GEOGRAPHICAL ANALYSIS

RESEARCH ARTICLE

Changes in the area under tank irrigation in Karnataka - A spatio-temporal analysis

P N Hema Chandra[1]

1 *Assistant Professor, Department of Geography, Maharani's Arts College for Women, Mysore, 570 005, Karnataka, India*

OPEN ACCESS

Received: 22.08.2019
Accepted: 18.11.2019
Published: 28.11.2019

Citation: Chandra PNH. (2019). Changes in the area under tank irrigation in Karnataka - A spatio-temporal analysis. Geographical Analysis. 8(2): 62-65. https://doi.org/10.53989/bu.ga.v8i2.2

Funding: None

Competing Interests: None

Published By Bangalore University, Bengaluru, Karnataka

ISSN
Print: 2319-5371
Electronic: XXXX-XXXX

Introduction

Irrigation in Karnataka has been practiced from ancient times and irrigational tanks, wells and canals are the familiar feature of the state's landscape. Artificial lakes and canals that dot the state in hundreds are centuries old and some of them have served for more than 500 years (Puttaswamaiah K 1980).

If the monsoon fails, there will be lockout in agricultural industry" Therefore "Indian budget is gamble of rains". "Irrigation is everything in India; water is even more valuable than land, because when water is applied to land automatically it increases the productiveness at least six-fold. All these remarks bring out the importance of irrigation in economic development of India

The role of irrigation is more significant in Karnataka as it suffers from deficit rainfall. In fact, Karnataka is the second most arid state in the country next only to Rajasthan. Hence irrigation is a major catalyst of agricultural development in the state. The ultimate irrigation potential in the state has been estimated at 55 lakh hectors which form about 52% of the net sown area. At present the total irrigated area of the state is 31.31 lakh hectors (2019) of which 48.89% of the irrigated land was served by wells, 31.18% by canals, 6.17% by tanks and 13.76% by other sources.

Objectives

1. To analyse the spatial and temporal changes in the tank irrigation in Karnataka
2. To find out the reasons behind the changes in tank irrigation
3. To suggest the measures to improve the area under tank irrigation

Methodology

As the study concentrates mainly on irrigation development and particularly tank irrigation secondary data is collected to examine the overall changes in the study area. Irrigation reports, state at a glance, handbooks and other reports published by government are referred to collect the secondary data. To know the changes in the tank irrigation, the data is collected from 1956 to 2019 from various government records. The collected data is analyzed with the help of cartographic and GIS techniques.

Study Area

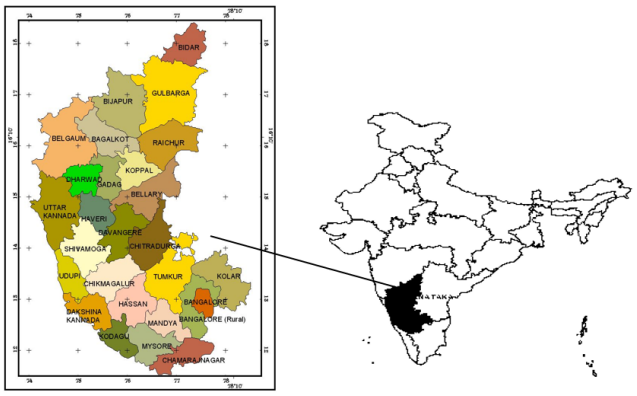

Fig. 1. Location of Karnataka State

The state of Karnataka extends roughly from 11°.35' North latitude to 18°.30' North latitude and 74°.5' East longitudes to 78°.35' East longitudes. Karnataka's total land area is 1.91.791 sq km. As per 2011 census, the state's population is 6.11 crore persons out of which 3.11 crore are males and 3.0 crore are females (sex ratio of the state is 968 and density per sq. km is 319). It is 5.05% of all India population of 1.21 billion

Irrigation Development i n Karnataka

Most of the large tanks were built by rulers, chieftains, rich merchants, or religious men as charity works in the distant past. They are often called sagara or lakes. The Shantisagara tank near Channagiri (Shimoga) for example, has a water spread of 41 sq km and the Watadahosahalli tank near Gudibanda (Kolar) irrigates nearly 1,000 hectares. Such large tanks are, however, only few in number and more than 90 per cent are small units with less than 40 hectares ayacuts, 16,400 have an ayacut of less than four hectares each.

