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Study of Surface Water Resources in Pune Division of Maharashtra

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Abstract:

Among the basic needs of mankind, perhaps water is the most important resource for the human life. Supply of the pure water for the domestic uses is very important problem. On this earth near about 71 percent water and only 29 percent land area covered. It means out of total area three quarters area is covered by water. Therefore, the Earth is known as 'Blue Planet'. Out of this 71 percent of water, 97.2 per cent of this water is salty while only 2.8 percent of fresh water. But 2.15 percent fresh water is locked in freeze (ice) condition, 0.62 per cent is ground water and while remaining in 0.03 percent water is found to be in rivers, lakes, tanks.

The average water availability in the state of Maharashtra is 163.81 km^3(qubic kilometers). According to interstate water tribunal awards the allotted quantity of water to the state is 125.94 km^3(qubic kilometers). Out of the five major river basin system, 55 percent of the dependable in the river basins (Krishna, Godavari, Tapi and Narmada) east of the Western Ghats. The water resource in Pune division of Maharashtra includes surface water through the rivers, dams, tanks, reservoirs lakes and Kolhapur Type Wares (KTW) etc. Surface water is vital for ecosystem services as well as for provides living support to a large section of the population.

Keywords: Water Resources, Surface Water, River Basin, Dams, Percolation Tank.

Introduction:

Air, Water, Natural vegetation, Animal, Minerals, Power resources, Soil etc. are the natural resources on the earth. Out of this water is an important natural resource. Water is a basic essential need for survival of human beings and for other living beings like plants and animals. Water is an essential for domestic use, agriculture, industry, animal, hydropower generation and recreational purposes etc. The most of water is used for domestic purposes. Domestic water can be used for drinking, cooking, bathing, washing clothes and dishes, garden and many more other purposes. As well as the animal of the world cannot exist without water.

Human habitation established in old times, near the sources of water. Age old culture has been originated and developed in the basin of rivers. The Hwang-Ho and Yangtze-Kiang in China, the Nile in Egypt, the Ganga and the Damodar systems in India are examples of these effects.

Man, and animals not only consume water, but they also consume vegetation for their food. Vegetation, in turn cannot grow without water. Growth of vegetation also depends upon bacterial action, while bacteria need water in order to thrive. The bacterial action can convert vegetable matter into productive soil. New plants, which grow in this soil, grow by sucking nutrients through their roots in the form of solution in

water. Thus, an ecological chain is maintained. Water maintains an ecological balance in the relationship between living things and environment in which they live. Therefore, the present research work deals with the sources of surface water in in Pune division of Maharashtra state.

Objective:

The main objective of this research paper is to the study of surface water resources in Pune division of Maharashtra.

Data Base and Methodology:

Present study is based on secondary data. The secondary data is obtained from District census handbook, State Gazetteers, State statistical department and socio-economic review and various books to related water resources. Collected data is processed and presented in the forms of tabular and graphical.

Surface Water:

Surface water is available on the surface of the earth in the form of rivers, lakes, tanks, canal, Kolhapur type wares etc. In the Pune division of Maharashtra state, rivers are the most important source of surface water. This has encouraged the development of lift irrigation schemes on their both banks. However, the water resource of Pune division of Maharashtra state includes surface water through the rivers, dams, tanks, reservoirs lakes and Kolhapur Type Wares (KTW) etc. Surface water is vital for ecosystem services as well as for provides living support to a large section of the population

I. Rivers:

The direct source of rivers is rain in Pune division of Maharashtra state. Most of the rainfall of the Pune division is received from the south-west monsoon which lasts from June to September. The north-east monsoon is usually active from October to February. The average annual rainfall has considerable variations in space and time, and accordingly the flow of water in the rivers is also affected greatly. The rivers of the Pune division of Maharashtra state depend upon the monsoon rainfall. Therefore, during the monsoon season they carry very flows, which dwindle down to negligible quantities in the fair weather.

Rivers have always been the lifelines of human life, providing water, food, transportation and fertile land for agriculture. They are a hotspots for biodiversity, supporting a variety of plants and animals. They play a vital role in economic development by facilitating agriculture, industry and energy production.

The Krishna River is one of the important rivers in the Pune division of Maharashtra. The Krishna River originates at Mahabaleshwar in Satara district. The water of Krishna and its tributaries is used for irrigation, industry and drinking. Bhima River is the largest tributary of Krishna River. Bhima River originates at Bhima Shankar in Ambegaon taluka of Pune district. Mula, Mutha, Indrayani, Man, Ghod, Sina, and Nira are the tributaries of Bhima River. The Koyna River rises in Mahabaleshwar, Satara district of Maharashtra and is a tributary of the Krishna River. The Koyna River is famous for the Koyna Dam, the largest Hydroelectric project in Maharashtra. Panchganga River is an important river in Kolhapur district. This river is a tributary of Krishna River. This river is 87 km long and is the eastern channel of the river. The rivers Kumbhi, Kasari, Tulsi, Bhogavati, and Saraswati come together to form Panchganga River. Since independence, Maharashtra state has made significant progress in increasing the storage potential of the available water by building dams on various rivers.

