THE DREAMS AND REALITIES OF KANGSABATI COMMAND AREA, WEST BENGAL

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ABSTRACT

The present study is an attempt to interpret and analyze the role of Kangsabati dam in terms of its irrigation potentiality in the command area. The Dam constructed on the river Kangsabati has naturally brought perceptible changes in the ecology and environment of the area. The information, data and documents regarding the period prior to the Dam speak about a particular way of utilization of river water, river borne sedimented pockets suitable for agriculture, forestry and other economic aspects establishing a type of ecological set up which has been forced to be changed during and post-dam situation. Contextually, the irrigation canals constructed in the undulated plateau-fringe topography never satisfy the downstream consumers with adequate supply of irrigation water. They are unable to supply water sufficiently in the period of scarcity, neither protect from inundation during the rainy season, when the Dam authority releases the water through the canals inundating the crop fields only in the interest of protecting the Dam. The water holding capacity of the reservoir is decreasing day by day. On the contrary, loss of water by evaporation and through seepage in the canals is increasing. Further, supply of water in right time is always delayed, with the realization, service delayed is actually service denied. All these facts in the command areas of the dam are analyzed elaborately giving emphasis on field visits.

KEW WORDS: Catchment area, Command area, Dam, Impedimentation, Integrated society, Siltation.

INTRODUCTION

The river Kangsabati, locally known as 'Kansai' or 'Kassai' is a right bank tributary of the Bhagirathi – Hugli river systems. It emanates from Jabarban peak on the Ghoramara hill located east of Chotanagpur Plateau (23º32´30´´North and 85º56´30´´East) and flows through the Districts of Puruliya, Bankura and Medinipur and ultimately falls into the river Hugli (Bengal District Gazetteers, Puruliya, 1985). The length of the river in these three Districts is about 368kms. The Kangsabati dam was constructed during 1960s, just three km above the confluence of Kumari with Kangsabati with two major objectives - irrigation and flood control. Any large scale development project is conceived, planned and designed to achieve a set of objectives to enhance the welfare of society (WCD, 2000). Thus, it should be assessed with the real data collected through intensive field observation. The findings in case of Kangsabati Dam in West Bengal, both positive and negative related to the command areas are interpreted.

OBJECTIVES

The objective of the present study is as follows—

i. To assess the irrigation potentiality of Kangsabati Dam in its command area.

ii. To examine the problems related with the irrigation and agriculture in the Command area, and

iii. To suggest remedial measures.

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MATERIALS AND METHODS

The work is mainly based on primary data. Secondary data have been collected from both government and non-government published and unpublished records and reports about the irrigation and agriculture system of the area. A number of topographical, cadastral and other maps have been consulted to fulfill the objectives of the paper.

The methods and techniques applied in this research work have been derived from the objectives itself. The objectives of the study make it clear that artificial impedimentation on the free flow of a river may not allow to remain unified as an integrated society living within its valley. Actually, a dam dissects the entire basin into two-one demand zone and another supply zone. In order to test the impact of demand zone on supply zone in terms of irrigation and agriculture, the following working steps have been undertaken-

