Volume : 2 | Issue : 3 | March 2013 • ISSN No 2277 - 8160

Research Paper | Science

Water Scarcity in Agricultural Sector in Murshidabad, West Bengal

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ABSTRACT

Rapid pace of ground water development has resulted in a number of problems. In many arid and hard rock areas, overdraft and associated water quality problems are increasing. The overdraft has resulted in the failure of wells and shortage of water supplies necessitating depending of existing structures, thereby increasing the pumping lifts and costs. The unscientific and isolated development of ground water in some coastal areas in the country has led to land ward movement of sea water and fresh water interface resulting in contamination of fresh water aquifers. Deterioration of water supply has also been observed in major agriculture and industrial belts and urban complexes. This paper demonstrates the water balance in the agricultural sector in Murshidabad. It will help formulate the development plans in agricultural sector of the study area

KEYWORDS: Murshidabad, Demand-Supply of Water, Agriculture in Murshidabad

INTRODUCTION

The main stay of India's economy remains to be agrarian one; naturally the agriculture here consumes the good part of the ground water supply to have the fields irrigated for growing crops. Over the period following the advent of the Green Revolution that initiated through both intensive and extensive agriculture the requirement of water has steadily gone up and consequently the exploitation of ground water in farming came in. In course of a short period the extent of exploitation reached the level too high to sustain the course of development, and eventually it met with an unprecedented crisis- a hazardous depletion of under-ground water resource wherever the Revolution went rampant. After the introduction of Green Revolution the cropping pattern has been changed. The HYV crops demand more water which resulted in unplanned and non-scientific development of groundwater resources, mostly driven by individual initiatives. This ultimately has led to an increasing stress on the available groundwater resources. Groundwater is annually replenishable resource but its availability is non-uniform in space and time. Hence, the sustainable development of groundwater resource warrants precise quantitative assessment based on reasonably valid scientific principles. National Water Policy, 2002 has also laid emphasis on periodic assessment of groundwater resource on scientific basis. The Policy also reiterates that the exploitable quantity of groundwater should be limited to the amount, which is being recharged annually, more commonly known as Dynamic Groundwater Resource.

OBJECTIVES AND DATABASE

The main objectives of the study are –

1. To assess the water requirement in the agricultural sector in Murshidabad.
2. To assess the water scarcity in agriculture in the study area

The study is based on secondary sources of data. The sources are various govt. reports.

STUDY AREA

Murshidabad is the northern most district of the Presidency Division situated at a height of 19m above mean sea level, between 24˚50'20' & 23˚43'30' N and between 88˚46'00' & 87˚49'7' E. The district is distinctly divided into two zones viz, 'rarh' & 'bagri'which are situated on the western and eastern side of the river Bhagirathi respectively. In terms of the soil types the district is divided in two almost equal but remarkably different zones-- the Rarh and the Bagri. Rarh is situated on the western part of the river Bhagirathi and the latter stands to the east of the river Bhagirathi. The soil of this region is alluvial and very fertile. The region gets 100 to 156 cm of rainfall and is characterized by big beels, marshes and swamps. The depth of the aquifer in the district is 26 to 70 metre. The normal average depth of the water table measures below 25 to 40 feet. It has dwindled drastically: availability of the groundwater has been on the way out.

After Green Revolution Murshidabad district recorded decline in net cropped are but increase in gross cropped area and cropping intensity. During 2006-07 the district registered the largest gross cropped area (976 thousand hectares) in the state. The district also witnessed the second highest cropping intensity (245%) in the state during the period. The district recorded increase in area under total rice and boro rice. The study area recorded increase in area under fruits. During 2006-07 the district recorded second largest area under fruits (24.0 thousand) in the state. During the same period it has been observed that the district ranked 1st in terms of area under vegetables cultivation (81.2 thousand) in the state.