Table 1. Temporal changes in the development irrigation in Karnataka (in lakh hectors)

Source of irrigation	1956-57	in %	1986-87	in %	2018-19	in %
Canals	165088	22.30	412669	33.95	948564	31.18
Tanks	327534	44.25	255792	21.04	147068	6.17
Wells	129359	17.47	326878	26.89	1165446	48.89
Others	118273	15.98	120128	9.88	328140	13.76
Net area irrigated	740254	100.00	1215467	100.00	3131000	100.00

Source: Hand book of Karnataka and Suvarna Karnataka

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.(Ministry of water resource report-2018)

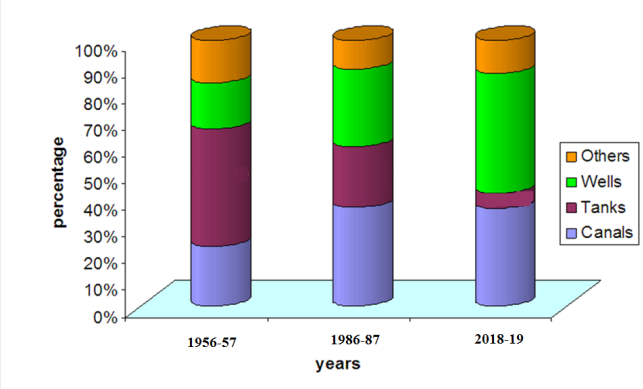

Fig. 2. Temporal changes in the development irrigation in Karnataka

Table 2. Temporal changes in the development of tank irrigation in Karnataka

Source of irrigation	1956-57	in %	1986-87	in %	2018-19	in %
Tanks	327534	44.25	255792	21.04	147068	6.17

Source: Hand book of Karnataka and Suvarna

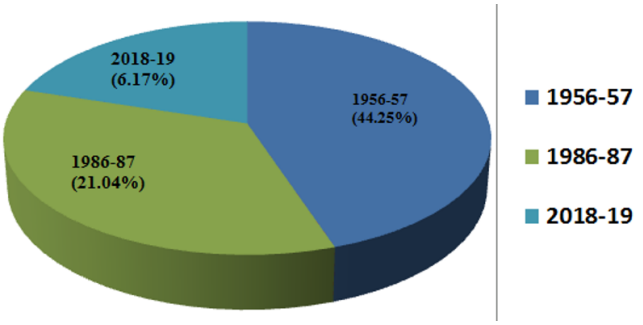

Fig. 3. Changing are under Tank irrigation

Tanks had the largest area under irrigation (44.25 per cent of net irrigated area) in 1956-57 and canals came a distant second with 22.50 per cent. The decline in tank irrigated area is attributable mainly to the reduction in their storage capacity as most tanks have silted up and their weirs, some of which are very old, have collapsed for want of repairs. The funds granted by the government for tank maintenance are grossly inadequate and the irrigation users also do not come forward to share the cost or work, thus allowing an enormous potential worth scores of major schemes, to go to waste-a major failure of the Karnataka state, (extract from the irrigation report 2003-04)

Over 70 per cent of the 3,524 minor irrigation tanks in Karnataka have gone dry due to poor monsoon rains. Minor

irrigation tanks play a vital role in the State's food grain production and cover a total ayacut area of 4.19 lakhlhectares. According to Karnataka minor irrigation department statistics, at the end of two south-west monsoon months of monsoon rains, 28 per cent of the tanks have storage capacity of 30 per cent to 50 per cent of their capacity. Only one per cent of the tanks had storage of more than 50 per cent.

District level scenario

It is one of the traditional methods of irrigation practiced since ancient times in almost all the districts of the state. Tank irrigation has shown sharp decline over the last 50 years from 44.25% in 1956 to only 6.17% in 2019. Even the spatio-temporal patterns of tank irrigation have undergone phenomenal change in the state over a period of 6 decades. The below table gives a clear picture of changing pattern of tank irrigation.

