JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue

JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

An International Scholarly Open Access, Peer-reviewed, Refereed Journal

Utilizations of ground water in bore wells for Agricultural Development in Mysore District

Dr. H.KAMALA
Associate professor,
Department of Geography,
Maharaja's college,
University of Mysore,
Mysore.

ABSTRACT: -. . Ground water is an important natural resource essential for sustenance of life. This paper has revealed to bring out the district level ground water supply through bore wells. And highlighting the ground water in resource potentiality, quality aspects, recharge – discharge relationship, etc., for the agricultural development of the district. The resources of fresh water in the groundwater of bore well [98%] can be used only within certain limits. Most of them are located at great depths so that extraction becomes expensive. Water which is involved in the precipitation but which is used is bound to become exhausted in the modern time.

Of the 23.4 millionkm3 of ground water 10.53millionkm3 is fresh water representing 30.1% of the earth's entire fresh water. Several of this extensive ground water deposits for farms between 20000 to 50000 years ago while other are more than 10, 000 years old. If these resources are used, they are not renewed under the present climatic conditions so that the drawings cause the lowering of water table with the corresponding increase in the static head and cost of extraction. The study focuses on to understand the how ground water influences on the agricultural practice and assessing the financial status and suggest scope for improvements.

Key word: Ground water, potentiality, recharge, rain water harvesting

Introduction:- Groundwater plays a crucial role as a decentralized source of drinking water for millions urban families. According to some estimates, it accounts for nearly 65-80 per cent of the urban water needs. Groundwater is generally less susceptible to contamination and pollution when compared to surface water bodies. Groundwater is used intensively for irrigation purposes. Ground water contributes to about eighty percent of the drinking water requirements in the rural areas, fifty percent of the urban water requirements and more than fifty percent of the irrigation requirements of the nation

Ground water is one of the gifts of nature to mankind. It is one of the important sources of origin of life on the earth surface. Mysore district has plenty of ground water. Bore well helps to formers to irrigate their agricultural land and improve their agricultural productivity. Ground water is the main source of domestic supplies and irrigation in major parts of the district. Out of the total area of 1180 km2 under irrigation, about 11% is irrigated using ground water through dug wells and bore wells. Farmers with small land holdings depend mainly on the rainwater and water available in the shallow wells. There are 4501 dug wells and 16478 bore wells in the district as per census.

Location: The Mysore is one of the 27 districts of the state lies in the southern most part of Karnataka state with an area of 6269 sq.km, which constitutes 3.27 per cent of the total area of the state. It ranks 13th in size and 4th (4.97%) in terms of population (2011). the study area extends from 11^0-45' to 12^0-50'North Latitude and longitudinally 75^0-45' to 77^0-10' East. On the north is bounded by the Hassan, Mandya and Bangalore districts and the Chama raja nagar district and Wynad district of Kerala on the south and east, on the west by Kodagu.

Mysore district spatially consists of seven taluks: Mysore, Thirumakudala Narasipura, (T.Narasipura), Hunasur, and Krishnaraj nagar (K.R.Nagar), Nanjanagud, Periyapatna, and Heggadadevana Kote (H.D.Kote). These taluks are grouped into two subdivisions namely Mysore and Hunasur for administrative purposes, with 33 hoblies, eight towns and 1257 villages with 236 grama panchayats and nine townships/ municipalities. In addition to this there are 129 uninhabited villages as per 2011 census.

Drainage:

The major drainage in the district is the east flowing Cauvery River. The Kabini River one of the major tributaries of Cauvery flows diagonally from the SW of the district to the NE before joining the Cauvery River at T. Narasipur in the NE part of the district. The main Cauvery River flows from west to east in the northern parts of the district till its confluence in the K.R.Sagar reservoir. The reservoir makes the northern boundary of the district. Kabini River, a tributary of Cauvery enters the district from its southern part, flows in the easterly direction and receives Nugu and Gundal rivers. Lakshmanthirtha River, another tributary of Cauvery enters the district

in Hunsur taluk near Chikka Hejjur. It flows in NE direction through Hunsur and K.R.Nagar before joining Cauvery. It is a perennial system of rivers.

Objectives :- This study is to understand the problems of development of agricultural activities through ground water through the efficiency of the bore wells in Mysore district. And also the status of functionality of the ground water through the bore wells as well as the socio-economic status of taluks of Mysore District

Methedology: the Mysore district Ground Water Information has been prepared based on the information available and data collected from secondary sources. Various state and central government organizations by several hydro-scientists of Central Ground Water Board with utmost care and dedication and it will certainly serve as a guiding document for further work and help the planners, administrators, hydro geologists and engineers to plan the water resources management in a better way to the agricultural development of the district.