DISCUSSION

Status of Irrigation in the Study Area

The major source of irrigation is well/bore wells which provides for irrigating 132550 ha. against the total arable land area of 365000 ha. This is followed by tank irrigation which accounts for 49916 ha. The major Deep Well, Medium High Density Deep Tube Well and Minor Deep Tube Well irrigate 13560 ha. 4120 ha. and 1520 ha. respectively. In the western part a small area is covered by Mayurakshi canal command. A major part is dependent on minor irrigation network. Among the groundwater structures deep tube wells, shallow tube wells, medium duty tube wells are dominant. In the eastern part of the Bhagirathi flood plains the shallow tube wells fitted with centrifugal pumps are predominant. Two minor irrigation censuses have been carried out over the last 10 years. These reveal that minor irrigation structures have increased to a great extent. The census data reveals that there is 40 per cent increase in deep tube wells and 40 per cent increase in shallow tube wells. It also appears that density of shallow tube wells is 22 STW/ sq km of cultivable land, i.e., there is one shallow tube well in each 4.63 ha land. Command area under deep tube wells is 22440 ha approximately. Therefore, it can be concluded that Murshidabad district is almost saturated with shallow tube wells.

As per the Groundwater Estimation Committee, 1997, the total groundwater resources thus calculated is about 227038 mham. About 200837 mham is being withdrawn from different purposes which is about 88.45 per cent. This leaves a balance of 16842 mham available for future use for irrigation. The stage of ground water development is very high as compared to the state average i.e. 42.95 per cent.

Demand and Supply of Water in Agriculture in Murshidabad

Agriculture is the main landuse with cropping intensity more than 150% in the study area. Rice is staple food in this area. Only four blocks out of the total Rarh region of Murshidabad- Nabagram (2662ha), Khargram (940ha), Kandi (420ha) & Burwan (600ha) have got benefit from the Mayurakshi Project for irrigation The Rarh in the pre-Green Revolu-

tion era produced good amount of rice by means of canal irrigation. The people including traders from the Bagri region to the east of the Bhaguirathi used to collect paddy or rice. Thus as a result of historic 'Cordon' (in 1965) imposed by the West Bengal Government, the supply of paddy /rice to Bagri sharply declined. Consequently, the farmers were hard put to it. In the mean time, the Green Revolution brought HYV (High Yielding Variety) dwarf species of wheat and paddy. The farmer fell greedy of tangible boost in harvest. These species are very much water –thirsty. Cultivators started draining out water from wetlands, beels, ponds etc. to cultivate paddy there. They began to destroy forest, grasslands, fallow lands and changed the sowing time. They began to draft huge amount of groundwater by highly subsidized tubewells and pumps. Thus the whole landuse and cropping pattern of the region changed within few years. The traditional rain fed kharif and rabi crops like indigenous varieties of Aman and Aush paddy, oilseeds, pulses etc.-- all were replaced by water-thirsty HYV paddy and thus eco –friendly traditional cropping pattern disappeared. Unfortunately, the Revolution did away with the multi-crop pattern, and brought about almost irreversible ravage of ecosystem, local stream, water bodies, wetlands went dry and grasslands, bushes and thickets vanished for alleviation of severe hunger.

Decadal growth rate of Murshidabad district is quite high as compared to the majority of the districts of West Bengal. In the period of 1991-2001 the growth rate was 23.54 per cent in the district whereas the average growth rate of the state was 17.84 per cent. In terms of rural density of population the district ranks fourth in the state. To feed this huge population the cultivable area has been used to its fullest extent. The percentage of cultivable area in 2004-05 in the district was as high as 76.15. The amount of cultivable area per agricultural worker in 2004-05 is very low in the district i.e. 0.49 hectares. The net cropped area in the district has changed through time and it is in decreasing trend due to unavailability of agricultural land further. Here the cultivators have started to cultivate even the wetlands and river beds which are crucial component of the ecosystem. They have drained out the water from the wetlands for having more farmland. This also has negative impact on ground water situation of the district. The district ranks 3rd in term of net cropped area in the state (Directorate of Agriculture, Govt. of West Bengal, 2006-2008).