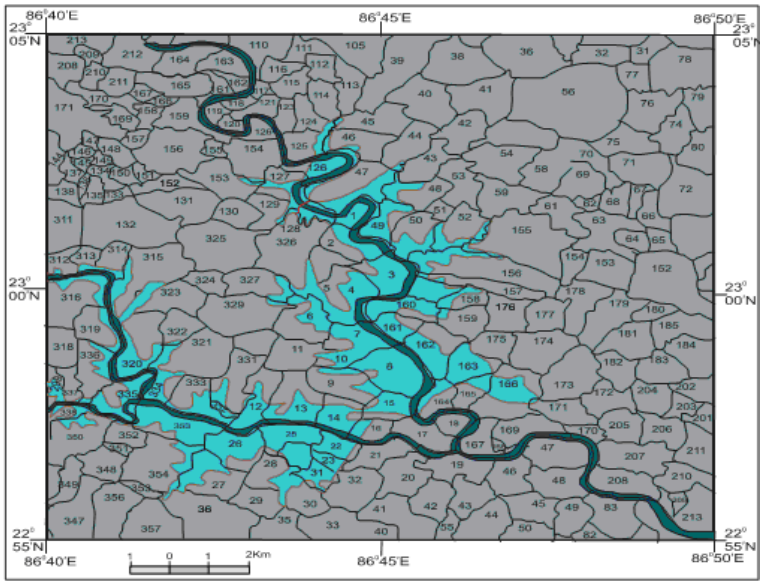
Step I-To have a complete set of information on the situation that existed prior to 1961 about the irrigation and agriculture system in the area concerned.

Step II-To amass all information about the changes in terms of the irrigation and agriculture system of the study area between 1961 and 2012 in a way so that these information can be tabulated and mapped appropriately using the data gathered from field investigation, and

Step III-To compare the results of 1961 and 2012 in a proper analytical method to arrive at the final conclusion.

Map No. 1

KANGSABATI RESERVOIR AND ITS SURROUNDINGS



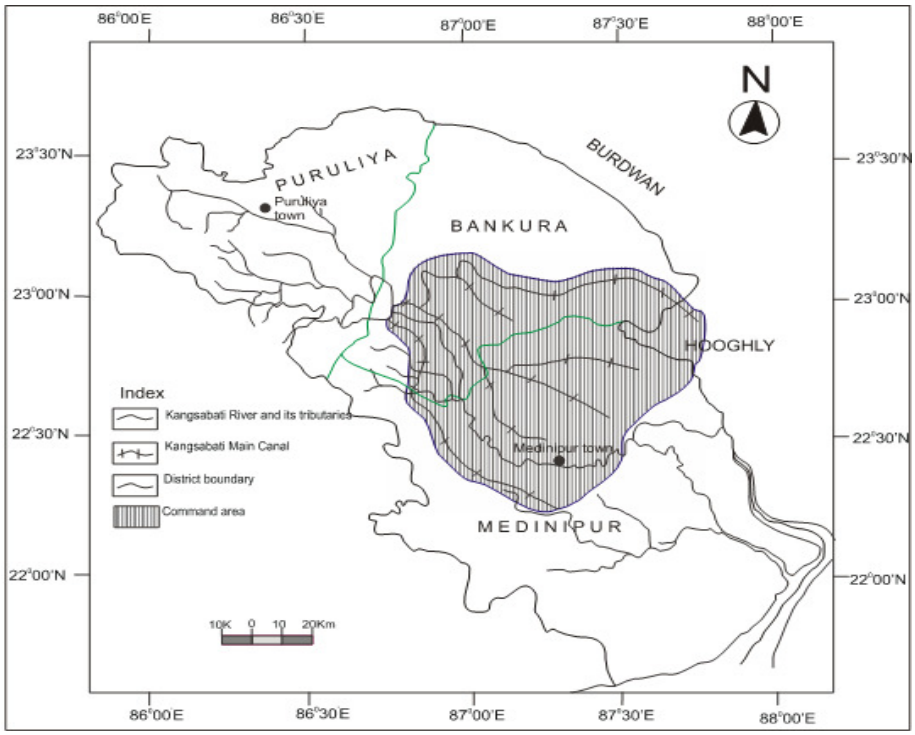
THE STUDY AREA

The necessity of exploring the possibility of major irrigation scheme in a drought prone area of West Bengal to cover the major portion of the district of Bankura and northern part of Medinipur, which constituted an area of scarcity and famine, was felt for a long time. Investigations to cover this area with major irrigation projects were started in pre-Independence period. However, after Independence, a suitable site for Kangsabati Dam was found as per the recommendations of the Government of India. The original estimated cost was Rs. 25.26 crores. Though the project was formally approved by the Government of India in the year 1961-62 (Kangsabati CADA, 2005), but the construction work commenced in March, 1956. In the first phase, a dam was raised over the river Kangsabati. Irrigation started from 1966 on the *kharif* lands in the areas where canal network had been established since then. After that, the dam was completed over Kumari (a right bank tributary of the river Kangsabati) in 1973-74 and both the dams were then connected to form a single reservoir named "Kangsabati Reservoir" (Map No.1).