Agriculture and Irrigation:

The net sown area comprises 72% of the total geographical area, of which about 20% is sown more than once. Paddy is the major crop in the district and Is grown in favorable areas totaling about 1107 km2, followed by pulses and Ragi which are cultivated in 989 and 972 km2 respectively. Other major crops grown in the district are Cotton, Sugarcane, Jowar Tobacco and Oilseeds. About 17% of the total geographical area is under irrigation in the district, comprising of the command area of K.R.Sagar and

Kabini Projects. The right bank high level canal of K.R.Sagar known as the Varuna canal passes through Mysore, T. Narsipur, Nanjangud, & H.D.Kote taluks. Out of the total area of 1180 km2 under irrigation about, 11% is irrigated from ground water by dug wells and bore wells. While canals account for 81% of the total area under irrigation, tanks account for approximately 7% of the total area irrigated. It was estimated that groundwater development through the bore wells reached 37% in HD Kote and 73% in Nanjanagudu. And both taluks are dominated by the agricultural activity.

AREA UNDER PRINCIPAL CROPS in the District (2018-19) area in ha

Crop:

Paddy	Ragi	Jowar	Pulses	Oilseeds	Fruits & Vegetable	Sugar cane	Tobacco	Cotton	Others
118084	79824	19819	119016	25551	9572	95350	459482	71938	69785

Total: 582606

IRRIGATION BY DIFFERENT SOURCES

Dug wells	Bore wells	Tanks/ Ponds	Canals Lift	Other Sources
10323	5795	17377	87685	375

Net Irrigated Area 121555

The hydro geological investigations and groundwater exploration have revealed the existence of potential zones within 100 meters depth in Granitic and gneissic formations. The report on Hydro geological Conditions in Mysore district was prepared in the year 2011. Mysore district receives an average rainfall of 786.7 mm. There are 53 rainy days in the district on an average about 50% of annual rainfall occurs during the southwest monsoon period. The rainfall generally decreases from west to east. The coefficient of variation is around 30% in the west to above 35% in the east, indicative of consistent rainfall in the west as compared to the east. The pre monsoon rainfall is more consistent than the post-monsoon rainfall. The southwest monsoon had been normal from 1994 onwards till 2018, excessive during 2000 and deficient thereafter. The northwest monsoon is much better comparatively being excessive to normal during the recent past. Over all on an annual basis, there are more normal to excessive rainfall years than deficient ones. While during 1997, 1999, 2000 and 2005 and 2018, the district received Excess rainfall, 1998, 2001, 2002, 2003and 2004, it was Normal and only during 2006 to 2018 the district received deficient rainfall. The average minimum and maximum temperatures vary from 34 to 21.4oC in April to 16.4 to 28.5C in January. Relative humidity ranges from 21 to 84%. Wind speed ranges from 7.9 in October to 14.1 km ph in July. Annual potential evapo transpiration is 1533.5 mm., the monthly mean rainfall during the months of July, September and October in different taluks, thereby indicating availability of water 4 Status of Ground Water Development: Net annual ground water availability in the district is 41143.06 ham, total annual ground water draft is 23822.33 ham, available resource for future development is 17761.65 ham, which can create ground water irrigation potential of 19577.35 ha.

The ground water is being exploited from within the depth range of 10.00 to 20.00 m bgl through dug wells and30.00 to 92.00 m bgl through dug-cum-bore wells and bore wells The ground water development

