

# A GEO PLANNING APPRAISAL OF ACUTE WATER SCARCITY AND ASSOCIATED PROBLEMS IN THE SELECTED COMMUNITY DEVELOPMENT BLOCKS OF BANKURA DISTRICT, WEST BENGAL.

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**ABSTRACT:** Water scarcity is one of the most important concern of present day geographers as water is the central subject of all kinds of developmental activities. Water is essential for all socio-economic development and for maintaining a healthy ecosystem in the world. At present reduction of water scarcity is prime goal of many countries and governments. Bankura is fourth largest district in West Bengal, locate in the western part of this state. Water scarcity is a regular threat for the people of Bankura district which has a great negative impacts on development of Bankura. So it is very crucial to free the people of Bankura from this curse of water scarcity. For this purpose the present paper has been designed for A Geo Planning Appraisal of Acute Water Scarcity and Associated Problems in the Selected Community Development Blocks of Bankura District, West Bengal. Bankura district Water crisis is increasing day by day due to climate change, Physiographic as well as socio economic factors. As a result peoples face water scarcity related problems and health impact. Water scarcity maximum face during summer seasons. It is impossible to reduce the present day scenario of water scarcity of Bankura district without investigating the true causes of water scarcity .So this study emphasis how to mitigate this problems by using several planning strategies, Plan and Programme.

**Key Words:** Anthropogenic, Geology, Hydrometeorology, Socio-economic development, Water Crisis, Physiography, Scarcity.

**1.1 Introduction:**Water is the fundamental needs of every living creature. On an average, generally one adult person requires minimum 10 litre per day but availability of per capita water reduces day by day. In India per capita fresh water availability reduced from 1816 cubic m in 2001 to 1588 cubic m in 2011. In West Bengal, the drought prone districts like Bnkura, Purulia and Paschim Medinipur. In this paper an emphasis is given on the management of water specially in drought prone area in Bankura district, this district located in the Western part of West Bengal. From last few years this region facing scarcity of water. Availability of per capita water reduced in this region due to population pressure, prolonged absence of rainfall, Global climate change, Irrigation, mismanagement of water etc. Water related problem is increasing day by day in this region so, it is essential to follow robust water management procedures to ensure water availability during prolonged dry period. We can deal with the problem of scarcity only with vision and planning and proper management of water. Bankura have a long history of water scarcity. Deficient rain clubbed with low moisture retention capacity of soil and faulty agricultural practices led to a situation where the gap between demand and supply of water is widening day by day. Rapid increase in population in last two decades enhanced the pressure on the existing water supply while there are no sign of planned groundwater abstraction policy that can bridge the gap efficiently. That's why the present paper is nothing but a useful effort to identify the water scarcity and associated planning, a case study of Bankura district in West Bengal, India.

**1.2 Objective of the study:** The main objective of the present study are:-

- 1.2.1 To identify the global and regional water scarcity scenario;
- 1.2.2 To identify the causes of water scarcity in Bankura district ;
- 1.2.3 To analysis impact of water scarcity on environment as well as surrounding nature;
- 1.2.4 To identify the temporal change detection and land use pattern of this district;
- 1.2.5 To identify various problems that local people of Bankura district facing during Water scarcity
- 1.2.6 To incorporate some remedial measures through which problem of water scarcity be recover.

**1.3 Data Base:** This research work is based on both primary and secondary data, collected from different sources.

**1.3.1 Secondary Database:** Secondary data was collected from various sources which include various websites of internet sources, articles, and replica. A structured questionnaire was prepared to collect the data from the local people as well as B.D.O, S.D.O and other office of Bankura district 5 community development block (Taldangra, Onda, Khatra, Ranibandh, Raipur).

**1.3.2 Primary Database:** Primary data have been collected from the local people of Bankura district's 5 community block (Taldangra, Onda, Khatra, Ranibandh, Raipur) area based on perception study with the help of structured questionnaire. Therefore 75 sample have selected from each C.D block of Bankura district and total sample size was (75 samples \* 5 C.D block) 375 and systematic random sampling was done to point out and removal process of water scarcity of this district.

**1.4 Methodology:** Any research paper has been initiated based on some methodology.

**1.4.1 Initial Phase:** In this phase various literatures have been studied and secondary data have been collected as well as Structured Questionnaire has been prepared.

**1.4.1 Final Phase:** In this phase primary survey has been done based on structured questionnaire followed by making of cartograms and several photographs have been snapped out. QGIS, 21st Century GIS, professionals, Map info, Corel draw, Adobe Photoshop software have been used for digitization and drawing of maps. It also includes a comparative study of 5 C.D block to know the level of water scarcity zone, and also compare district wise land use pattern and condition of water scarcity of neighbour district of Bankura and further identify the present condition of global and national water scarcity condition scenario. Finally some strategies and initiatives are suggested for future control of water scarcity in Bankura district.

#### **1.4 Literature Review:**

Any research study is based on past research work. A literature survey will give focus to the theme, area, and serves as a background too any research study which includes National, and district wise

##### **1.4.1 International Level:**

• **Khan Tahir (2014)** in their paper entitled as *“Water scarcity and its impact on agriculture Case study of Layyah, Pakistan”* stated that The issue of water scarcity and socio-economic impact of water shortage on small scale farmers is a reality in many developing countries including Pakistan. With its high population density, mostly in the rural areas, a majority of the households engage in activities that are geared towards survival for their livelihood activities. Small farmers are poor and can't afford more advanced agriculture tools to extract water and to conserve water. The tribulations for small farmers are poverty and illiteracy.

The study was conducted in Layyah, a southern district of Pakistan to explore small farmer's perspective on water scarcity. The main objective of this research is to evaluate impact of water shortage on small land holders and their strategies to cope with it. For this purpose, a detailed data set was acquired by making field trips to small villages and arranging extensive interviews with the farmers. A standard questionnaire was prepared to maintain consistency and coherence in the analysis.

##### **1.4.2 National Level:**

**Dr. P. Saravana Kumar (2013)** in their paper entitled as *“Water Crisis in India – an Alarming Problem”* stated that In India, population is growing as if a woman doesn't need 9 months to give birth to an infant. Every Second, a new Indian takes birth, but he/she doesn't know that what he is going to see in future and especially about Water. If this is the level of Water Crisis now, then what will be in future with global warming and pollution? Is our future generation is so unlucky that they will not get entity called water without which no one can survive. In every city, no matter whether near a river or far from a river, Water level has decreased horribly. Even in metro cities, rich people are not getting water regularly. In Gurgaon, Delhi, Noida, Hyderabad and even in tier-2 and 3 cities water is main problem and without water power crisis also exists. If we don't wake up now, it will be too late. Remember one thing that “we can't generate water; It can come only from Cloud”. Water is one of the most crucial elements in our national developmental planning for the 21st century. The proper management of our limited water resources will be essential to ensure food security for our growing population and to eliminate poverty. It will be essential also to avoid the growing conflicts and the possibility of social unrest in the country in future due to water scarcity.