The command area of the Kangsabati Dam lies in the districts of Bankura,Medinipur and Hugli. Eleven Police Stations of Bankura, thirteen Police Stations of Medinipur, one Police Station of Hugli have been benefited by the construction of the Dam (Map No.2).

Map No.2

COMMAND AREA OF THE KANGSABATI PROJECT



Source: N.A.T.M.O., 2005

RESULTS

Cropping pattern in the command area of the Kangsabati Dam

The command area of the Kangsabati project is an undulating terrain (Bengal District Gazetteers,Bankura, 1968). About 40% of the command area is Highland composed by porous sandy loamy soil, unsuitable for growing high water consuming crops like paddy,

as the porous nature of the soil is very much susceptible to percolation. But ground- nut is very much suitable for this type of soil and it can be grown in *kharif* season with very little irrigation. About 30% of the command area is formed of Medium land, consisting partly by sandy clay soil and partly of clay loam soil. Short duration paddy of High Yielding Variety (HYV) like C.R. 126-42-1, Bala Canvery, Ratna, C-R.44-1, (Duration 90-105 days) can be suitably grown in *Kharif* season. The rest 30% land of the command area is Lowland consisting of clay loam soil. Medium duration (120 days) paddy like Jaya, I.R.24 can be suitably grown on these lands. The cropping pattern of Kansgabati Command Area during pre-irrigation and post-irrigation period is represented below (Fig.No.1& 2)

Fig No.1

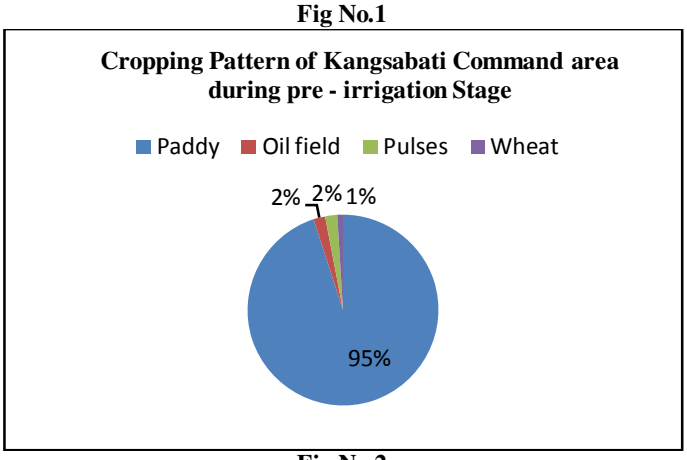
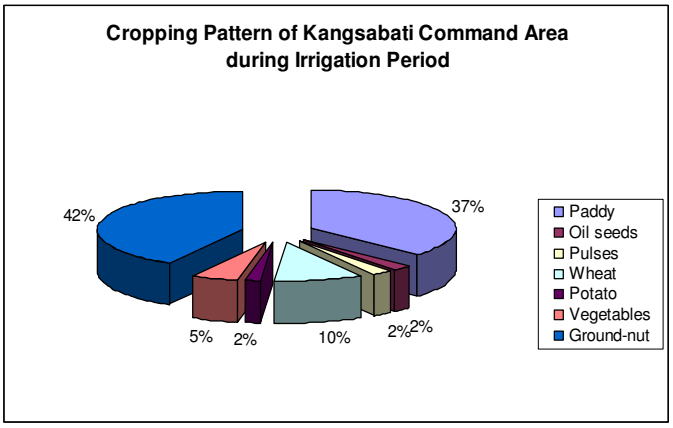


