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Water resource management in Karnataka: With special reference to Chickballapur district

CP Shashikala[1], Dr. Y Rajaram[2]
[1] Research Scholar, Department of Management, Tumkur University, Tumkur, Karnataka, India
[2] Research Guide, Ramaiah Institute of Management Studies, Bengaluru, Karnataka, India

Abstract
Water is essential for all living things survival. In this circumstance, the ever depleting water resources and their protection as well as sustainable consumption and supply of clean and potable water for increasing population is biggest challenge of 21st century. Increasing population is increasing pressure on water. Water supply is an important contextual theme in planned economic development.
The state is endowed with limited water resource that is stressed and depleting. Different sector demands are growing rapidly. Increase in population, urbanization, rapid industrialization and rising incomes are putting this resource under stress. Unless water resources are properly developed and managed, the state will face acute crisis within the next two decades. Serious destabilization of water sector affecting the hydrology, economy and ecology of state.
Sustainable development requires wise policies and effective strategies that conserve, protect, manage fresh water to meet needs of human and other creatures.
This paper focus on problems needs, sources, key issues of water resources challenges of water resources management in Karnataka with reference to Chikkaballapur district, the paper ultimately aims at recommending solution to the problem.

Keywords: water, water resource, water resources management

1. Introduction
Water resources: The total natural water present on earth, the different resources are surface water sources, ground water sources and frozen water.
Water Resource Management: Is the activity of planning, developing, distribution and managing the optimum use of water resource, balance demand and supply that is rarely possible.
In India, water management has been a government priority for several centuries, with various rulers, British and smaller princely states paying great attention to irrigation and drinking water supplies. In fifth year of independence the Indian Government developed the country's water resource further and today the scope for expanding surface and ground water resource, through a judicious mix a delegation of responsibility to local institutions and large scale investment in re-directing surplus water to deficit area.

Water Resource Management Key Areas
- Basin wise management: To protect the quality and availability of water while balancing the Competing demands of both upstream and downstream uses.
- Ground water management: Protect fresh water reserves that supply millions of farmers and urban and rural people with their daily water needs. Periodical reassessment of ground water potential on a scientific basis will be undertaken exploitation will be regulated.
- Flood and drought: Prevention to protect communities from extreme conditions that can cause catastrophic loss of life and environment degradation, disaster management strategy.
- Quality of water: As growing demand and increased pollution threatens the purity of lakes, rivers, estuaries and ground water around the world.
- Climatic changes: Adoption and mitigation of climate changes to manage the short term and long term effects of weather variability on water resource.
- Institutional arrangements: Recommend, strengthen, decentralization of water institutions to lowest level with regard to development and management of water sources.
- Enhancing the role of civil society: Recommendation, encourage stakeholder participation and Consultation with water user associations, non-governmental organizations and private sectors Representatives in the formulation and enforcement of water policies.
- Conserving and protecting the eco-system: Recommend, establish a rate of depletion of non-renewable ground water sources for irrigation, Domestic and industrial etc.
- Rain water harvesting and water conservation: Efficiency of utilization of water will be improved. And awareness about water as a scarce resource must be fostered. Conservation consciousness will be promoted through education, regulation incentives and disincentives

Benefits
- Increase water availability
- Increases quality of ground water
- It is environment friendly
- Reduces soil erosion, etc
- Future estimation of water resource: To estimate the future

demand of water resources and its supply. So as to balance both.

- Planning, development and management through integrated approach for a hydrological units.
- Allocation of water resource: for
  Drinking water
  Irrigation
  Hydropower
  Aqua-culture
  Agro industries
  Non-agricultural industries
  Navigation and other uses.
- Desalination of water: It is significant commercial development using various desalination technologies. Where converting salt water to sweet water to increase supply of fresh water.
- People Participation and capacity building: For making the people of various sections of society aware about the different issues of water resources management.
- Recycle and reuse of water: Another way through which we can improve fresh water availability is by recycle and reuse of water. The waste water, used water, polluted water is to be recycle and reused.
- Inter-basin transfer: Transfer water from surplus are to deficit areas many schemes have to be implemented for inter-basin transfer.
- Legal restriction on water use: one of active strategy could include provisions of legal restriction on use of water mainly during the period of scarcity and legal restriction on people utilization of ground water resources.
- Land use planning and cropping pattern: Planning of land use especially in new land development areas where water supply priorities are low can be planted with drought resistant varieties of trees etc.
- Water pricing: change in water pricing structure. The rates can be varying with availability.
- Watershed management: for equitable and sustainable management of shared water resources, flexibility, holistic approach of integrated water resources management. many programmes from central, state, Ngo, private sector is required. Water-shed management refers to conservation regeneration and judicious use of all the resources Natural (land, water, plants, animals) human with in watershed areas. These are the key areas in which water resources management deals with in.