##### **1.4.3 Local Level:**

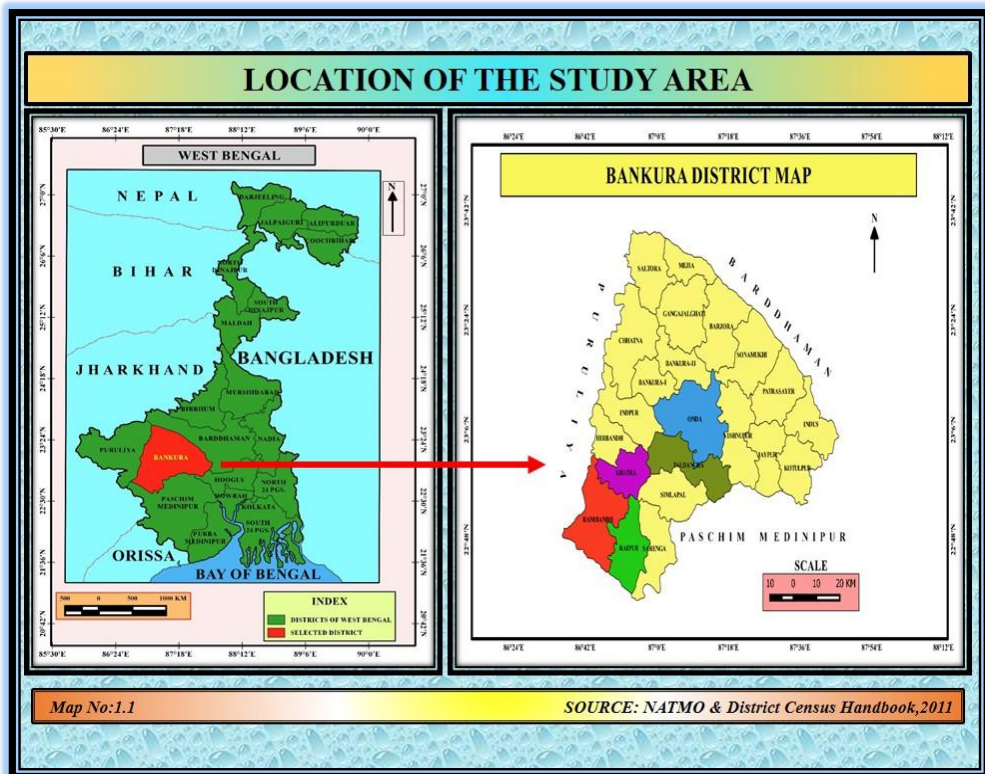
**Haldar Sarbeswar and Saha Prasenjit (2015)** in their paper entitled as *“Identifying the Causes of Water Scarcity in Purulia, West Bengal, India - A Geographical perspective”* stated that, Water scarcity is one of

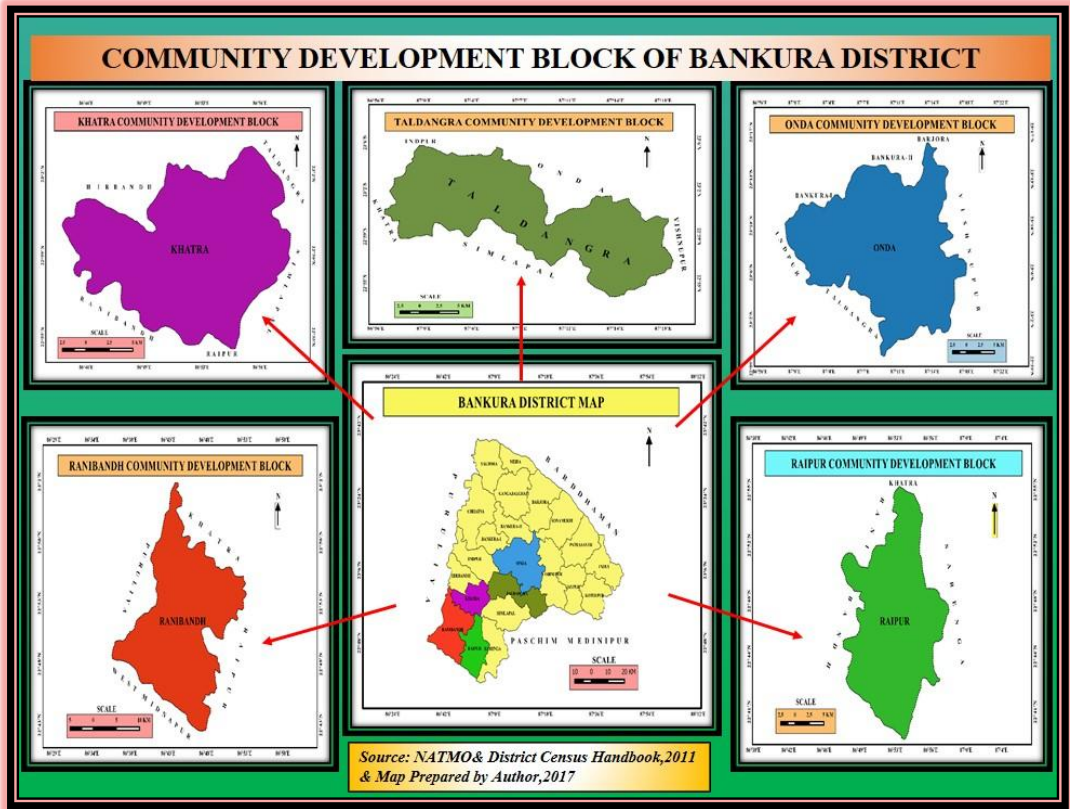
the most important concern of present day geographers as water is the central subject of all kinds of developmental activities. Water is essential for all socio-economic development and for maintaining a healthy ecosystem in the world. At present reduction of water scarcity is prime goal of many countries and governments. Purulia is one of the most backward district of West Bengal in terms of economic and human development and also it has the second largest schedule tribe population. Water scarcity is a regular threat for the people of Purulia district which has a great negative impacts on development of Purulia. So it is very crucial to free the people of Purulia from this curse of water scarcity. For this purpose the present paper has been designed for the identification of root causes of water scarcity of Purulia .But it is impossible to reduce the present day scenario of water scarcity of Purulia without investigating the true causes of water scarcity for further water resource management planning of the district.

**Maiti Moitra Moumita (2015)** in their paper entitled as **“Role of Roof – top Water Harvesting to Manage Drought in Bankura District of West Bengal”** stated that, In the present work, draught prone region of Bankura district is selected for the analysis of feasibility and sustainability in developing participatory and coordinated systems of roof-top water harvesting. In the present study area, subsurface sources of water are not equally accessible to all. Withdrawal of subsurface water requires huge investment and technology to get access to deeper aquifers. Dug wells at shallow aquifers become dry in lean season and most of them have to experience the hardship of collecting water. A detailed survey with structured questionnaire is made for analyzing the extent of problem and to estimate the demand for water per household per day through the assessment of adult and minor constituents of population, family composition etc.

