:**

This type of irrigation sources includes lift irrigation, flood water and ground water used to irrigate agricultural lands. During 1999-2000, Dharwad district had 4289 hectares (9.84%) of land under irrigation by other sources and in 2009-10; it is decreased to only 13 hectares (0.02%). The farmers are not using this kind of irrigation systems during span ten years (Table 2)

**Table 2 AREA IRRIGATED BY DIFFERENT SOURCES IN DHARWAD DISTRICT-2009-10****Area in hectares (In bracket indicates percentages to the district total)**

Sl No	Name of the Taluks	Canal	Tanks	Wells	Tube-Wells	Others	Net-Area Irrigated
1	Dharwad	---	372 (4.90)	---	7291 (94.92)	13 (0.16)	7681
2	Hubli	1450 (28.92)	0	---	3563 (71.07)	0	5013
3	Kalghatagi	---	6 (0.16)	---	3698 (99.83)	0	3704
4	Kundagol	---	0	---	664 (100)	0	664
5	Navalagund	33912 (99.93)	0	---	21 (0.06)	0	33933
	District Total	35362 (69.34)	383 (0.75)	---	15237 (29.87)	13 (0.02)	50995

Source -District at a Glance 1999-10

**Intensity of Irrigation:**

The intensity of irrigation is controlled by various factors such as source of irrigation, types of crops grown, cropping season, quantity and quality of water supply and density of network of water channels etc. The benefits of intensity of irrigation are reflected in the cropping pattern, productivity of land, land use efficiency and method of cultivation. In an agricultural region other things being equal, intensity of irrigation will increase with decrease of rainfall and vice-versa. The intensity of irrigation will always remain low and negligible in rain fed areas. The intensity of irrigation is worked out by using the following formula.

$$\text{Formula} = \frac{\text{Net irrigated Area}}{\text{Net sown Area}} \times 100$$

**Table 3 INTENSITY OF IRRIGATION DURING 1999-2000 and 2009-10**

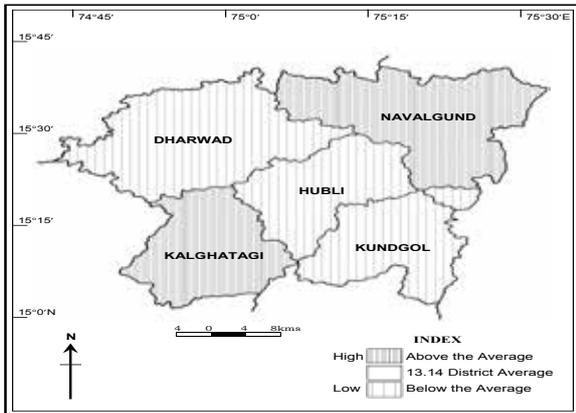
Sl No	Name of the Taluks	1999-2000	2009-10
1	Dharwad	7.54	10.70
2	Hubli	6.22	9.93
3	Kalghatagi	13.33	8.94
4	Kundagol	0.17	1.13
5	Navalagund	27.49	46.32
	District Total	13.14	17.19

The intensity of irrigation refers to more and more use of water for the same piece of land to cultivate different types of crops or more number of crops in a year or an agricultural season. The areas which are provided by assured water supply like river canals may be thrusting to cultivate single crop like sugar cane which needs not less than a year period. In such situation the intensity of irrigation does not arise. The intensity of irrigation therefore refers to cultivate more number of crops in a year such as rice, groundnut, Sunflower, etc., In such situation it is interesting to underline that these crops may consume less water than sugar cane cultivation while the total number of crops grown will add to more income of the farmer and it may be suitable to farmers for diversified needs than that of sugar cane cultivation. Therefore, the intensity of agriculture will support to farmers localized interest such as subsistence needs of food crops, animal needs like fodder, and use of animal products like

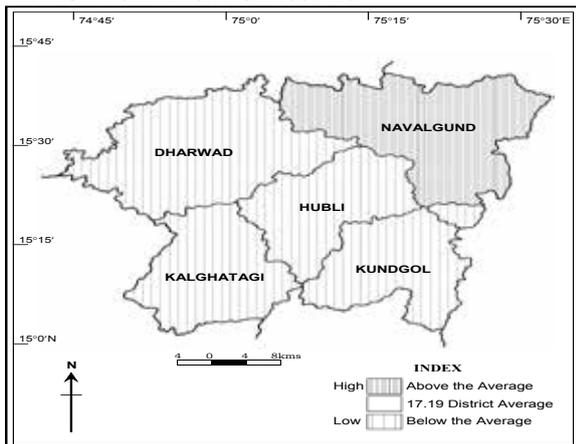
dung for bio mass fertilizer production, milk production, meat production, leather of the animals etc., Therefore the high index of intensity of irrigation in a region can definitely show the agriculture development in an Indian context.

The intensity of irrigation is not uniform in Dharwad district. The district as a whole intensity value was 13.14% in 1999-2000 that increased to 17.19% in 2009-10. The net increase in the intensity of irrigation is 30.82% (Table 3).

**DHARWAD DISTRICT INTENSITY OF IRRIGATION 1999-2000**



**INTENSITY OF IRRIGATION 2009-10**



Suggestions and Conclusions:

In view of the depleting water table from year to year it is very essential at this juncture to plan and implement the following measures to restore the water table and to conserve the ground water potential for future exploitation.

- 1) De-silting of existing tanks to provide augmentation of recharge to ground water body.
- 2) Creating artificial recharge by the way of construction of natural ground water harvesting structures like, check dams, subsurface, dykes, gully, plugging etc. wherever possible.
- 3) Judicious utilization of ground water and its conservation for the future by the way of deployment of drip and sprinkler irrigation system.
- 4) Conjunction in the use of surface and ground water

Critical shortages of underground water due to limited natural recharge, small surface storage capacity, and over use have stimulated efforts to recharge ground water reservoirs with surface water. Thus, it provides water to seep into the underground reservoirs. Flow of streams, sewage and industrial water may also be utilized for recharging these reservoirs. Full conservation of available water supply requires and integrated use of surface and underground water and storage facilities.

Crops cultivation to a large extents and rearing livestock depend upon the resources of their immediate environment. Therefore, land owners and cultivators will have to select appropriate and adaptable crops to the existing physical environment. Since agriculture is directly related to physical environment variations, this in turn also affects agricultural land use. Thus, agriculture is not only an economic activity, but also a form of applied ecology. The crop production potentiality of an area always depends primarily on the prevailing climatic and soil conditions.

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