Fig No.2



Source: Modernisation of Kangsabati Reservoir Project, 1988

It is observed that the area of *kharif* crops has been increased for 69,000 hectare from 1960s to 1990s. At the same time, cultivation of *Aman* paddy has been decreased for 84,000 hectare while ground-nut cultivating area has been increased for 1,53,000 hectare In case of *Rabi* crops, 65,700 hectare of cultivating area has been increased in post-irrigation period because of irrigation facilities availed from the Kangsabati project.

Development of irrigated area

The year-wise development of irrigation may be seen from the following Figures (No.3, 4, 5&6) as per Annual Report of Kangsabati C.A.D.A., Bankura, 2004-05.The Fig.3 shows

that the irrigated area gradually increases in temporal scale because of the construction of proposed canal networks. The same picture is also seen in case of *Kharif* crops (Fig 4).

Fig No.3

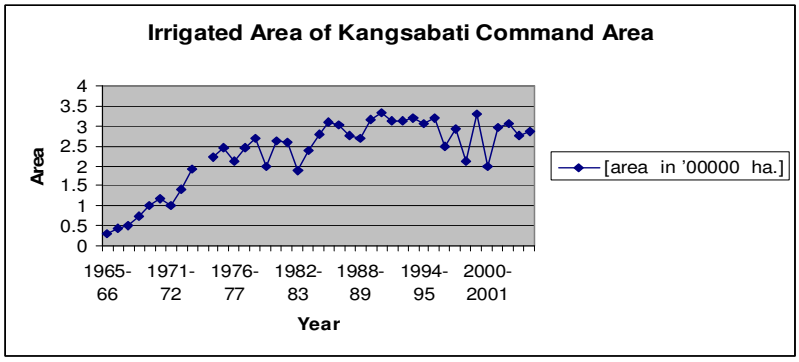


Fig.No.4

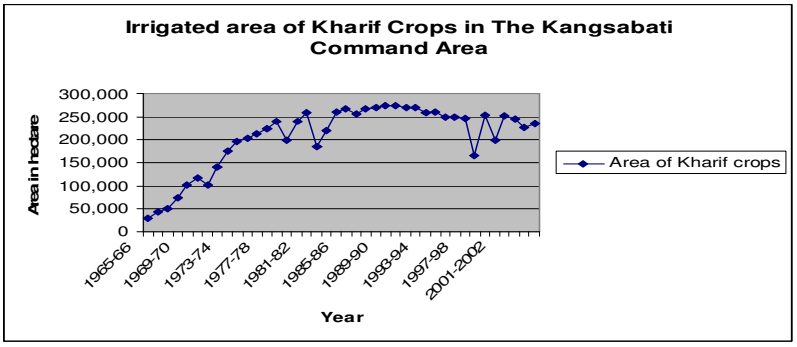


Fig.5 & 6 show irrigated area of Rabi crops and *Boro* rice cultivation in the command area. An interesting picture is that both the Figures show fluctuating nature of irrigated cultivated area in temporal scale. During this period, irrigation is necessary for cultivation. But in those years rainfall is meager, dam is unable to supply water for irrigation. Besides, if rain occurs timely in the months of September, October and November, then the dam may supply water for cultivation in winter and summer. Large scale crop failure in the command area of the dam occurs due to drought in the years—1966-67, 1979-80, 1982-83 and 1998-99.