**1.5 Location of the Study Area :**

The study area of this research work is confined within the limit of Bankura district, West Bengal and the perception survey area is 5 community block of Bankura district that are – Onda, Khatra, Ranibandh, Raipur, Taldangra. Bankura district is an administrative unit in the Indian state of West Bengal. Bankura is surrounded by Bardhaman district in the north, Puruliya district in the west and Paschim Medinipur district in the south and some part of Hoghly district in the east. Damodar river flows in the northern part of Bankura district. The district head quarter is located in Bankura town. Bankura district is the part of Medinipur division. It is situated between 22° 38’ and 23° 38’ north latitude and between 86° 36’ and 87° 46’ east longitude. It has an area of 6,882 square kilometres (2,657 sq mi). To the west the surface gradually rises, giving way to undulating country, interspersed with rocky hillocks. Much of the country is covered with jungles.

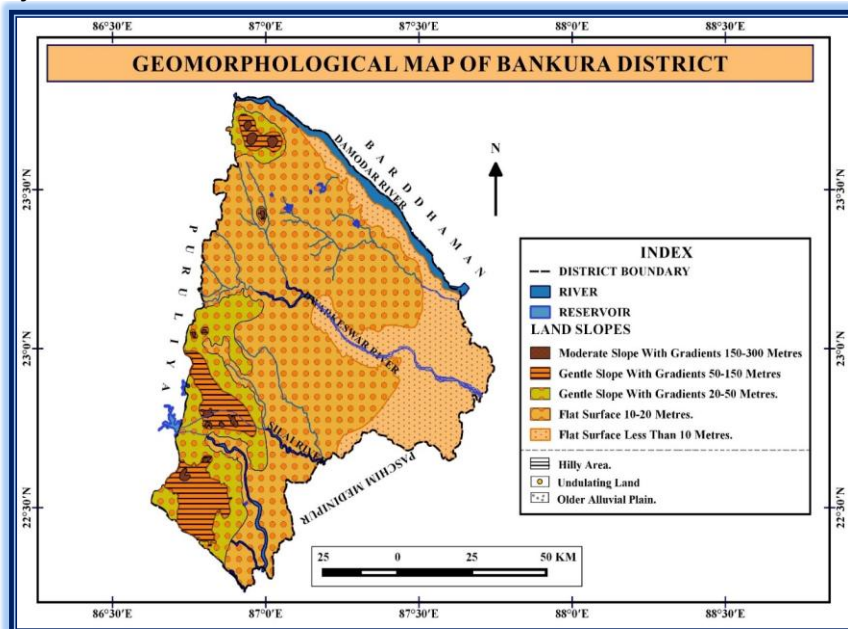




**2. Physical Set Up of Bankura District:**

**2.1 Location and size:** Bankura, the fourth largest district of West Bengal is located in the western part of the state, Geographically Bankura district is situated between 22°38”N and 23°38” North latitudes and between 86°36”E and 87°46” East longitudes. It is bounded by Purba Medinipur and Hugli district to the East, Puruliya to the West, District Barddhaman to the North and Paschim Medinipur to the South. Bankura is almost triangular in shape with a total area of 6,882 sq. kms. Its north to south extension is of 112 km. and that of east to west is of 120 km.

**2.2. Physiography:**



Map No: 3

Source: NATMO & Map Prepared by the Author, 2017

The district is described as the “connecting link between the plains of Bengal on the east and Chota Nagpur plateau on the west.” The areas to the east and north-east are low lying alluvial plains, to the west the surface gradually rises which gives way to undulating country, interspersed with rocky hillocks. Much of the district is covered with jungles. The regions of the district could be divided into broad three parts viz.

- 1) The hilly areas to the west,
- 2) The connecting undulating tract in the middle, and
- 3) The level alluvial plains to the east.

**2.3 Climate:** The climate of Bankura district is tropical, dry and sub-humid. In winter, there is much less rainfall in Bankura than in summer seasons. The Koppen-Geiger climate classification is Aw. The temperature here averages 26.6°C. The average annual rainfall is 1236mm.

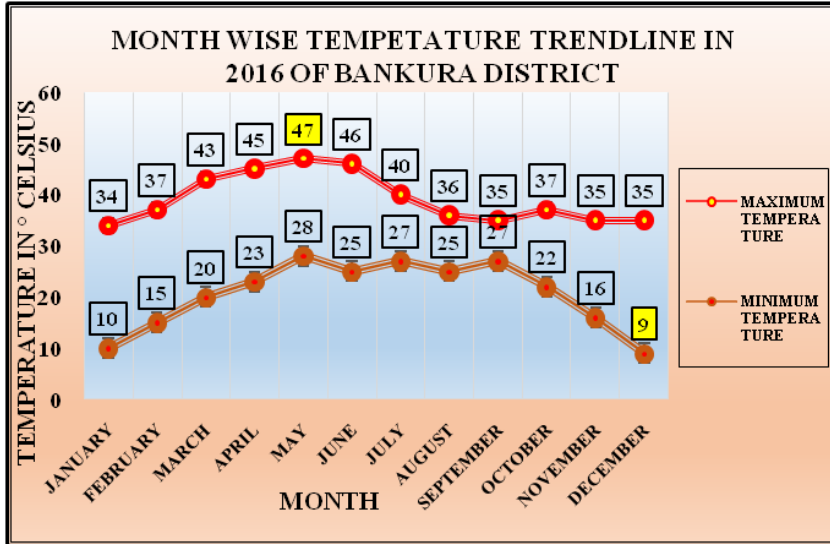
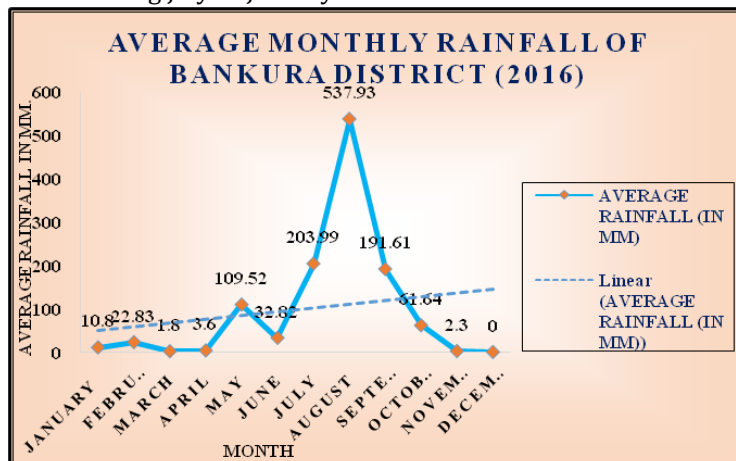


Fig: 1 Source:-I.M.D, 2016

This diagram (Fig: 2.6) represent month wise temperature data in last year of 2016, Bankura district. According to data it has says the maximum temperature is found in the month of May that is 47°C during the year of 2016 and minimum temperature is found in the month of December that is 9°C. From the temperature trend line it has been seen that the trend line is gradually increases during the time of February, March, April and May this time temperature is increases rapidly duo to summer seasons and then the trend line is fallen down during July to January due to monsoon and winter seasons.



