

GEOGRAPHICAL ANALYSIS OF WATER RESOURCE OF THE KOSI COMMAND AREA: ITS APPRAISAL AND MANAGEMENT

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ABSTRACT:

The command area of the project lies in the erstwhile districts of Saharsa and Purnea which have since been regrouped into six districts viz. Saharsa, Supaul, Madhepura, Purnea, Araria and Katihar in Bihar. Kosi project is one of the important projects of Bihar especially as it has played a major role in saving the state from catastrophic floods annually and has contributed considerably to the development of its economy. The plains of north Bihar, specially the command area of Kosi project, of eastern Kosi canal system including Rajpur canal system used to be replenished by silt brought from Himalayas by various rivers, including Kosi, which flooded annually and devastatingly. This article presents an overview of relevant issues pertaining to development and management of water resources of Kosi Command area in India.

Keywords: Command area, Catastrophic floods, Multipurpose project, Irrigation, Protected area.

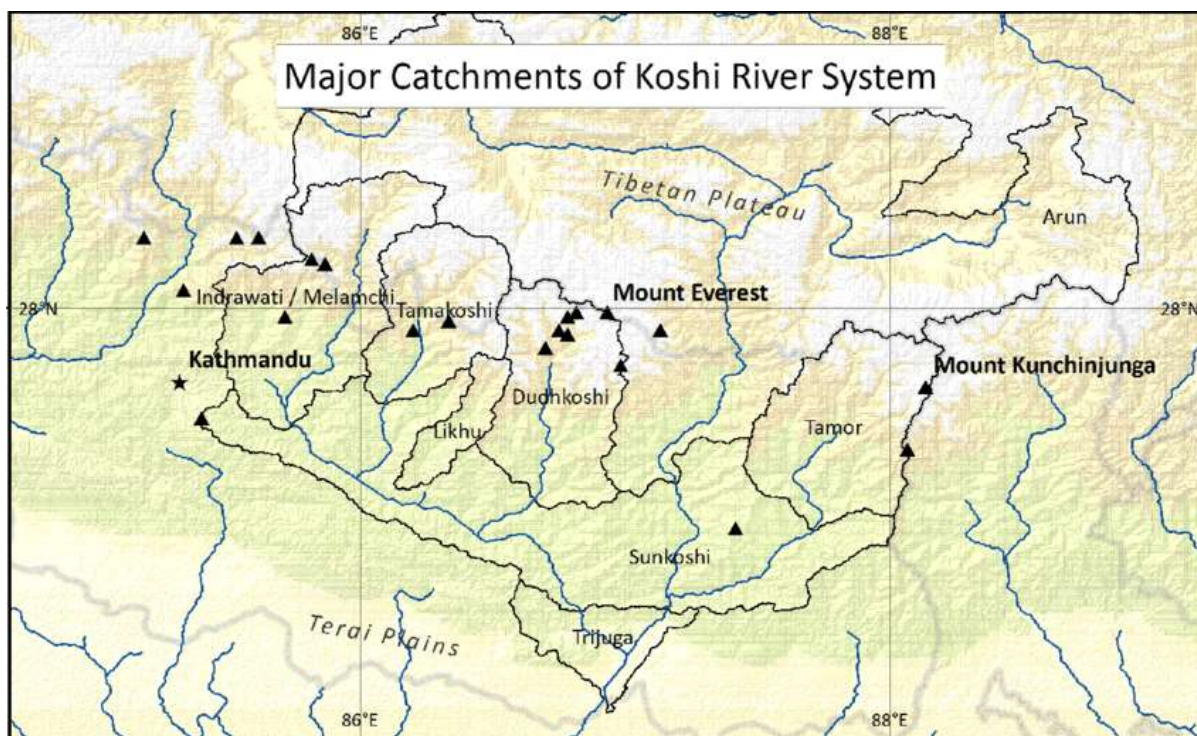
Objectivity :

The main objectives of the research paper is

1. Attempts to modify the flood of the Kosi Command region
2. Attempts to modify the susceptibility to flooding damage
3. Attempts to modify the loss burden in the region
4. Bearing the loss All these measures for flood management can be classified as structural measures or non-structural measures.