Fig No.5

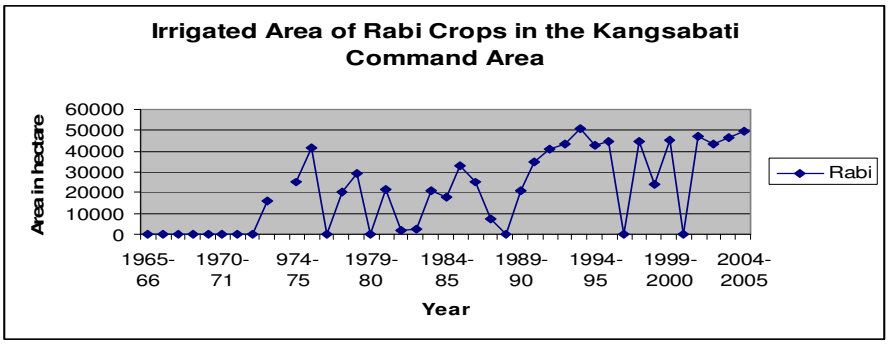
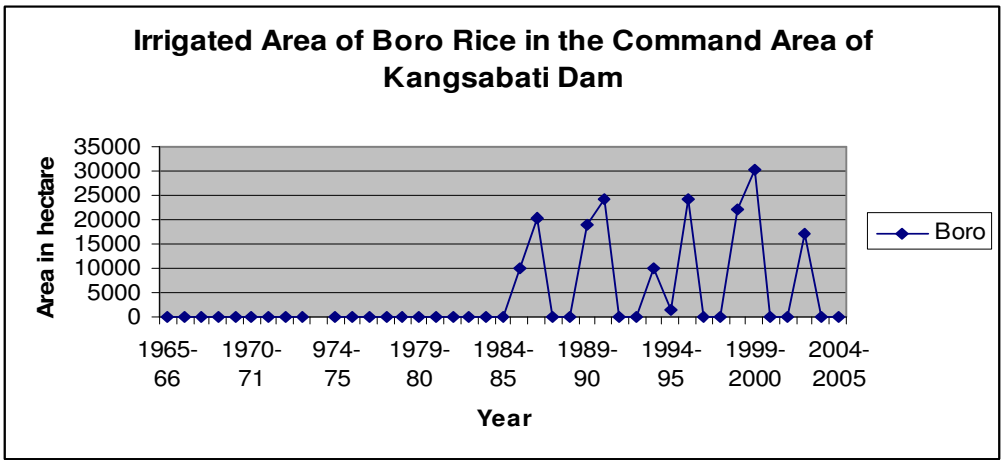


Fig. No.6



DISCUSSION

When an impedimentation is made over the river with a purpose to distribute water through mechanical engineering, it imposes the question of inequality in the distribution of water between the people living in the upstream and downstream section. The large dam like Kangsabati has been constructed to allow major diversions of the water from the natural drainage flow of the river. These diversions result in a major change in the distribution patterns of water in the Kangsabati basin. Therefore, the dam is the source of conflict over the distribution of water between the different parts of the basin.

The Government of India spent more than 345 crores of money (Kangsabati CADA, Bankura, 2005) during the last fifty years for the construction of Kangsabati Project – its dams and canal networks; still, there is a wide gap between the dreams and realities. The causes behind it are as follows:

Lack of hydrological data during planning period

The hydrological data were extremely meager when the Project was undertaken. Run-off data of Medinipur Anicut, 110 km. downstream of the Kangsabati Project, was extrapolated to find out the possible run-off strength at the dam site. This estimation proved surplus than the actual. For that reason, there was the provision for construction of 1 major, 7 medium and 24 minor irrigation schemes in the catchment area to irrigate 70,000 hectare of *kharif* and 18,000 hectare of *rabi* crops area by utilizing the surplus water upstream of dam site. But at present, it is seen that, the extrapolation method of run-off as indicated above, has been proved extremely erroneous, because 75% dependable yield from the catchment (if 25% is tapped by other minor projects) is not sufficient to fulfill the needs of the Kangsabati project, even the project will not be able to irrigate the areas committed for the schemes based on the projected surplus (Modernisation of Kangsabati Reservoir Project, 1988). If the above mentioned projects are completed in near future, the water availability of the Kangsabati Reservoir will be much less than the demand in future. At present, it is being felt that the project is facing a peculiar problem of scarcity of water, which was not anticipated during formulation, or even at the execution stage of the project