II. Dams / Reservoir:

Availability of water is very important natural resource of a nation, which can be used for the development of the country. Thus, our aim is to harness the large quantities of water running in the rivers and use it most efficiently for various purposes. It is an impervious or fairly impervious barrier put across a natural stream so that a reservoir is formed. Due to the construction of the dam, water level in the river at its upstream side is very much increased and a large area may be submerged depending upon the water spread of the reservoir so formed.

The running water can be stored by creating reservoirs. In general terms, a reservoir can be defined as a large body of water created by constructing a dam across a river. But in water resources engineering a reservoir is defined as a comparatively large body of water stored on upstream of a dam constructed for this purpose. Thus, a reservoir and a dam exist together. Dams and reservoirs are the most important and expensive elements in multipurpose river basin development.

Table.1 shows the number of dams in Pune division; the total numbers of dams are 552 in Pune division of Maharashtra state in the year 2014. Out of these total dams' major dams 33, medium dams 46 and minor dams 473 are in the Pune region respectively (Fig.2). Solapur district (120) observed the highest dams in Pune division of Maharashtra followed by Satara district (116), Kolhapur district (605), Pune district (104), and Sangli district (99) respectively. It is observed that the Solapur district occupies the highest dams in Pune division because this area comes under drought prone region. These areas have a scarcity of water. Hence, it becomes necessary to construct dams across the rivers, store the water in reservoirs and supply it to the deficit areas.

On the other hand, the district wise distribution of the major dam's Pune division (33) is the highest in Maharashtra state. Pune district has the highest major dam (16) in pune division as well as in the Maharashtra state. Because, the Bhima and its tributries like Kundali, Ghod, Indrayani, Mula, Mutha, Pawana, Sina, Nira and Man rivers rise in the western ghat in Maharashtra and supply the water. As well as the bank of Bhima River are densely populated and form a fertile agricultural land. So, the river of Bhima is also known as the houses of dam.

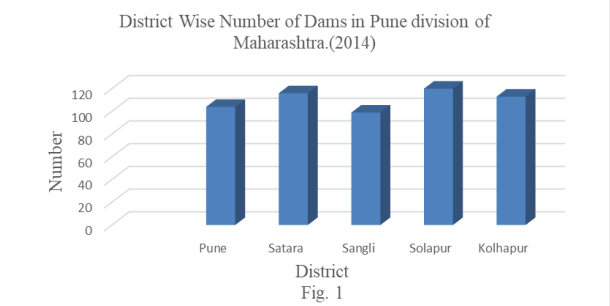

Fig. 1

Table 1: District wise Dams in Pune Division of Maharashtra (2012)

Sr No	District	Major	Medium	Minor		Total
				State	Local	
Pune Division		**33**	**46**	**359**	**114**	**552**
1	Pune	16	9	79	0	104
2	Satara	7	11	38	60	116
3	Sangli	5	6	65	23	99
4	Solapur	1	8	111	0	120
5	Kolhapur	4	12	66	31	113

Source: Socio-Economic Review and District Statistical Abstract of All District in Maharashtra State 2014.

III. Percolation Small Tanks:

Percolation small tanks generally include such storage schemes, which impound water of

streams and rivers for irrigation purpose. They are feasible mostly in areas where streams can be dammed or bunded. Some tanks are built as partly dugouts and partly enclosing bunds, which vary in size, from a work like Lake Fife and whiting in the study region to vary small village tank capable of irrigating about 5 acres or even less. Large tanks are few in number, need considerable technical assistance and require a large expenditure to make them reasonably safe against breaches. Large numbers of tanks serve domestic purposes in addition to meeting irrigational needs. It is observed that the 2961 total percolation small tanks in the study region.

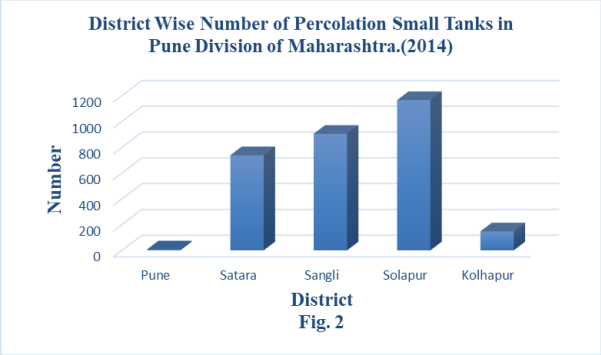

Fig. 2

Out of these percolation small tanks 1165 highest found in Solapur district. Followed by Sangli district (904), Satara district (738), Kolhapur district (147), and Pune district (7) respectively (table 3 and fig.3). The physiography is an important factor affect on the distribution of percolation small tanks in Pune division **of** Maharashtra.

IV. Kolhapur Type Wares (KTW):

Kolhapur type wares are also a type of water deposited. By using this method water is stored in specific area on various rivers and nalas. In Maharashtra state this type of Bhandara found on basically rivers such as Godavari, Krishna, Bhima etc. As well as constructed on small nalas in the study region.