2. Statement of the Problem

In Chikkaballapur district I noticed shortage of water and also the water is contaminated and over exploitation of underground. There is urgent need to look for alternative sources of portable water in places where water quality has deteriorated sharply, community based water quality monitoring guidelines should be encouraged, people should be encouraged to look at effective methods of providing water sources.

Ground water is over drafting leading to diminished agriculture yield and pollutants of water resources harming biodiversity. Further regional conflicts over scarce water resources sometime resulting is warfare. Drought dramatizer the underlying tenuous balance of safe water supply but it is imprudent action of humans that have rendered human population vulnerable to the devastation of major drought.

Water situations has occurred because of lack of proper rights, government regulations and subsidies in water sector, causing prices to be too low and consumption too high. The main of research question is to find out whether the role of different agencies in management of water is effective are not.

This study will focus on answering to the question causes for water problem and water resources management in Karnataka with special reference to Chickballapur District.

3. Objectives of Study

The following are the important objectives of the study:-

1. To know about various water resource in Karnataka especially Chikkaballpur district.
2. To know about various factors influencing on water resource management in Chikkaballapur District.
3. To offer constructive suggestions on topic to improve water resource management.

4. Research Methodology

Used Explanatory research methodology

Primary Data: Primary data has been collected with help of interview.

Secondary Data: Is collected with the help of books, journals, newspapers, reports and internet.

5. Water Resource in Chickballapur District

Chikkaballapur became district in 23/8/2007 and it includes 6 taluks and population is 11,490,07.. The taluk is bound by Gudibande, Sidlaghatta, Gudibande, Chikkaballapur, Bagepalli,Chinthamani are taluks of chikkaballapur district.

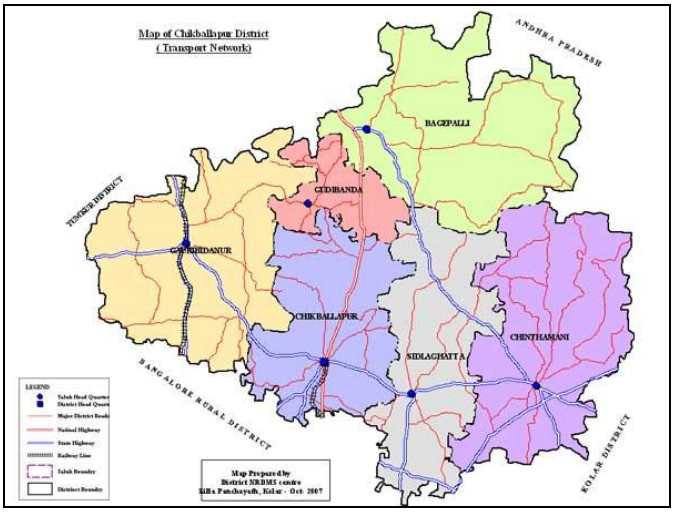

Fig 1

The annual rainfall in Chickballapur is 745 to 750mm and most of rain occur in September-October months.

Sources of Water Resources in Chikkaballapur District Surface Water

There are numbers of rivers, tanks, check dams, ponds but most of tanks are silted up and there by reducing the water storage capacity. There are rivers namely Uttarapeenakini,

Arkavathi, Palar, Chitravathi but Arkavathi and Palar takes its birth in Nandhi hills and supply water to Bangalore. It does not serve Chickaballapur. Chitravathi and Uttara Peenakini flow only for 2 months and there is a shortage in remaining months.

Fig 2: Palar Birth Place- Nandi Hills

Fig 3: Arkavathi -Birth Place Nandihills

Table 1: Ground Water Levels Related Information

Sl. No.	Taluks	Ground water Level Mini	Ground water Level Maxi	Classification
1	Bagepalli	6.33	13.27	SAFE
2	Chikkaballapur	25.84	32.14	Over EXPLOITED-100
3	Chinthamani	15.03	18.94	OVER EXPLOITED-100
4	Gauribidanur	10.29	14.02	OVER EXPLOITED-100
5	Gudibande	6.32	10.7	OVER EXPLOITED-100
6	Shidlagatta	13.88	19.12	OVER EXPLOITED-100
	Total	6.32	32.19	

6. Need for Water Resources Management

There is urgent need for water resource management because:
National economic efficiency: Main objective of water resource management is to uplift national economic efficiency by contributing to increase gross national product. As production get increases and further the wellbeing of nation will also increases.
Regional welfare: Another Important objective of water resources management is balanced regional development which may often even tone down the objective of national economy. This may involve costly and difficult projects in backward and chronically drought prone areas to be given priority over other economically attractive projects in comparatively developed regions for creating employment opportunities, stable economic base and securing income distribution on need. It may necessitate long distance conveyance of water from surplus sources to attain regional welfare.
Environment Quality: Preservation or enhancement of area of aesthetic beauty such as natural river, lakes and landscape protection and improvement of water quality, prevention of erosion and enhancement of fish and wild life resources cover varied aspect of environment quality.
Priority and quick return: Irrigation and hydro power development has priority for economic and social uplift because of obvious benefits which flow from it to agriculture and industry.
Better water management: Optimum utilization of available water resources is basic to economic advance survival
Optimum utilization: Optimum utilization of available water resource, augmentation through development of utilized or underutilized water resource such as underground reservoirs, desalination of sea water in low rainfall areas for irrigation is one of vital objective of water resource management.
Integrated development: Surface and ground water are the sources in India. Integrated development of surface water and ground water.
Encourage Artificial Recharge: Water resource management helps to preserve water by artificial recharge for use in dry

- Store excess surface water and ground water.
- Improve quality of underground water.
- Purification and reclamation of sewage effluents.
- Increase in agriculture productivity.