This diagram (Fig: 3) represent the month wise average rainfall data of Bankura district in the tear of 2016. So form the data shows that maximum rainfall is 537.93 mm in the month of August and also seen that the rainfall trend line is rising in the month of June and August during monsoon period and it gradually fallen in the month of August to November. And the month of December there was not found rainfall.

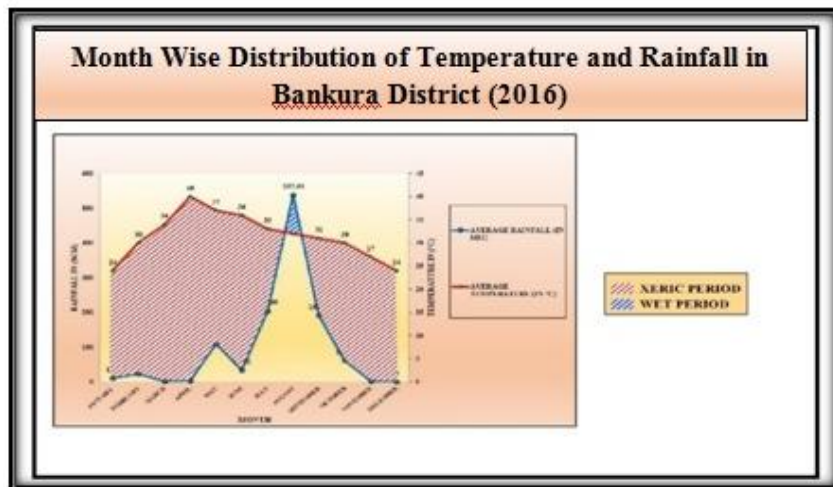


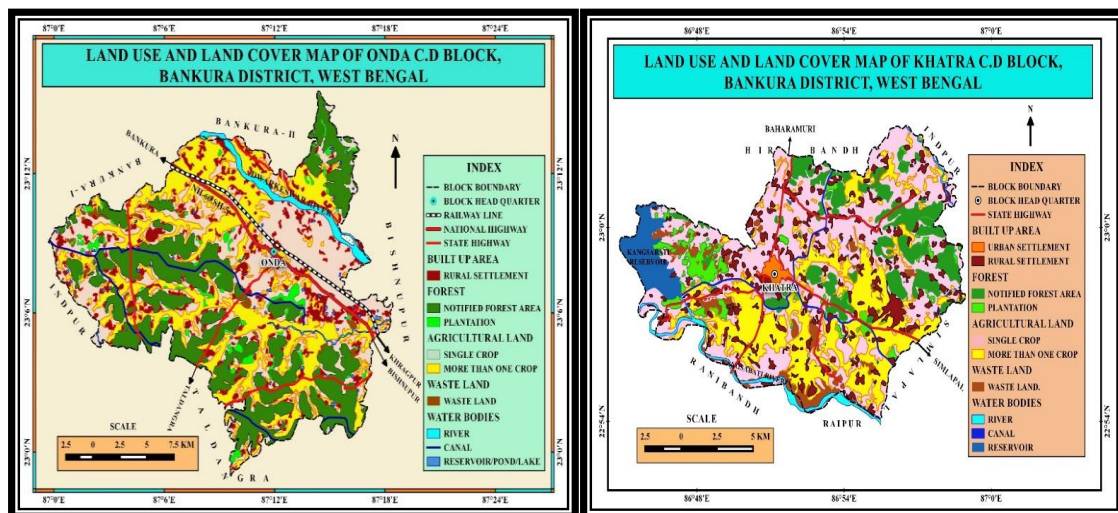
Fig: 3&4 Source:-I.M.D & District Statistical Handbook, Bankura2016.

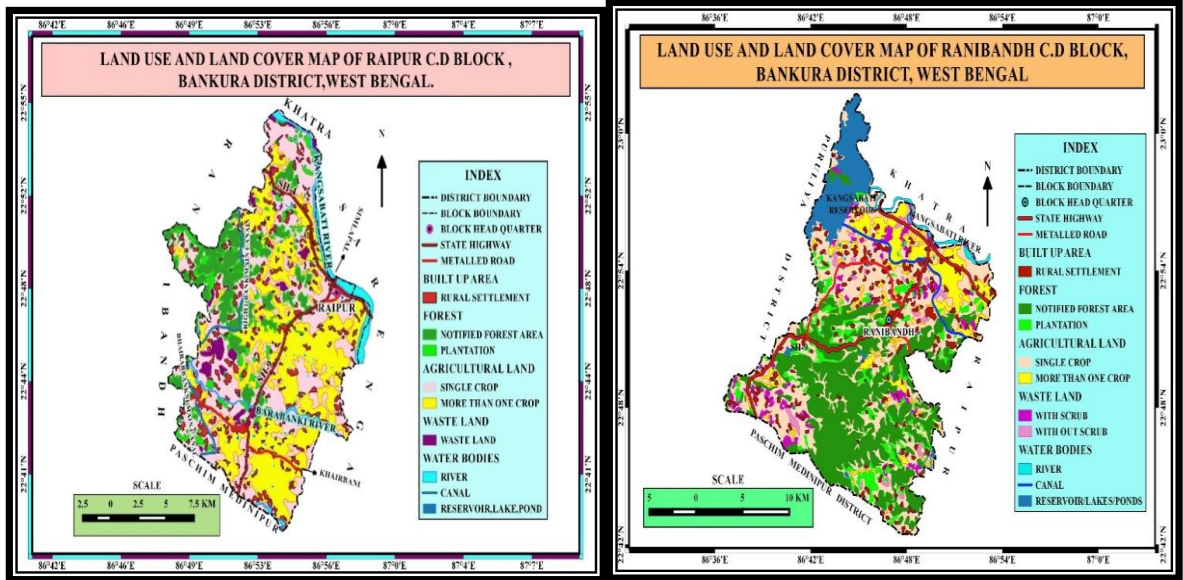
This diagram (Fig: 4 represent month wise distribution of temperature and rainfall in Bankura district (2016). So from this diagram we notice that maximum month of this district belong to xeric period and only July and August month belong to wet period. So we says that Bankura district is drought prone region of West Bengal.