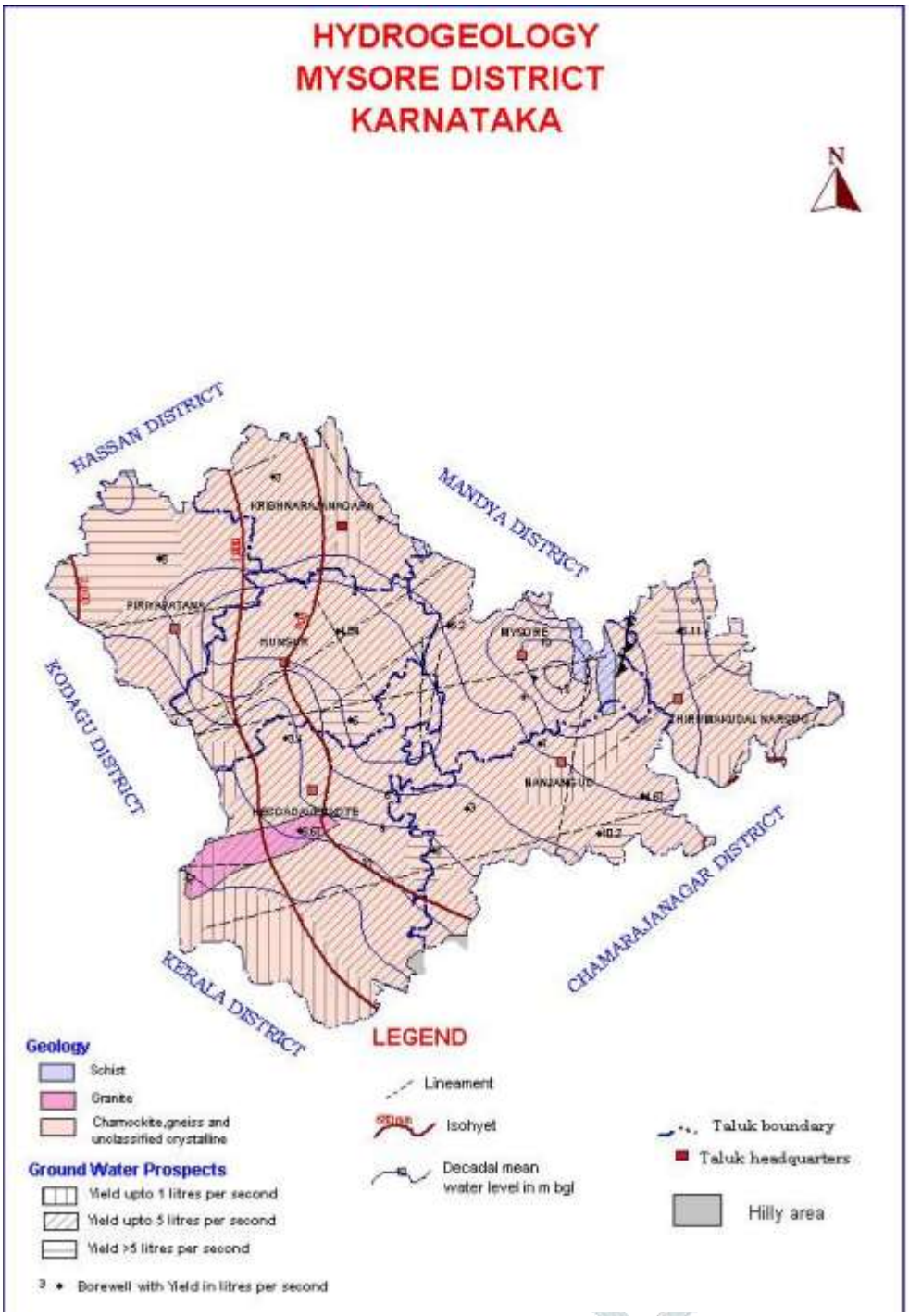
in the district is 63%. When considered talukwise, the ground water development is highest about 88% in Mysore taluk, followed by Nanjangud (73%), T. Narasipura (71%), Hunsur (57%), Periyapatna in taluk (42%), K.R. Nagar (39%) and the least, about 37% in H.D. Kote taluk. The taluk-wise groundwater resource Water lifting devices used in the district are Electric motor, Diesel Pump, Wind Mill and manual / animal operated. Electric pump is the most common water-lifting device, being used in more than 90% of the wells. Out of the total area of 1180 km2 under irrigation, about 11% is irrigated using ground water through dug wells and bore wells. Farmers with small land holdings depend mainly on the rainwater and water available in the shallow wells. There are 4501 dug wells and 16478 bore wells in the district. Out of these 87 dug wells and 349 bore wells is not in use due to various reasons including drying up of the wells. Taluk-wise wells are presented in table:

Distribution of Wells according to status as per MI Census 2000-01

		Wells in Use				
Sl No	Taluk	Dug Wells	Bore Wells			
1	H.D. Kote	261	2506			
2	Hunsur	853	2381			
3	K.R. Nagar	621	823			
4	Mysore	222	3155			
5	Nanjangud	604	3077			
6	Periyapatna	187	2033			
7	T. Narasipura	1753	2503	Total	4501	16478

The soil type of district is grouped in to three type's viz., the red sandy soils, red loamy soils and deep black soils. Almost entire district is covered by red sandy soil except a small parts of T. Narasipura taluk. The soils are having high permeability and neutral with a pH of 7. The texture is usually clayey throughout the profile.

These soils are fertile and generally produce good yields. Adequate soil and water management practices and drainage facilities are essential to obtain Sustainable yields; otherwise salinity and water logging conditions may develop. These soils need to be drained once in 3-5 years with good quality water.