Discussion:

The Kosi project which was primarily intended to be a flood protection scheme, later came to be converted into a multipurpose project providing irrigation benefits also in the flood protected area. The Kosi irrigation project was executed between 1958 and 1968. The Kosi area development authority was constituted by the Government of Bihar in October, 1973 and started functioning in January 1974. The jurisdiction of the authority was not confined to the command area of the Kosi canal system but extended to all development activities connected with agriculture.



The Kosi area development authority was converted in December 1974 into a corporate body by a notification issued under an ordinance of October 1974 and renamed as Kosi Area Development Agency. The agency functions under the chairmanship of the Kosi area development commissioner. The canal systems in the Kosi Project are as follows: (a) Chatra canal system, (b) Eastern Kosi Canal system, (c) Rajpur canal system, (d) Western Kosi canal system. Nepal is served by the Chatra canal system and partly by the western Kosi canal system while Bihar is served by the Eastern Kosi canal system, Rajpur canal system and partly by the western Kosi canal system. The total geographical area of the districts in which Kosi command area lies is 14,695 ha. And the culturable command area is 67.41% thereof, i.e., 9,83,960 ha. Kosi command area covers 973 villages in 36 blocks as seen below. Old Saharsa district which now stands regrouped as the districts of Saharsa, Supaul and Madhepura has 4,37,136 ha. of Kosi CAD area and 75% of the geographical area of the old Saharsa district. Similarly Purnea and Araria account for 3,86,916 ha. of CCA (39.22% of Kosi CAD area and 66% of the geographical area of the district) and Katihar for 1,59,908 ha. (i.e., 16.25% of Kosi command area and 54.89% of the district's geographical area).

The salient features of Kosi project of relevance to Bihar, are: I. Barrage and Headworks, II. Embankments, III. Eastern Kosi canal system, IV. Hydel power station, V. Rajpur branch canal system, and VI. Western Kosi canal system. The irrigation potential and its CCA has been a contentious issue since water was first released in the Kosi main canal in 1964. The Kosi irrigation committee assesses the CCA at 4.40 lakh ha with annual irrigation of 4.48 lakh ha with annual irrigation of 4.48 lakh ha as shown below. Initially after the system was opened for irrigation (in July 1964 with partial discharge of about 5.7 m³) the development of irrigation was very slow and the very nature of the river, heavy concentration of sediment load during monsoon period compounded with the technical problems of running canal at about 13% of total designed discharge went on creating unsurmountable problems on the conveyance system. The irrigation committee constituted later in 1973 to assess the real potential not only reduced the gross command area, culturable area in the canal commands but even drastically changed the assumed cropping pattern of the project. Even with a drastic reduction in the ultimate irrigation potential the utilisation did not exceed 48% at any stage between 1964-65 and 1990-91. The average discharge in the eastern Kosi main canal as well as the number of days of the canal's operation also presented a grim picture.

Salient functions of Kosi CADA: According to agency reports, the emphasis of the programme has shifted to the following component since 1976.

On Farm Development Works: Development of field channels and field drains within the command of each outlet. Land levelling on an outlet command basis - Realignment of field boundaries wherever necessary. (Where possible consolidation of holdings to be combined). Enforcement of a proper system of 'Warabandi' and fair distribution of water to individual fields. Supply of all inputs and services including credit. Strengthening of extension services. Selection and introduction of suitable cropping patterns including soil survey. Development of groundwater to supplement surface irrigation. Development and maintenance of the main and intermediate drainage system. Modernization, maintenance and efficient operation of the irrigation system upto the outlet of one cusec capacity. 19 The flood control benefits of the Kosi project have been accruing to the entire area right from 1958-59 and there is spectacular improvement in the entire protected area in various social spheres such a social, environmental, economic, climatic etc. In the first week of October, 1968, highest ever flood discharge passed through the river Kosi but the entire protected area remained safe with the river between the two embankments flowing to the brim.