Helps for equitable water distribution: supplies of water particularly in large is of great significance volumetric supply of water needs to encourage and water rates charged on volumetric basis.
Water resource management encourage grid of water system: Inter basin transfer of water resources from areas where surplus water is available to areas of scarcity. Water resource management encourage rain water harvesting: So that the rain water is collected and stored for future period of time and it increase water level.

Chikkballapur District Consists Of Key Problem

- Mismanagement of fresh water
- Lack of planning
- Unequal distribution of drinking water
- Poor planning
- Lack of sustainable water projects
- Water supply problematic villages 213
- Water coverage area-10379.64 hecters
- Tanks- 202

Table 2

Taluks Water resource	Total no. Of Problematic Villages	Required amount Pipe lines	For problem Pumpsets And others	Villages in Bore wells
Chikkaballapur	36	19840	22	19
Chintamani	37	11400	24	28
Gowribidanur	38	19295	22	22
Bagepalli	33	8625	20	24
Sidlagatta	63	46950	51	53
Gudibande	6	3150	6	0
Total	213	109260	145	146

7. Factors Influencing On Water Resource Management

- Natural factor: The first and foremost factor influencing on water resource management
- Water quality: Physical, chemical and biological characteristics of water in particular area.
- Geological features: Geological erosion over millions of years has produced on organized stream system which constantly changes from natural process and human activities, hill and mountain areas, topographic etc.
- Climatic condition prevailing in the region.
- Different water sources like river, tanks, ponds, ground water level, sea etc.
- Forest vegetation.
- Population: The existence of population in particular region. The demand for water resource and different sources of supply influence on water resources management.
- Political system: several politicians harass official for cut of fund allocated for development of large government project and detail planned work or victimize government officials if their demands are not accommodated. So the political system is importance.
- Way of planning schemes: Non-viable and unplanned schemes which do not have assured water in the sources or do not have favourable cost benefit ratio are sometime taken up for implementation purely for political consideration. So the planning the schemes which effect on water resources management.
- Availability of finance: The financial condition of institutions which deal with water resource is important because non-availability of finance leads to long delay in implementing planned projects and conflicts over water rights and allocations reduce the efficiency of water resource management.
- Co-operation among government bodies: The co-operation from different institution is very important between central, state local government for effective running of institutions.
- Effective involvement of local communities: The social setup in region influence on water resource Management like
- Encourage from local people
- Participation of people
- Involvement and care taking
- Need for water resource will influence on success or failure of water resource.
- Availability of Ngo's and private sector participation: There are good Ngo's who have
- the competence and experience to do community level mobalisation and encourage people's Participation there are several Ngo's who are given charge of doing similar work but do not have required competence to carry out their stipulated functions this lacks of adequate community involvement on the ground.
- Quality information: Another factor which influence on water resource management. When there is availability of quality information the success occurs if not failure of different water Programmes.
- Capacity at all levels: Is vital at different levels within government institutions, as also within local communities to improve the provision and maintenance of water supply service. The capacities related to technical, social, managerial and institutional issues from organizing effective community participation, building soldierly vision a sense of purpose within communities.
- Statutory frame work: Half of jurisdictions address the issues of water resource in their constitutions with several giving the state the authority to regulate water resource so the statutory frame work influence on water resource management.
- Dispute settlement: Water legislation needs to address the resolution of disputes government agencies. Less formal mechanisms can reduce costs and delays, with formal mechanisms reserved for more intractable disputes. These are the various factors which influence on water resource management.

8. Suggestion and Recommendation

- Ground water management: Protect fresh water reserves that supply millions of farmers and urban and rural people with their daily water needs. Periodical reassessment of ground water potential on a scientific basis must be undertaken.
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- Water pricing: change in water pricing structure. The rates can be varying with availability.
- Watershed Management: Water-shed management refers to conservation regeneration.
- Training

Others
- Complete all ongoing and committed water resources projects.
- Establish water resource data information center and collaborating arrangements with concerned departments.
- Restructure the water resource department to improve planning and management capabilities.
- Restructure and strengthen training, research and development in the water resource management.
- Develop plans for modernization and rehabilitation of water resources projects.

9. Conclusion
There is interplay of different factors that govern utilization of water resources in spite of increase in demand for holistic and people centered approach. Water resources management requires combined initiative and action of all.

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