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WATER RESOURCE MANAGEMENT IN KARNATAKA: WITH SPECIAL REFERENCE TO DHARAWAD DISTRICT

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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 Dharawad district, the paper ultimately aims at recommending solution to the problem.

Keywords: water resource, resources management

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, and animals) human with in watershed areas. These are the key areas in which water resources management deals with in.

STATEMENT OF THE PROBLEM

In Dharawad 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 Dharawad District.

OBJECTIVES OF STUDY

The following are the important objectives of the study:-

- To know about various water resource in Karnataka especially Dharawad district.
- To know about various factors influencing on water resource management in Dharawad District.
- To offer constructive suggestions on topic to improve water resource management.

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

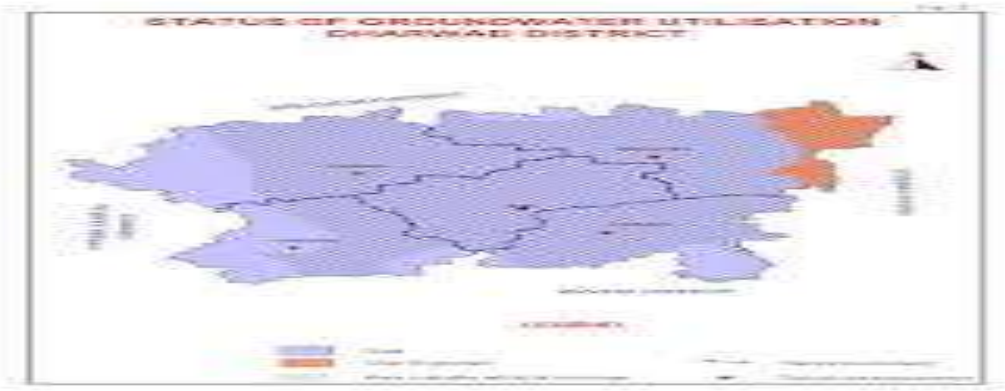
Water Resource in Dharawad District

Dharawad became district in 23/8/2019 and it includes 6 taluks and population is 903,136. The taluk is bound by Hubli, Kalagatagi, Kundagol, Dharawad Kundagol Navalagund are taluks of Dharawad are taluks of Dharawad district.

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

WATER LEVELS

The decadal mean depth to groundwater level (DTW) record reveals shallower water level in the west-central stretch of the district especially in Dharwad and Kalghatgi taluks as depicted in the Hydrogeological map, fig-3. where as the deeper level recorded in the south-south-eastern parts. The general levels recorded in the range of 6.00 to 9.0 mbgl in May-2006 (Fig-4) and is recorded between 4.50 and 7.00 mbgl during November-2006 (Fig-5). The water level is



between 10 to 20 mbgl in major part of Kundgol, parts of Navalgund and bordering Dharwad, Hubli taluks. The water level trend for the month May for the period of 1997 to 2019 shows a general fall of 0.5 to 1.5 m, with a few

isolated pockets at rising (+ fluctuation) trend in the order of 1.0 to 5.0 m. A general declining trend recorded in November month ie post monsoon period and a appreciable rise of about 1.00m/year noticed in few patches of western hilly region. Generally the water table contour fall along the regional topography as it flows towards the major river courses depicting a gentle water table gradient. The contour traced also exhibits the ground water divide along the watershed boundaries (Malaprabha and Kali rivers). The ground water flow seems to be converged down to the deeper level in the eastern region. The water table traced show in the altitude range of < 515.15 to 686.26 above mean sea level (amsl) and < 514.85 to 682.70 amsl respectively during post-monsoon and Pre-monsoon period of 2005.

GROUND WATER RESOURCES

The main known source of groundwater in the district is recharge by annual precipitation (rainfall). The ground water potential reveals the annual resource as 31961.81 Ham for the year 2004, as a replenish able /dynamic resource, as indicated in table (A) below. The annual groundwater drawl in Dharwad-taluk accounts for 3441.18 ham and minimum of 937.38 Ham in Kundgol taluk as detailed in table (B). Due to the prevailing socio-economical condition and an uneven distribution of potential aquifers about 2610.35 ham have been used for drinking and 9551.88 Ham both for industrial purpose and irrigation purpose with a total draft of 11059.94 ham during the year 2004 as shown in Table 1(A) and Table 1(B).