**3. Land use and Land Cover Map of Five C.D Block of Bankura District:**

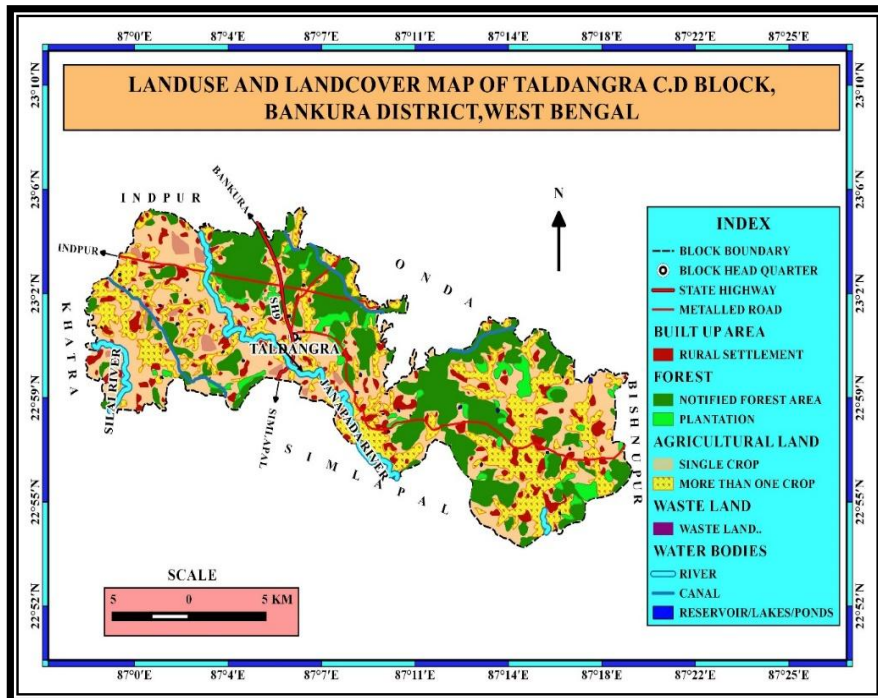
Land use and land cover map of different community development block of Bankura district has been prepared from the land and land reforms department map of Bankura. At first 5 C.D block (Onda, Khatra, Ranibandh, Raipur and Taldangra) map is downloaded in land and land reforms site, for the justification and identification of land use and land cover area pattern of this community block of Bankura district. All map is drawn by QGIS software and then this maps are interpreted and know about the land use and land cover pattern and location of map. Land use and land cover maps identified, and for interpretation it is divided some part that are, Block information, Built up area, Forest area, Agricultural land, Waste land, and Water bodies, and this part also have some sub-part that are all discuss in follows map interpretation.

From the above map and district handbook data it also response that, total maximum built up area has found in Onda block and minimum built up area has seen in Raipur block .And according to agricultural land area, maximum agricultural land seen in Onda block and minimum agricultural land found in Khatra block, according to forest area maximum forest area seen in Ranibandh block and minimum forest area seen in Onda block. Therefore, according to waste land, maximum waste land has found in Ranibandh and minimum found Taldangra block and at last land use are compare according to water bodies, so in this five block maximum water bodies area are found Ranibandh block followed by khatra, Raipur, Onda, and minimum water bodies found in Talgandra block.

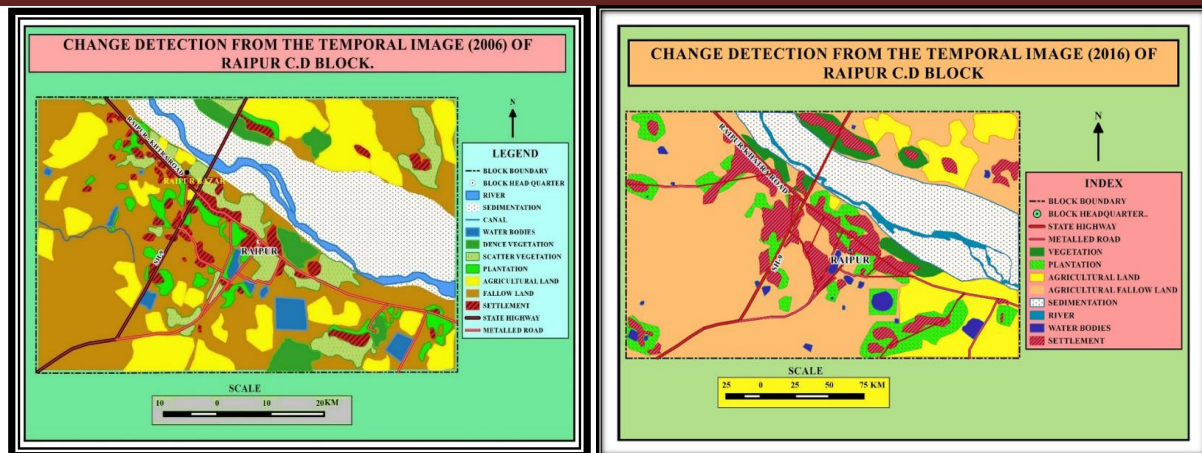




**Map No: 2,3,4&5** Source: Land and Land Reforms Department, Govt. of West Bengal & Prepared by the Authors. 2017



Thereafter, we compare the use of water in five block of Bankura district. So according to water bodies land use data, it says that ,area of river is maximum seen in Raipur block followed by Onda, Khatra , Ranibandh , and minimum is found in Taldandgra block and other water bodies is Canal, that maximum area cover in Onda block, followed by Khatra, then Taldangra , Raipur And minimum canal found in Ranibandh . Reservoir, lakes, pond and tanks are another source of water, so its maximum area cover in Ranibandh, followed by Khatra, Onda, Raipur, and minimum reservoir, lakes and tanks are found in Taldangra block. So above discussion it concluded that, Taldangra block's people is increases day by day but here water bodies area is minimum than the other block, so here maximum people face more water problem. Therefore, it says that it is the most water scarcity zone than the other block of Bankura district.



Map No:7 Source: Google Earth Image Downloaded from Google earth.com & Map Prepared by the Author, 2017.

So, from the above two temporal image interpretate it has been says that the temporal detection land use and land cover area of Raipur blocks. The several change detection identified, that are- the number of road connectivity increases in the year of 2016 than 2006. And the second image(2016) has pointed out the temendous change of settlement patch that mean it has encroached a lot, almost 20% settlement area increases than the previous image(2006). However agricultural land area decreases and agricultural fallow land has increases in 2016 , basically its main causes is population prasser , water crices and climate change. Number of water bodies(pond) is decreases in 2016 and a temendous chage has been identified of river width, in 2016 river width has been decreases and sadementation cover increases as a resut river water holding capacity also decreases , hence river side agricultural land decreases and irrigation also stoped in present year. So a change detection has been identified from 2006 to 2016.