The problem of shifting of the river, however, has been raising its head year after year, as the other components of the original Kosi project, aimed at improving river morphology by discharge regulation, improving sediment carrying capacity of the river and soil conservation measures in the upper water shed were not taken up. Year after year the river's banks are still shifting at one place or the other making it difficult at times to contain the same within the embankments.

The level of ground within the embankments has risen due to heavy siltation, creating difficulty in drainage of countryside land through original sluices into the river. Kosi river carries maximum 0.747% and average 0.16% silt of annual run off due to such heavy silt carried by river Kosi. Heavy siltation in canal system has occurred, thus minimising the capacity of the canal system. the losses as estimated is 17% in main canal, 8% in distributary and 20% in water course. 22 The project originally planned to provide water conveyance system upto 200 hectares block 95 cusec or 0.1416 cumec capacity). Subsequently, it was extended to 40 hectares block and later upto 5 to 8 hectares blocks at project cost. The figures of the potential created indicate completion of the system upto 5-8 hectare blocks. According to the following table, the area covered by warbandi is only 0.29% of Kosi CCA (which has been assumed to be 6,35,000 ha.)

The problems of the small farmers have not escaped the attention of various researchers who have studied Kosi region. Many of them view that the tenuri conditions prevailing in that region are responsible for the worsening plight of small farmers. Chakravarty, who studied the problems of small farmers in Kosi area has documented following factors as handicaps of the small farmers; fragmentation of holdings, insecurity of tenure, inadequate and untimely supply of inputs, inadequate and untimely irrigation, unsuitability of land, lack of credit facilities and other factors like storage, marketing etc. Chakravarty views insincerity of tenure as the most important handicap suffered by the sharecroppers. B. G. Varghese's 'Kosi Kranti' (Kosi revolution) programme started in five blocks of Purnea district had aimed at effective and speedy implementation of land reform by combining the power of the people with that of the state and it was based on the premise that the tenurial conditions existing in the Kosi area were responsible for the backwardness of the region, according to, Niranjan Pant.

In the Kosi region Small Farmer's Development Agency (SFDA) was a major state interventionist strategy directed towards the poor farmers. It was based on the assumption that a farmer with 3 or 3.5 acres is viable if he has an assured water supply and the necessary inputs

to go with it. Thus, SFDA scheme was started in 1969, aimed at enabling potentially viable farmers to participate in development and share in the benefits. The scheme provides special credit, advising and other services to cultivators who own and cultivate between 2.5 to 5 acres. However, it has been found that the role of cooperatives and commercial banks in providing finances to small and marginal farmers has not been up to the expectations.

Field Observation

For field work in Kosi Area, three blocks Narpatganj (head reach), Banmankhi (middle reach) and Chausa (tail reach) of Jankinagar Branch Canal was identified. Jankinagar branch canal has a designed discharge of 99.0 (cumecs), a length of 82.11 and a CCA of 1.09 (lakh ha). It emerges from the Eastern Kosi Main Canal and can be said to be in the middle of it. The EKMS has a GCA of 7.426 lakh ha as per the KCADA reports.

As the area was geographically big it was not possible to survey the entire region, a few individuals belonging to a population was selected for the purpose of research. Thirty farmers each in head, middle reach and tail reach were interviewed. Ten officers each (Junior engineers, executive engineers, administrative officers etc.) were interviewed in each reach. It must be noted that the farmers and officers interviewed belonged to all sections of society and no particular caste was favoured. The educational qualification of farmers ranged from illiterate to graduate. The land owned by them ranged from zero to ten to fifty acres. Landless farmers who were interviewed usually practised share-cropping. At times the respondents were not very sure of their answers. Such responses were taken as no. In Kosi area about 85% of farmers are small and marginal farmers having about 0.70 ha holding per family. They also possess land scattered throughout the village and on an average they have lands in three-four different places. The consolidation of holdings under the revenue act was started in early sixties but the progress has been slow. The research shows that until 1993-94, there did not appear to exist any effective system of equitable distribution of irrigation water. The farmers in the upper reaches, who had no fear of water logging or that of additional submergence and consequent loss of crop, is said to have gone on to take water far in excess to their requirement which, on account of the sandy nature of soil and steep gradient in the upper reaches of the command area, compared to that in the lower reaches reappeared as a source of additional submergence in the lower commands, depressions and 'Chours'.