Table-1(A)

S.N	Taluk	Recharge from rainfall during monsoon season (ham)	Recharge from Other sources during monsoon season (ham)	Recharge from rainfall during nonmonsoon season (ham)	Recharge from Other sources during nonmon soon season (ham)	Gross ground water vailability (ham)
1	DHARWAD	7407.58	453.04	1024.86	402.68	9288.17
2	HUBLI	3803.07	189.12	584.09	199.40	4775.67
3	KALGHATGI	5099.76	125.53	535.11	273.39	6033.80
4	KUNDAGOL	2594.12	303.52	548.55	117.47	3563.66
5	KUNDAGOL	2874.06	3265.67	909.93	2445.32	578.98
6	NAVALGUND	5043.80	627.36	899.12	438.35	7008.64
7	NAVALGUND	712.90	712.90	712.90	712.90	712.90
	Total	27535.30	5677.16	5214.55	4589.50	42303.61

GROUND WATER QUALITY

The water in phreatic aquifer zones found in potable form whereas it is alkaline to saline in the deeper zones, especially in the eastern part of district. The electrical conductivity (EC) of waters observed in the range of 900 to1200 µm/cm, at places in Dharwar, Hubli and Navalgund taluks it recorded between 4000 to>7500 at 25°C. The higher concentration, ie.more than permissible limit of Nitrate (NO3) as >45 mg/litre occur in many localities as indicated in fig.1. The fluoride presence in some pockets of the central and eastern border areas noticed as around

1.5mg/l, is greater than the permissible limit as depicted in fig.1, the rest of the area have acceptable limit of 0.2 to 1.0 mg/lit. The presence of chloride as high as >1000 mg/l in many parts of eastern region observed as in the area demarcated in the Fig-6, is said to be due to the extensive use of chemical fertilizers in agricultural lands.

STATUS OF GROUND WATER DEVELOPMENT (ADMIN BLOCK WISE)

The ground water developmental activities in the district mainly concentrated in the valley regions and along the banks of rivers/streams. The extraction of groundwater for irrigation in western region is comparatively high and is in low rate in the eastern region as detailed in the table-2.

The borewells tapping within the depth range of 150-to 200 mbgl yield an adequate quantum of water as the presence of saturated fractured zones in exploratory wells. It is observed that the yield of dug and dug-cum-borewells exhibit wide variation but the borewell drilled along the lineament yield copious water as seen in (Devar Gudihal village) Dharwad taluk.

Table-2 Taluk wise ground water draft data

Taluk	Existing Gross Ground Water Draft For Irrigation (HAM)	Existing Gross Ground Water Draft For domestic& Industrial purpose (HAM)	Existing Gross Ground Water DraftForAll Uses (HAM)
Dharwad	3035.41	405.77	3441.18
Hubli	1303.49	249.18	1552.67
Kalghatgi	1831.09	180.72	2011.81
Kundagol	691.25	246.13	937.38
Navalgund	2690.64	426.26	3116.90

In all there are13543 irrigation electric motors registered in the district, DAG-2006. The wells in the highly weathered Grgneissic rock aquifer in the eastern parts get depleted resulted in drying of wells during post-monsoon periods. A major part of domestic need is met from groundwater through various drinking water supply schemes implemented by government viz mini-water supply BW-347 nos, accelerated rural water supply, Piped water supply BW-399 nos and 2500 bore wells installed with hand pumps (DAG-2006). In general the ground water development found between 27.67 to 46.69% over the taluks, where as the district average rate accounted for 35.44%.

Since the water levels in the area as a whole has not shown any appreciable decline the district is categorized as “SAFE” category in terms of development. An area of about 21 % in Navalgund taluk as shown in Fig.7 has been identified as over exploited, is categorized as “over exploited”. The previous record reveals a remarkable increase in the usage of ground water with a total drawl of 9551.88 Ham of groundwater.

GROUND WATER MANAGEMENT STRATEGY

Since, the district with the major part of the domestic water and agriculture demand met from groundwater the water management aspect become an integral part for all round socio economical development of the region, in addition to that the environmental management and ecological stability. Hence, a proper groundwater management strategy is essential to make most economical, efficient and judicious use of water to achieve sustainable development of the resource.

Table 1: Ground Water Levels Related Information

Taluk	Allocation for Domestic and Industrial Use For Next 25 Years in HAM	Domestic and Industrial Use For Next 25 Years in HAM Net Groundwater Availability For Future Irrigation Development. HAM	Average Crop Water Requirement (m)	Balance Ground Water Irrigation Potential Available Ha
Dharwad	583.27	5205.07	0.69	7543.58
Hubli	349.97	2883.417	0.815511	3535.719
Kalghatgi	251.20	3649.816	0.8175	4464.607
Kundagol	347.28	2349.015	0.849916	2763.82
Navalgund	615.91	3437.015	0.615658	5582.671
Total	2147.64	17524.34	3.79	23900.36

With the existing scenario the feasible abstraction structures as presented in table-4, viz DW/DCB have been proposed to utilize the resources and effectively develop the potential created for the future.

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.

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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