Non realization of storage capacity

Run-off data of the catchment area upstream of dam site was computed by interpolation of the observed discharges recorded at the Medinipur Anicut (110 km. below the dam site) due to absence of proper records of run-off at the dam site. On that basis, average inflow

from the catchment at dam site was computed as 210,000 thousand hectare , of which 109,000 thousand hectare meter would be utilized in the project and rest would be surplus. But at present, it has been observed that the project is facing a problem of water scarcity for fulfilling its targets. Current storage position of Kangsabati Reservoir is shown below (Table No.1)

Table No.1
STORAGE POSITION OF KANGSABATI RESERVOIR, WEST BENGAL (LIVE CAPACITY AT FULL RESERVOIR LEVEL IS 0.914 BILLION CUBIC METRE)

Year on last day of the month	**Storage as percentage of live capacity at full reservoir level**
February, 2001	14.00%
September, 2003	19.00%
May, 2004	7.43%
March, 2006	12.00%
March, 2007	29.00%
Last 10 years average for the month of March	22.00%

Source: Central Water Commission, Govt. of India, 2007

From the Table1, it can be easily understood that the last 10 years' average storage capacity of the Kangsabati Reservoir for the month of March is only 22% which is very nominal. So, at present situation, it is very difficult to supply committed volume of water to the command areas of *rabi* crops.

Problems of agriculture

Gross Command Area (GCA) of Kangsabati Reservoir Project is 5, 66,800 hectare of which Culturable Command Area (CCA) is 3,40,000 hectare. Before the inception of the project, CCA for *kharif* crops was 65%, mainly used for traditional local variety of *aman* paddy and 4% of CCA was used for raising *rabi* crops in winter. High water consuming crops like potato and vegetables were grown in 0.44% area of CCA. After completion of the project, 85% of CCA is used for raising high water consuming crops of paddy (HYV) during *kharif* season, 23% of CCA is used for *rabi* crops. High water consuming *rabi* crops like potato and vegetables are grown on 7.41% of CCA. As a result, it has been observed that most of the water of Kangsabati Dam is consumed during the *kharif* season for raising High Yielding Variety (HYV) of paddy. Field survey of 2011 and 2012 reveals that Farmers in the command area feel acute scarcity of water for raising *rabi* crops.

Administrative problem

At first, it was decided to construct 1 major, 7 medium and 24 minor irrigation schemes in the catchment area of the Kangsabati river for tapping the water resources. Some of the schemes are already implemented; some are nearing to be implemented except the major one i.e. Upper Kangsabati Project. The scheme already functioning in the command area is: Silabati reservoir, Tarapheni reservoir, Bhairabbanki reservoir and Parang weir. Another fifteen small irrigation schemes are also functioning in the command area utilizing the waters collected from small streams. Most of these schemes are under administrative control of the Kangsabati Project, and the rests are proposed to be brought under control. But due to lack of close co-ordination in the operation of all the irrigation schemes, proper utilization of available water is far from the targets.

Engineering problem

The irrigation network planned for the project is quite adequate. However, some more regulating structures on the canals and some escape- regulators are necessary for proper control on the supply of irrigation water and release of excess water at the time of emergency (Kangsabati CADA, 2005).

Poor communication system

At present, communication system is maintained by telephones connecting strategic places. During storms and heavy showers, these systems are frequently disrupted and this type of communication gap often brings a lot of problems of supply and demand of water into the fields. For proper control of reservoir and barrage, it is necessary that the important structures should be connected to the Divisional Head Quarters by Very High frequency (V.H.F) wireless sets.