Conclusion

In line with the policy of water resources department, Kosi Command Area Development Agency was set up for optimising irrigation from the project. But it can be said that the irrigation component has not clicked despite setting up of KCADA. It is estimated that hardly twenty percent or so of Kosi's CCA is irrigated by Kosi canals. The Kosi canals have been providing irrigation for Kharif crops (at the cost of delaying or partially cutting out supplies for Rabi and summer crops which have a lot of potential in the area for increasing both cropping and irrigation intensities), which in a way do not always need canal irrigation because of heavy well distributed monsoon rainfall in the area and availability of plenty of groundwater both for supplementing and supplanting canal irrigation wherever and whenever necessary. Kosi waters during the period June to September are extremely muddy because of very heavy soil erosion in the river's catchments in Nepal. 90 to 95 percent of its silt load concentration flows in its water during this period resulting in heavy siltation of the barrage and of the canals and filling up and obliteration of the unlined water courses and filed channels constructed by

KCADA. The silt load has not only drastically reduced the carrying capacities of the canals, distributaries, minors and sub-minors but also obliterated most of the 'kuchcha' channels making it difficult to carry water to the cultivator's fields. In the sample survey, works regarding construction and maintenance of water courses, field drains, 'kuchcha' field channel and lining of field channel, it has been found that not too much progress has taken place except some on 'kuchcha' field channels and field drains. Not too much attention has been paid at all on water courses and lining of field channels. So, field channels are yet to be constructed over a large part of Kosi CCA and whatever have been constructed have largely become dysfunctional. It can be said here that if the government is not able to meet its targets, it can pass on the responsibility for construction and maintenance of field channels and water courses to the farmers and Kisan Samitis. This is sure to have some positive outcome. According to officials Kisan Samitis are reported to be operative and participating in warabandi programme in Kosi command area. But interviews with farmers reveals that though such samitis exists in pockets, they are hardly active. Farmers complain that officials hardly consult them on policy matters. Outlets at many places are said to be ungated and measuring devices are also said to be missing. It is estimated that hardly 40 to 45 percent of water flows in the canal and reaches upto partial lengths. Thus water courses, in the sections not getting water, are getting obliterated. It is also learnt that sometimes there is lack of coordination between the Irrigation and Agricultural staff of Kosi CADA in planning and execution of the work relating to the construction of field channels. This is evident from the fact that some of the field channels have been constructed at places where no irrigation water has ever reached. It is said that for efficient water management, the land holding should be of minimum 0.4 ha. In Kosi area, about eighty. five percent of farmers are said to be small and marginal farmers, possessing land scattered throughout the village and blocks. The consolidation under the revenue act was started in early sixties but wrongful rating of the land quality, malpractices by the influential farmers as well as by the revenue officials, hampered the consolidation work and ultimately the Government of Bihar had to defer the consolidation process. The Government of Bihar has suggested that the consolidation should be by farmers themselves and the CAD authorities should endeavour for this. But our study reveals that like other areas hardly any progress has taken place on this front.