**Perception Study on Water and Associated Problem in Selected Blocks of Bankura District:**Any research paper has been based on perception study, so this paper is not exceptional case. Bankura district has been identify water scarcity zone, here maximum blocks peoples face water scarcity. Water crisis maximum observed during summer time. Therefore this chapter introduce the perception study and people opinion about the water scarcity in this district so, some questionnaire has been selected for perception survey in 5 C.D blocks (Taldangra, Onda, Khatra, Ranibandh and Raipur) of Bankura district and this

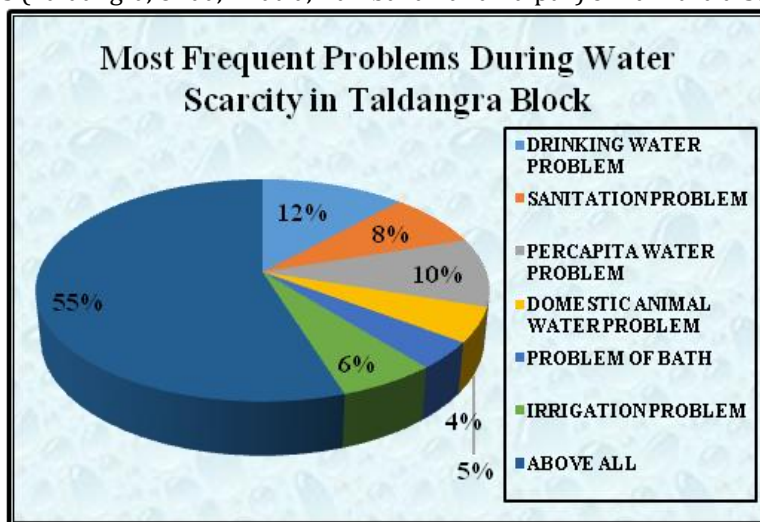


Fig No: 1

Source: Primary Data, 2016

This diagram (Fig-1) represent most fequent problems during water scarcity. 12% respondents of **Taldangra** block says they face drinking water problem and 8% repondents face sanitation problem, 10% people face percapita water problem, and 5% respondents told domestic animal water problem, 4% people face bathing problem and 6% respondents facing irrigation problem and maximum people of this region almost 55% people facing above all problems.



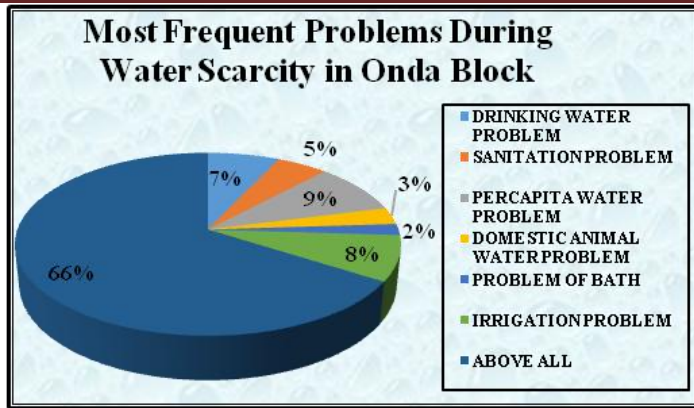


Fig No:2 Source: Primary Data, 2016

This diagram (Fig-2) represent most fequent problems during water scarcity. 7% respondents of **Onda** block says they face drinking water problem and 5% repondents face sanitation problem, 9% people face percapita water problem, and 3% respondents told domestic animal water problem, 2% people face bathing problem and 8% respondents facing irrigation problem and maximum people of this region almost 66% people facing above all problems.

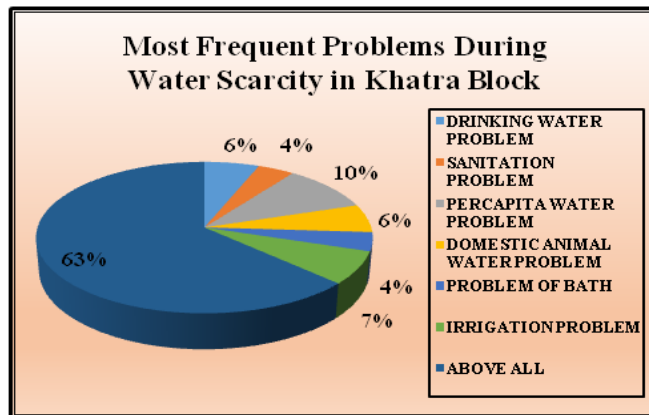


Fig No:3 Source: Primary Data, 2016

This diagram (Fig-3) represent most fequent problems during water scarcity. 6% respondents of **Khatra** block says they face drinking water problem and 4% repondents face sanitation problem, 10% people face percapita water problem, and 6% respondents told domestic animal water problem, 4% people face bathing problem and 7% respondents facing irrigation problem and maximum people of this region almost 63% people facing above all problems.

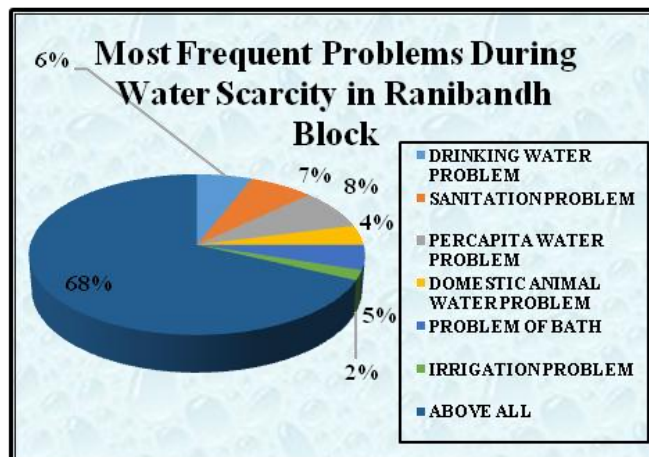


Fig No:4 Source: Primary Data, 2016

This diagram (Fig-4) represent most fequent problems during water scarcity. 6% respondents of Ranibandh block says they face drinking water problem and 7% repondents face sanitation problem, 8% people face percapita water problem, and 4% respondents told domestic animal water problem, 5% people face bathing problem and 2% respondents facing irrigation problem and maximum people of this region almost 68% people facing above all problems.

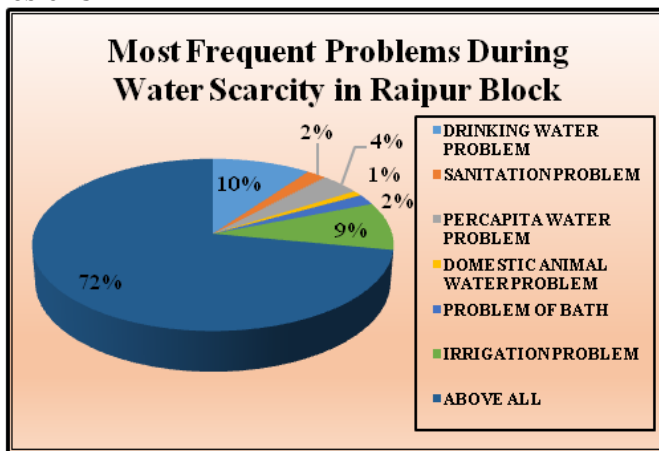


Fig No: 5 Source: Primary Data, 2016

This diagram (Fig-5) represent most fequent problems during water scarcity. 10% respondents of Raipur block says they face drinking water problem and 2% repondents face sanitation problem, 4% people face percapita water problem, and 1% respondents told domestic animal water problem, 2% people face bathing problem and 9% respondents facing irrigation problem and maximum people of this region almost 72% people facing above all problems.

Therefore, from the above diagram it says that local people of this 5 blocks identified the most frequent problems during water scarcity that are drinking water problem, sanitation problem, percapita water problem, domestic animal water problem, irrigation problem,etc. Maximum peoples says those all problems they facing during water scarcity. Mainly Ranibandh and Raipur block peoples says above all problems they facing during water scarcity.