Defective process of operation and distribution of water

The principal canals for the distribution of irrigation water have been designed for the project with capacities is noted below:

***1. Left Bank Feeder Canal* (lined) – 191.93 cumecs**	
Khatra Main Canal (Partly lined) 85.85 cumecs	*Supur Main Cana l* (lined) 108.85 cumecs
2. Right Bank Main Canal (Partly lined) – 79.18 cumecs.	

The Left Bank Feeder Canal runs through the westernmost part of the rocky tract of the area. After few kms. ahead, it has been bifurcated into two :

(a) Khatra Main Canal, and
(b) Supur Main Canal.

Khatra Main Canal irrigates about 30% of the Command Area, which is located in the inter-fluve of river Kangsabati and river Silabati, whereas, Supur Main Canal irrigates about 40% of the Command Area which is located in the inter-fluve of river Silabati and Darakeshwar. The Right Bank Main Canal starting from the Dam, irrigates about 30% of the command area, which is located on the right bank of the river Kangsabati.

During *kharif* season, the total area is divided into three parts commanded by the above three main canals and their distributaries. The system of irrigation that have been maintained in the Command Area, is a system of rotation among three trunks (one remain closed and the other two opened), continuously operated during prolonged dry period and also supply water on demands of farmers. In this system, water needs longer time to reach the distant fields, which often makes the tail-end farmers frustrated. Besides, the farmers living in the mid-distance of canals are generally habituated to cut down the embankments of canals to meet their requirements quickly. This generates social conflicts among the cultivators.

Communication gap between project authorities and farmers for releasing water

Kangsabati Project Authority has adopted the following system of administrative set up for operation and distribution of irrigation water (Table No.2). The time gap between placing of indent and releasing of water takes more than a week. Within this period, there are chances of some heavy showers or a very dry spell in the command area which changes the demand. On that case, the demand is revised and releases are modified. It also takes another one week more time (Modernization of Kangsabati Reservoir Project, 1988).

Table No.2
OPERATION AND DISTRIBUTION SYSTEM OF WATER FROM KANGSABATI DAM

Commanding officer	Role
Patrolling officer	He looks after irrigation of a 2000 ha. area. He makes everyday inspection of the area and orders to release water through the outlets with the help of khalasis. He also assesses the demand portion and reports to the Sectional Officer.
Sectional officer	Looks after an inspection area of about 6000 ha. He compiles the requirements of his area and reports to the Sub-Divisional Officer.
Sub-divisional officer	Looks after an inspection area of about 24000 ha. He compiles the report of his Sub-Division and sends it to the Executive Engineer.
Executive engineer	He places his expected demand to the Executive Engineer-in-Charge of Head works, preferably a week ahead of the requirement.
Executive engineer in-charge of head works	He releases water according to indent after informing the Superintending Engineer-in-Charge of the project.

Source: Modernization of Kangsabati Reservoir Project, 1988

Temporary stagnation of water in the agricultural field

The river Kangsabati itself is the master stream in the command area. Excess rainfall and irrigation water are carried from the agricultural fields through natural *nullahs* or tributaries to the river Kangsabati. In the middle portion of the command area, excess water drains into the river Silabati and its tributaries, while the northern and north-eastern parts to river Darakeshwar. River Subarnarekha also serves the purpose partially for a small part in the south. Flood problem is totally absent in the upper and middle part of the command area as the topography is undulating. However, at times of heavy rains, the rainfall and water released from Dam jointly make a sudden rush from uplands towards low lands and cause temporary stagnation of water. The lowland is the most fertile lands in the command area and is composed of clay soil best suited for production of paddy. But temporary stagnation of water at the critical stages of growth like tilling, flowering etc. adversely affects the production. As per villagers' opinion, some trend towards decrease in production is noticed in the good fertile lowlands. To reverse this trend, field drains of proper capacity are required in the low lands.