Table 3. Temporal trends of area under tank irrigation. (District level)

% of area under tank irrigation	1956		1975		2019	
	No. of districts	% of districts	No. of districts	% of districts	No. of districts	% of districts
< 10	2	10.53	7	36.84	20	74.07
10 – 20	3	15.79	2	10.53	-	-
20 – 30	4	21.05	2	10.53	6	22.22
30 – 40	2	10.53	-	-	1	3.70
> 40	8	42.11	8	42.11	-	-
Total	19	100	19	100	27	100

Source: Hand book of Karnataka and Suvarna Karnataka

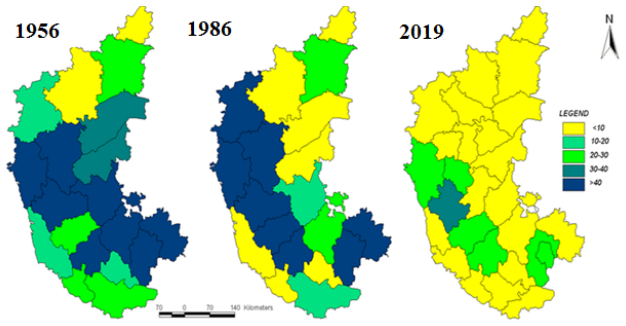

Fig. 4. Spatial distribution of area under tank irrigation (area in percentage)

In 1956, tank irrigation was extensively found in almost all the districts of the state except Bidar and Bijapur districts. Bangalore, Kolar, Tumkur, Hassan, Chitradurga, Shimoga, Dharwad and Uttar Kannada districts practiced tank irrigation with their full potential. In 1976, there were 7 districts under the category of less than 10% showing a declining trend. In 2019, except Shimoga, all the districts of the state lost area under tank irrigation drastically.

The sustained and pervasive decline of area under tank irrigation is a pointer to a great contention of the present study. As a source of irrigation, tanks compare unfavorably with canals, both in respect of productivity and stability gains. While the land productivity gains are found to be quite modest, the agricultural stability gains turn out to be rather precarious. Land was an abundant resource in ancient times; hence large tanks were built by native kings, but now, land is quite a scare resource. Moreover, tanks submerge fertile, cultivable and more useful land when compared to dams which are usually constructed on hilly regions (Pandey 1979). It is because of the present high value of land on one hand and high density of population on the other hand that the tank beds have been extensively encroached upon by both tank beneficiary farmers and settlers on the fore shore side of tanks.

Reasons

The main reason for this decline is silting of tanks, failure of monsoon, encroachment of tank area, poor maintenance etc. In Bangalore urban districts, the major reason for vanishing of tanks is speedy growth of urbanisation. Many residential layouts growing like mushrooms have swallowed large tank areas in recent years. According to many town planning experts, frequent inundation of waters during monsoon in Bangalore city is due to construction of houses on the encroached tank area.

Embanked tanks are an integral part of the rural landscape of Karnataka. They formed till recently, an extremely important irrigation source in the state. In spite of a decline in their number in recent years, Karnataka still has about 36,000 tanks, their ayacut size varying from a few to over 500 hectares

The main reasons for this decline are
Silting of tanks
Failure of monsoon
Encroachment of tank area
Poor maintenance
Too many tube wells.
Lack of proper policy by the government

Solutions

Rain water harvesting policy should be adopted. Periodic desilting of tanks should be taken. Encroached area should be regained through strict and stringent government policy. Tanks should be well connected to major canals of river valley project

Suitable adjustments in the cropping patterns and improvements in irrigation techniques can bring about a lot of efficiency and save substantial loss of tank water.

There is need to effect these changes, particularly in the irrigation of paddy and sugarcane, which crops with only about 12 per cent of the total cropped area consume more than 40 per cent of irrigation water. They require 3-4 times the water needed for irrigating crops like jowar, ragi,maize and other oil seeds. Scientific policy should be evolved for drilling tube wells. Rejuvenation and renovation of tanks should become the immediate concern for the government.

Conclusion

Today the agricultural development of the entire country is undergoing structural changes and transformation. The irrigational facilities of Karnataka are not exception to this. Change is a law of nature and it is a continuous process both in terms of time and space and this can be seen in the proceeding analyses. As pointed out in the foregoing analyses the irrigational facilities have sharply increased in terms of canal irrigation but alarmingly decreased in terms of tank irrigation. Further the increase is very much uneven and lopsided. Policy makers and administrators should design a plan in such a way that thousands of tanks in our state should be preserved and protected for coming generations.

References

1) Government of Karnataka, Water Resources Department (Major & Medium Irrigation) Annual Report 2006-07. .
2) Government of India Ministry of Water Resources, "Report of the Working Group on the Water Resources for the XI Five Year Plan (2007-12) New. .
3) Hand books of Karnataka. Delhi. 2019.
4) Kenzo F, Nakayama S. Recent changes in rural south India through development. *Fujiwara*. 1984.
5) Hand book of Karnataka and Suvarna Karnataka. .