**4. Causes of Water Scarcity:**

Bankura has a long history of water scarcity. Every year in summer in Bankura village women begin to walk along the village streets with earthen pots and pitchers looking for water. There are several factors which are mainly responsible for the water scarcity of Bankura. Recently the gap between demand and supply of water is widening day by day due to rapid growth of population.

**4.1 Factor responsible for Water Scarcity:**

**4.1.1 Geological Factors:**

The greater portion of the district consists of a rolling country covered by laterite and alluvium. While metamorphic or gneissose rocks are found to the extreme west, to the east there is a wide plain of recent alluvium. Strong massive runs of hornblendic varieties stretch across the region in tolerably continuous lines, the general strike being nearly east and west.

**4.1.2 Topographical factors:** Topographically the district is characterized by undulating topography with rugged hilly terrains in the western and middle parts. General elevation of the land surface ranges from 150 m to 300 m, the master slope being towards the west to eastern part. According to the structure and land form, Bankura happens to be a part of the Ranchi pen plains and this physical character is so dominant that the Government of India has classified this physiographic unit as an economic region. The Bankura is covered by several hill systems specially residual and isolated hills which are responsible for high run off.

**4.1.3 Climatic Factors:** During summer time Bankura district temperature is high that approximately above 45° and here annual rainfall is very low than the other part of West Bengal. So it is the main causes of water scarcity in this region.

Above physical factors are responsible for water scarcity of Bankura district.

**4.2 Other Causes of Water Scarcity:**

**4.2.1 Demand and Use:**

**Domestic purpose:** Domestic 30% of the rural population of Bankura district lack access to drinking water,

**Agricultural purpose:** 90% of total water resource uses, So during dry period, all ground water are used for agricultural purpose, that means it reduces the supply of water.

4.2.2 **Supply:** Only 48% of rainfall occurs in Bankura but only 18% rain water gets people. As a result this people face water crisis related problems because of lack of sufficient rain water.

4.2.3 **Ground water:** 82% goes to irrigation and agricultural purpose and only 18% is divided domestic and industrial purpose.

4.2.4 **Climate Change:** Climate change is exacerbating the depleting supply of water. The climatic condition is dry and hot in summer, medium rainfall so, during summer time maximum tube well is damages and well is being dry, surface water amount is decreases so its create water scarcity in this region.

4.2.5 **Population:** Heavy pressure of population could not fulfil the demand of water need. Population increases day by day in this rapidly and it create the pressure on the ground water for irrigation and others purpose. As a result it create water crisis.

4.2.6 **Environmental Degradation:** Environmental degradation is also the causes of water scarcity due to deforestation, soil of Bankura district become loose enough, and water not been stored, as a result, those are create scarcity of water in Bankura district.

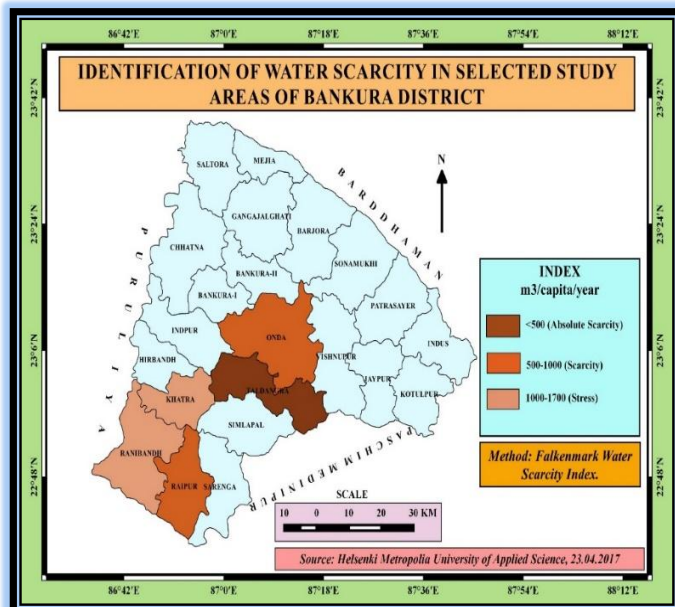
4.2.7 **Irrigation Practics:** More the irrigation in the agricultural field waste the ground water and it causes water scarcity problems.

## 5 Findings:

5.1. In Bankura district there are lot of source of water that are bore well, river, reservoir, public tab, community well etc. but **this amount is not sufficient in this district so, peoples face water scarcity.**

5.2. Maximum people of the district mainly **women are covering distance almost 2 kilometre to collect drinking water from the source.**

5.3. Local **government authority and people does not step to clean well.**



Source: Irrigation Department Government of West Bengal

5.4. According to the respondents opinion, **the maximum duration of water scarcity time is summer time that is the month of March, April and May month.**

5.5. Rural peoples are **not satisfied for drinking water service.**

5.6. The temporal condition of **water scarcity is increased day by day in this region.**

5.7. According to the local peoples **the main cause of water scarcity is prolong absence of rain water, climate change, drought, more irrigation practice, less amount of ground water, less supply of dam water etc.**

5.8. The main source of water for irrigation in this district that is **60 % people use ground water and 40% people use other source of water like, pond water, dam water and other surface storage water.**

<b>Name of the Blocks</b>	<b>Water Availability Per Capita Per Year (m<sup>3</sup>/Capita/Year) Threshold Value 1700 m<sup>3</sup>/Capita/Year</b>
<b>Taldangra</b>	<b>375</b>
<b>Raipur</b>	<b>876</b>
<b>Onda</b>	<b>762</b>
<b>Ranibandh</b>	<b>1236</b>
<b>Khatra</b>	<b>1445</b>

## 6. Problems:

Due to water scarcity the main problems observed that's are below:

**6.1 Lack of Access to Drinking Water:** The biggest problem that happens when you have water scarcity is that people are not able to get fresh, clean drinking water. The human body can only go so long without water, and a lack of drinking water can result in a number of other problems, which we discuss below. In my study area the main problem is drinking water is not assessable. Women are covering distance almost 2 kilometre to collect drinking water from the source. So people face water scarcity. That's why they needed rainwater harvesting technique.

**6.2 Hunger:** If there is no water that can be used in order to help water the crops, then you are going to have people that are going hungry. Animals will also die, which will result in a lack of meat as well. Water scarcity, in short, causes starvation to occur en masse for both people and animals that are located in the area.

**6.3 Lack of Education:** Water scarcity makes it difficult for people to get the education that they need or that they deserve. That is why those children are either too sick to go to school (which we will discuss below), or they are working to help get water to the home and the family.

**6.4 Diseases:** Due the lack of waterspread of life threatening diseases such as dysentery; loss of hygiene because people cant wash their hands; dehydration & heat strokes. If you don't have clean water access, then you will be more likely to get diseases from the water that you do have. Whether you're drinking the water or using it for bathing, those diseases will get into the body and, in a number of cases, the people carrying those diseases will pass away.