Sources:WaterBoaordKarnataka

Problem and prospects of ground water in the agricultural development

Large parts of Mysore, T. Narasipura taluks and parts of Hunsur, Nanjangud and H.D. Kote taluks fall in over-exploited category. Water level in most parts of these areas are showing downward trend. Under the situation there is a need to augment ground water recharge by opting for rainwater harvesting and artificial recharge structures to harvest non-committed surface runoff. In the western part of the district where the topography is hilly and rugged artificial recharge structures like nalla and gully plugs contour bunds and contour trenches and nalla bunds may be constructed and in comparatively plain areas percolation tanks and point recharge structures like recharge shafts recharge pits and recharging through

existing dug/bore wells may be practiced. In semi-urban areas in the district, lot of roof area is available for rooftop rainwater harvesting. So in these semi-urban areas rooftop rainwater harvesting practices may be encouraged. This will help in supply ground water through bore wells for agricultural development

There are alluvial aquifers of limited aerial extent and thickness having primary porosity occurring along river courses. The river sections contain sand, silt and gravel in varying proportions. Hard rock's do not posses primary porosity, the ground water occurs under phreatic conditions in Weathered zones of granites and gneiss, and under semi-confined to confined conditions in joints and fractures of these rocks at deeper level in the district. In granites and gneisses, weathering has given rise to thick sandy residuum down to the depth of 2.0 and 20.0 m. And it forms an important phreatic aquifer in the district. There is over exploitation of ground water resource in 73% area of Mysore, 32% area of T. Narasipura, 27% of Hunsur and 20% area of Nanjangud taluks. This over-exploitation has resulted in depletion of water level. These aquifers are developed by dug wells, dug-cum-bore wells and shallow tube wells. The depth of dug wells in the district range from 5.28 to 17.59 mbgl .Cross sectional areas of dug wells varies from 5.39 to 115.31 m_2. The specific opacities of these wells range from 23 to 966 lpm/m and the discharges range from4.5 to105.6 m_3/hour. The draw-downs range between 0.65 and 4.44 m. The specific capacities in alluvial areas are higher ranging from 131 to 884 lpm/m. Fractured Granites and gneisses form prolific deeper aquifers in some parts of the district. In charnockites, specific capacities are in the range of 23 to 115 lpm/m while the major rock type viz granites gneiss have recorded specific capacities of 42 to 966 lpm /m. the transmissivities range between 21 and 912 m^2/d. The yield wise distribution of aquifers is given in fig 6.1. It is observed that the aquifers falling in about 90% of the district yield up to 5 lps. There are small patches of areas where yield is less than one LPs. There are small areas having high yielding up to 30 lps.

In Mysore taluk a small patch of 87 dug wells and 349 bore wells are not in use due to various reasons including drying up of the wells. Taluk-wise breakup of the average stage of ground water development in the district is 63% indicating that that there are areas where there is scope for further development. A hydro geological map showing water-bearing formations, yield potential, decadal mean water level and isohyets is Sustainability of ground water resource and its judicious use should be given prime importance while making development strategy. In critical and over-exploited areas, artificial recharge and rainwater harvesting measures are recommended to augment to ground water system. About 17761.65 ham of ground water resource is available in the district for further development. The development is recommended only in area categorized as safe and semi-critical. In such areas, potential aquifers can be located by hydro geological surveys aided by geophysical methods. Dug wells and filter-points are recommended only in river and valley banks where sufficient thickness of valley fill is available, which gets saturated during rainy seasons. Ground water development in other feasible areas should be done by bore wells. Spacing norm of 200 m may be strictly adhered to avoid interference. Aquifer should be pumped as per crop water requirement. In areas, which are categorized as critical and over-exploited, growing crops like paddy, sugarcane etc, having high water requirement may be avoided. Advance irrigation methods like drip and sprinkler irrigation may be practiced. In the command areas conjunctive use of surface and ground water may be practiced to avoid long-term hazards like water logging and ground water as well as soil salinity problems.

RECOMMENDATIONS

As already discussed the average stage of ground water development in the district is 63% indicating that there are areas where there is scope for further development. Categorization of the areas, It may be noted that all command areas are under safe category. Only for non command areas. While K. R. Nagar and Periyapatna taluks are safe for ground water development whereas in Nanjangud no area is safe except canal command and rest of the taluks are partly safe and partly over-exploited. But all the command areas falling in the district are safe for further development. For further improving of bore well efficiency will have to organize an exhibition, mela, fair. And should be to depicting various aspects of protection and conservation of water including various techniques rainwater harvesting and artificial recharge on its own as part of Mass Awareness Program me conducted at Mysuru.