Figure 1: Month-wise Area under Cultivation in Murshidabad

Data Source: West Bengal pollution Control Board, 2009

The quantum of water to be used in irrigation varies with seasons of the year, the pattern of cropping in an area and the month wise area taken under cultivation there. On the other hand with the human population spiraling the gross cropped area is extended, which wants a larger scale of irrigation water supply. Agenerous monsoon season, requires less water to irrigate crops than a delusive one. But, during the non-monsoon months a farmer cannot help lifting ground water to irrigate his fields. The district has been subjected to a sea change in cropping pattern these years. Kharif, rabi etc. cannot define the currently prevalent pattern; it has nothing to do with rains, it has invented the way of feeding on ground water by using mechanical lifts. Thus ther has a total paradigm shift taken place. Today, unlike rabi crops, growing crops in non-monsoon season consume much more water. Besides, in the Bagri region the farmers choose March for sowing jute, a major crop here, and quantity of ground water using their pump sets. It is to note that this indiscriminate choice costs the worst.

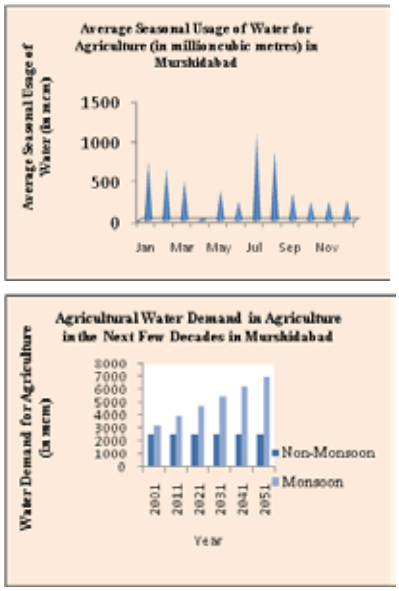
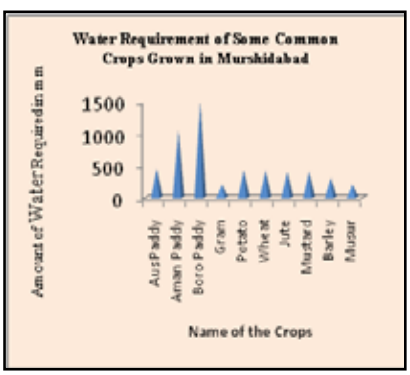


Figure 1a and 1b: (from left) 1a: Averages Seasonal Usage of Water in Agriculture in Murshidabad; 1b:

Projected Water Demand in Agriculture in Murshidabad Data Source: West Bengal pollution Control Board, 2009



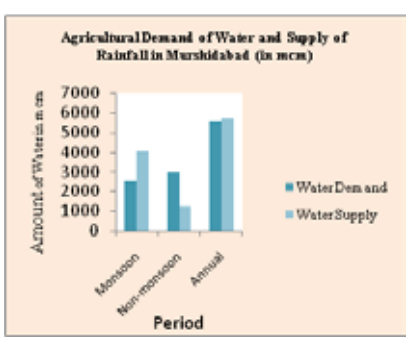


Figure 2a and 2b: (from left) 2a: Water Requirement for Major Crops grown in Murshidabad;

2b: Demands and Supply of Water for Agriculture in Murshidabad Data Source: West Bengal pollution Control Board, 2009

CONCLUSION

It is in this preferred period that the HYV boro paddy guzzles water by and large, from the underground source already stressed. Figure 4.5 shows the month-wise area under cultivation in Murshidabad. The seasons July-August and December- January- February keep the area under crops highest. During July-August the area receives somewhat monsoon rain, but the season during December- January- February when the area under cultivation reaches the peak receives little rainfall and the farmers folk has no choice left but depend entirely on the

ground water leading to an over- exploitation of the meager resource under ground. Now, let us have a look into the course of events. If we read the seasonal useage of water in agriculture, the Figures indicate that the farmers in the district use the greatest quantity of water for the month of July and subsequently came August, January, and February in descending order. Figure 4.7 presents the tentative demand of water for agriculture in 2012. The demand is estimated at 3951.7 mcm through the year, and the tentative demand stands to be 7016.5 mcm for the year 2051. The demand- supply balance profile suggests that the demand of water to be used in agriculture in the district is comfortably surpassed by the supply by 48.5 percent for the monsoon season. The demand, however, exceeds the supply by 61 percent for the non-monsoon season.

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