**6.5 Sanitation Issues:** Without access to clean water, there is no way to clean food, dishes, or people. When people are not given access to proper sanitation, disease (which we talked about above) ends up becoming much more of an issue than it would have been otherwise. It also causes mental health issues, including depression and anxiety.

**6.6 Poverty:** All in all, people who are dealing with water scarcity are often stuck in poverty as well. These people are not able to get the resources that they need in order to be able to thrive, and instead are just barely surviving through these difficult times.

**6.6 Environmental Impact:** If in an area Aesenic contamination occur then the water will not be accessible for futer use. If in an area desertification occur then the uinfiltration process will not occur propoerly & and the ground warer recharge will not be done in a proper way. Then water scarcityis occur.

### 6.7 Others Problems:

- Women and girls especially bear the burden of walking miles at a time to gather water from streams and pond and other sources of water ,
- ***During summer time maximum people admitted hospital*** due to water problem related disease.
- Maximum people have ***not access fresh and save drinking water.***
- ***Agricultural land area is decreases day by day and fellow land is increases*** in this area so as a result production crop is decreases and it is not fulfil food demand hence poverty and food scarcity is increases day by day in this region.
- During summer time maximum ***tube well is damages and well is being dry*** so water scarcity is increases as a result people use pond or other unsafe water,
- Peoples can't bath maximum day due to water crisis and that's result skein disease and other health impact face the local people.
- Animal husbandry decreases day by day due to water scarcity.
- Due to water scarcity people conflict increases day by day in this region.



**Photo Plate No: - 1 High Iron Affected Tube Well in Taldangra Block.**

**Source: author, 2016**

### **7. Needs for Water Management in Bankura District:**

- 7.1 To fulfil the demand of water among the local peoples;
- 7.2 To reduced the water scarcity problems during summer seasons;
- 7.3 To conserved water for fulfilment the demand of water during summer period.
- 7.4 Supply of water during water scarcity;
- 7.5 For provide drinking water and irrigation water and fulfil the food demand because during water scarcity agricultural production is decreases so, water management is very much necessary.

**8. Planning and Water Scarcity in Bankura District:** For the mitigating water scarcity in Bankura district , at first need some planning or take some project by the Government .Therefore, how to mitigate this problem take the some following planning that are discuss as bellow:

- 8.1 Rain water harvesting planning.
- 8.2 Watershed development programme.
- 8.3 Artificial rain making planning.
- 8.4 Safe Drinking Water Planning: The following steps are being adopted for providing safe drinking water to rural and urban population in the habitations:
  - a) 40 litres of safe drinking water per capita per day (lpcd) for human beings.
  - b) 30 lpcd additional for cattle in the Desert Development Programme Areas.
  - c) One hand-pump for every 250 persons.
  - d) The water source should exist within the habitation or within 1.6 km in the plains and within 100 metres elevation in the hilly areas.

### **8.5 Others Planning or Project Scheme:**

- a. Integrated Watershed Management Programme;
- b. Drinking Water Supply Scheme;
- c. Piped Water Supply Scheme;
- d. Reservoir or Dam Infrastructure Development Planning;
- e. Canal Network Development Planning for Irrigation;
- f. Household Water Supply Planning;
- g. Future Water Storage and Management Planning;
- h. River Water Purifying and Using for Drinking Water Planning;
- i. Identifying Drought Prone Area and Step to Mitigating Water Scarcity programme;
- j. Block wise Planning;
- k. Rain Water Harvesting Development Planning;
- l. Cultivation and Irrigation Programme;
- m. Water Scarcity Awareness Programme;
- n. Integrated Basin Area Management Planning;
- o. Micro Shade Water Planning; etc.

### **9. Suggestion:**

- 9.1 **Increasing Water Storage Capacity:** Activities such as farm ponds, percolation tanks, water reservoirs and construction of small and medium size dams and rivers can retain more surface water, while increasing the ground water recharge.

- 9.2 **Efficient Irrigation Practices:** Efficiency in irrigation is most essential and it remove the challenge of water crisis. So, at first need micro irrigation system start and do not use ground water for irrigation during the water scarcity.
- 9.3 **Watershed Development:** Development of watersheds is an important programme to make best use of the rainwater for agricultural production while improving soil conservation and biodiversity. So the Government of India needs to give top priority for watershed development to provide assured water supply of agriculture in rain fed areas.
- 9.4 **Control water pollution:** Excessive use of water for agriculture, industries and domestic uses is leading to water pollution, because such excess water is transformed into saline water, sewage or effluent. So water pollution must be control for removing water scarcity.
- 9.5 **Research and Development:** There is a need for investing in research related to ground water monitoring, weather forecasting, breeding water efficient and drought resistant crops and varieties which can cope up with the changing climatic conditions, arising due to global warming.
- 9.6 **Education:** There are plenty of opportunities out there that people can use in order to learn more about the world around them. By educating those who are not dealing with water scarcity, they can be in a position to help. Those who are dealing with it can get educated on how they can prevent the problem from becoming even worse in the future.
- 9.7 **Advance Technology Related to Water Conservation:** There has been a lot of work in the world of water conservation, but there is also a lot that needs to be done in order to ensure that the rest of the world is able to conserve water. Putting money and effort into conservation could be lifesaving.
- 9.8 **Improve Practices Related to Farming:** Farming and irrigation are often a huge culprit when it comes to water scarcity. Because of that, we need to improve practices so that we don't use as much water and those who are using water are using it to its fullest potential. Technology also needs to advance in this manner.
- 9.9 **Improve Sewage Systems:** Clean drinking water starts with a good sewage system. Without proper sanitation, the water in an area becomes ridden with disease and any number of other problems. By improving the sewage systems in these areas, we can prevent water scarcity from becoming any worse.
- 9.10 **Support Clean Water Initiatives:** There are organizations located all over the world that are looking to bring clean water to areas that don't have it. Consider donating to these organizations, either with our time, our skills, or our finances.
- 9.11 **Water scarcity areas for Action:** As the time is running out, it is necessary to act on priority in the following areas:
- 9.12 The irrigation projects should be well planned and different activities such as relief and rehabilitation of project affected population, micro level land use planning and capacity building of farmers, should be initiated simultaneously;
- 9.13 Afforestation on degraded forests, wastelands as well as river banks should be promoted on priority to facilitate soil conservation, recharging of ground water and preventing flooding of rivers and siltation of water reservoirs.

## 10. Conclusion:

Water is the most abundant substance on earth, the principal constituent of all living things, and a major force constantly shaping the surface of the earth. It is also a key factor in air-conditioning the earth for human existence and in influencing the progress of civilization.

Water scarcity affects all social and economic sectors and threatens the sustainability of the natural resources base. Addressing water scarcity calls for an intersect oral and multidisciplinary approach to water resources management, one that ensures the coordinated development and management of water and related resources in order to maximize economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems. Integration across sectors is needed.

Finally it can conclude that rain water harvesting technique is very much relevant in Bankura district to prevent water scarcity. If the rain the rain water harvesting technique will developed all over the region, then people will be benefit. Water supply will be easy. Drinking water will also available for the local people.

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