The result of soil survey conducted by the Principal Agricultural Officer (Bankura and Medinipur, 2005) showed the nature of soil in the major part of the command area is slightly acidic; P^H value ranges from 5.5 to 6.8. No marked effect of any adverse change in acidity or alkalinity in the soil has been noticed in the command area. Some parts of the command area, particularly tail-end Lowlands, are affected by floods during late monsoon months.

Loss of water from the irrigation canals through seepage

The Kangsabati dam is the second biggest earthen dam next to Hirakund (Orissa) in India. The project has more than 7500 canals. Total length of Main and Branch canals measures 620 kms, while the total length of the distributing channels and minor canals is 3000 kms (Kangsabati CADA, 2005). All the main canals are designed as lined canals with cement concrete. The Branch canals have been designed as unlined canals. The evaporation and seepage losses of water in other major irrigation projects of West Bengal are very high. In the canal network of the Kanshabati project in southern West Bengal, for example, the

seepage loss varies between 11% to 66% depending on the texture and structure of the soil. So the land lying at the tail end of the command area hardly receives any water during lean months (Rudra, 2003). About 60% of the total volume of water released at canal head from the reservoir does not reach the fields but is lost by percolation and evaporation in the distribution system (Modernisation of Kangsabati Reservoir Project, 1988).

In order to assess the quantum of this loss in the Kangsabati Project, some field observations were undertaken in some selected reaches by the Project Authority. Results of those observations may be furnished below (Table No.3)

Table No.3

SEEPAGE LOSS WATER IN KANGSABATI COMMAND AREA

Command Area	**Percolation losses (in cumecs per million sq.m.)**	**Percentage**
Western Rocky zone	3.37	11
Middle lateritic and red soil zone	13.29 – 21.95	66
Lower alluvial zone	2.44	23

Source: Kangsabati CADA, 2005

Problem of sedimentation in the reservoir

During the planning of the project, an estimation of the silt deposit was attempted in 1953 by River Research Institute, West Bengal. The average silt concentration of suspended load during the period of June to December, 1953 was estimated to be about 0.671 gms/litre.Kangsabati Reservoir sedimentation studies were carried out by Irrigation and Waterways Department, Govt. of West Bengal in two consecutive periods of 1970-71, 1993-94. Results of that observation were: Loss Index No.-273 acre feet/yr/100 miles (9% of the storage capacity).

Lack of reforms of existing ponds in the command area

As about 70% of the command area is an undulating terrain, it is easy and less expensive to dig large ponds for harvests, preservation and proper utilization of water. But due to lack of proper reforms of existing ponds and overdependence on canal water for irrigation, the existing ponds loose their actual water holding capacities. In the command area, the pressure of population on land is too high and majority of cultivators are marginal with small land holdings. Thus, it is not possible to construct and connect field channels and water courses with the ponds. As a result, the existing ponds are becoming unusable for irrigation purposes during *rabi* seasons or in case of emergency.

Social effects of large scale irrigation

Anthropological studies of traditional irrigation systems repeatedly show an inseparable link between the economic, cultural and social life of a community, and use of the irrigation technology (McCully, 1998), but in case of modern large-scale irrigation system, increasing intrusion of the Government in the lives of farming communities leads to loss of decision making power of the peasants. In course of field survey, it has been observed that the farmers are very much dissatisfied with the engineers and Government officials regarding untimely release of water. The situation becomes very worse during *rabi* crop cultivation. At that time, conflicts among farmers of a village or between the villages emerges for utilization of irrigation water. It is a common picture due to non-availability of water.

CONCLUSION

The Kangsabati Dam is mainly an irrigation dam. Thus important problems related to this dam are the persistent gaps between the created irrigation potentials and its utilization, failure to achieve the projected benefits in full, inequities and injustice in the incidence of

costs and benefits and above all, the problem of the distribution of benefits. All those problems will be minimized if emphasis is given for the management of water by constructing village level viable social organizations.

ACKNOWLEDGEMENT

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