Table 2: Percolation Small Tanks, Kolhapur Type Wares (KTW) and Bhuyari Deposited Bandhara in Pune Division of Maharashtra (2014)

Sr No	District	Percolation Small Tanks	Kolhapur type wares (KTW)	Bhuyari Deposited Bandhara
Pune Division		**2961**	**2048**	**1223**
1	Pune	7	534	113
2	Satara	738	613	388
3	Sangli	904	153	149
4	Solapur	1165	722	558
5	Kolhapur	147	26	15

Source: Socio-Economic Review and District Statistical Abstract of All District in Maharashtra 2014.

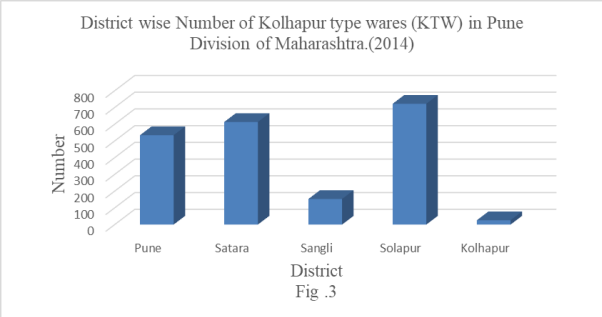

Fig .3

The total 2048 Kolhapur Type Wares (KTW) are found in the study region. Out of these Kolhapur type wares 722 highest found in Solapur district. Followed by Satara district (613), Pune district (534), Sangli district (153), and Kolhapur district (26) respectively (fig. 3).

V. Bhuyari Type Bandhara:

Bhuyari type bandara is an ancient kind of water deposited method. The best example of this type of method was used to collect water in Shanivar Wadha of Pune City in the Shivkalin Era. This type of method is also used in varies cities and in the Bhuekot Fort in Maharashtra state.

The total 1213 bhuyari deposited bandhara are found in the study region. Out of these bhuyari deposited bandhara 558 highest found in Solapur district, followed by Satara district (388), Sangli district (149), Pune district (113), and Kolhapur district (15) respectively (fig.4).

From the table 2 shows that the number of Percolation Small Tanks, Kolhapur Type Wares (KTW) and Bhuyari Deposited Bandhara in Maharashtra. This table concludes that the highest percolation small tanks, Kolhapur type wares (KTW) and Bhuyari deposited bandhara are observed in Solapur district because Solapur district are located in drought prone region. The proportion of rainfall is very low. This region is a very dry region, so the scarcity and shortage of water in this region. Therefore, the government of Maharashtra is constructing the small tanks for storage of water. These small tanks are supply water to irrigation and drinking purposes in these regions. On the other hand, Kolhapue and Pune district are lowest percolation small tanks, Kolhapur type wares (KTW) and Bhuyari deposited bandhara. Along the west coast of Maharashtra, the Western Ghats stretch in north-south direction. So, when the monsoon winds strike the Ghats from a south-westerly direction, the moisture in it condenses and heavy rainfall occurs on their windward side and top of the Western Ghats.

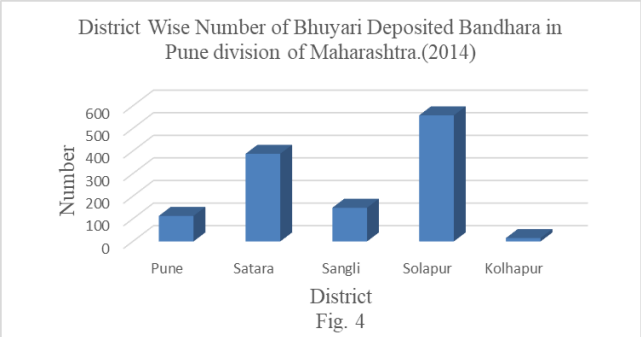

Fig. 4

Conclusion:

Water is one of the most precious natural resources and a key element in the socio-economic development of a country. The significance of the water resource in regional economic development hardly needs to be emphasized. Water is also known as a life. However, earth is known as the 'Blue Planet' because 71 percent of the earth's surface is covered with water. It is clear that water is most important natural resource, without it life cannot survive. Water is essential for the sustenance of life on the earth. For this reason, civilizations sprang up in pre-historic times along river margins not only in India but also throughout the world.

On the basis of occurrence, water is divisible in to two types such as surface water and ground water. Surface water is available on the surface of the earth in the form of rivers, lakes, tanks, reservoirs lakes and Kolhapur Type Wares (KTW) etc. In the Pune division rivers are the most important source of surface water. Krishna, Bhima, Koyna and Panchganga river are main rivers basins in Pune division of Maharashtra State. Surface water is vital for ecosystem services as well as for provides living support to a large section of the population.

According to the year 2014, 33 major projects, 46 medium projects, 473 minor projects, 2961 Percolation small tanks, 2048 Kolhapur type wares (KTW), and 1223 Bhuyari Bhandra are in the study region. Koyna, Ujjani, Radhanagari,

Khadakwasla, and Dhom-Balkwadi are the five most popular dams in Pune division of Maharashtra state.

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