It is here, we can say that active farmers organisation with complete rights can be effective like in the case of Paliganj in Sane GADA. Active participation in water management will help the farmers at all levels to understand each other needs better and be sensitive to others problems. Most of the beneficiaries feel that the attitude of the irrigation bureaucracy is at times non-cooperative and that, they point out, officials do not always pay heed to their complaints. It is believed by farmers at all reaches that if the officials paid even the slightest attention to their problems, things would improve considerably. At times, they say, lot of water get wasted because of small leakages but the officials do nothing inspite of reminders. With regard to canal maintenance, it is pointed out by farmers that every year vast amount was spent on the repair of canals but they remained as before. They get the feeling that overseers and engineers were not much interested in the canal's upkeep. At this juncture it can be mentioned that Kosi and KBC CADA during 1991-98 spent Rs. 1.46 core in excess due to non-adherence of cost calling of Rs. 6,000.00 per hectare. In Sane, KBC and Kosi commands during 1990-95, field channels/water courses, after incurring an expenditure of Rs. 01.80 crores were abandoned midway. In Kosi CADA, during 1991-98, Rs. 70.36 cores in excess of prescribed norms was spent. One cannot help asking here, if farmers involvement in development work would help in cutting the costs. The beneficiaries also complain of wrong assessment of irrigated land. They point out that even the fields which did not receive water were assessed as irrigated. It can be said that lack of farmer's confidence in the system is an

important reason for low utilisation of potential created. The farmers in Kosi CADA have little confidence in either timely supply or adequacy of canal water for irrigation and are thus generally reluctant to invest money in seed, labour and fertilisers etc.

Most of the farmers in head, tail and middle reach say that they do not get timely or adequate supply of water and are also not satisfied with CAD work. They complain of channels running for short period only. Almost all the farmers in the head reach reported that the first watering is received by them in the last week of December or January. The total number of waterings in all the cases was reported to be two. Most of the farmers in all reaches reported that they do not take water for irrigation of pulses, oilseeds or any other crop other than wheat during Rabi. However, over 90 percent of them grow oil seeds and/or pulses in the fields, where wheat is grown or irrigated. Cent percent farmers in all reaches confirmed that there is need to provide irrigation to pulses and oil seeds. Other modes of irrigation in Kosi CADA is pumps, well etc. Farmers use water from both canal and pump/well etc. Farmers who do get canal water complain of inadequate and short supply of water in the canals, low level of water, late supply of water and also of channels running for short period only. A common complain was the problem of siltation and drainage in the command. Another problem was of uneven and unlevelled surface of land. It was learnt that irrespective of crops, irrigation by flooding is also common. This method of irrigation is responsible for huge wastage of canal water apart from depriving farmers of lower reaches from getting their share of water. 100 percent of farmers in all the reaches felt that they were capable of taking decisions for their own benefit and that the government should transfer water management rights to the farmer's organisation after establishing them and empowering them with right powers. The tail end farmers felt hopeful of getting canal water if farmers were vested with distribution of canal water. 100 percent farmers in all reaches say that participatory irrigation management does not exist in their area. This can be confirmed by Kosi CADA report which puts at nil, the progress of participatory irrigation management in the area (See Appendix). 100 percent farmers in all reaches responded positively to participatory irrigation management when explained, to them saying that it would definitely help them in solving their problems and help in resolution of conflicts amongst themselves. Respondents say that though Kisan Samitis do exist in certain areas but they have no rights over water management. Though the government sounds earnest to establish farmer's organisation and transfer water management to them, every thing seems to be on paper alone. This is a classic case of non-implementation of government policy.

The study points to the fact that command area development agency, both Sane and Kosi, should also review its functions and help in, a) construction of roads, field channels and field drains, b) persuade farmers to volunteer for consolidation of holdings and full on-farm-development work which would all the more be necessary if multiple cropping is to be undertaken, c) ensure proper maintenance of canals and distributaries, d) help the farmers in providing the right technology and seeds and so on. The major concern of public policies dealing with irrigation systems in the recent years has been productivity and equity. Judging from this point of view, Sane and Kosi system falls short in both these respect. It can be seen from official datas that as far as GADA work is concerned, both in Sane and Kosi project, regarding land-levelling, construction of water channels, extension work, on-farm development work and so on, again, there is a huge gap between the target proposed and the target achieved. (See Appendix). The gap is all the more prominent as far as irrigation potential created and utilities is concerned (See Appendix). Thus, according to experts, one way of reducing this gap is to effectively spread PIM upto micro level and bring farmers at the stage of taking up management of canal water below the outlet.

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