Irrigation and Water Systems in Bundelkhand: A Report from Lalitpur District

How Better Planning, Priorities Can Result in Huge Savings & Protection for People

Bundelkhand region has emerged as one of the flash points of the deepening water-crisis in the country. Following the national-level focus on Bundelkhand's recent prolonged drought and water-shortages, however, considerable funds have been poured into Bundelkhand particularly for improving the water situation. Unfortunately, however, the ground-reality doesn't appear to be improving. Questions are therefore being raised about pushing of some dubious big-budget projects with many adverse side-effects while ignoring the potential of small-scale works which are ecologically sound and can give short-term as well as long-term relief to people at a low cost.

Kachnauda dam is being built on Sajnam River in Lalitpur district. An earlier version of this project presented in year 2007 cost Rs. 89 crore. Later in 2009 a revised version appeared which raised the cost between 4 to 5 times to Rs. 425 crore. What is most shocking about this massive escalation is that the later-day version also has massive additional social and environmental costs.

The Institute of Social Sciences (ISS), N. Delhi in collaboration with the Association of Local Governance (ALGI) N. Delhi took the initiative to study these aspects of Bundelkhand in the specific context of Lalitpur district (Uttar Pradesh). Bharat Dogra, Fellow ISS, who has written several reports on Bundelkhand for reputed newspapers and journals, took the lead in contacting some leading social activists of Bundelkhand region in U.P.

A four-member team was constituted including Raja Bhaiya, Director of Vidya Dham Samiti; Vasudev, Director of Bundelkhand Sewa Sansthaan and Rajabua Upadhaya, senior activist of ABSSS. This team prepared a report after visiting four project sites, speaking to affected villagers and visiting some areas where good traditional practices of water conservation had been practiced in the past. The preliminary findings of this team were presented at a well-attended press conference held at Lalitpur on May 17, 2012. The final report based on these findings has been written by Bharat Dogra. Briefly, this report hopes to show how billions of Rupees can be saved and even bigger environmental damage can be averted by a proper prioritisation and planning of water related projects and programmes. This report is divided into three parts:

I. Avoid this Massive Wastage of Resources and Huge Social and Environmental Costs - The Case of Kachnauda Dam and Canal Project.

II. Utilise the Massive Potential of Saving Crores of Rupees every Year and Protecting Environment By Encouraging Mangal Turbine.

III. Give New Life To Traditional Water Conservation Practices.

I. Kachnauda dam is being built on Sajnam River in Lalitpur district. An earlier version of this project presented in year 2007 cost Rs. 89 crore. Later in 2009 a revised version appeared which raised the cost between 4 to 5 times to Rs. 425 crore. What is most shocking about this massive escalation is that the later-day version also has massive additional social and environmental costs. One has heard of economic costs being raised to reduce social and environmental damage. But here is a case where economic costs go up and in addition extremely high new social and environmental costs also appear.

The earlier version of the project aimed at taking the canal water to a dry existing canal of an earlier project at a proper site with minimal adverse effects. However the changed version unnecessarily constructs an elevated canal over a long distance parallel to the existing canal of a previous project. There is no need for this extra elevated construction as the dry canal of a previous project already exists in the area. What is more, the new alignment of canal takes the canal to a height of about 25 feet and even higher. The nearby villagers complain with one voice that this can potentially destroy their villages.

As the people of Bamhori Sehna village, (panchayat Bhailoni Lodh, Block Bar) including elected panchayat representatives told us, they were never informed earlier that the canal will be taken from such a height, higher than their kutcha homes. They say that the seepage from this will destroy their houses as well as their fields. The wall will create a barrier dividing fields and temples on one side and houses on the other side. Thus normal drainage will be badly affected leading to much greater threat of water-logging and floods and eventual destruction of agriculture in the village. Even a very partial construction had led to the water-logging of the dalit basti. The soil taken for very high construction will also ruin fertile fields. The farmland here is less but it is very fertile. If this fertile land is lost the farmers here will be ruined, villagers told us. In addition a very important hundred year old tank will be lost due to huge trenches which are being dug to obtain soil using heavy machines.

People of about six villages with a total population of about ten thousand will be very adversely affected. These villages in Bar block include

Bamhori Sehna, Bhailoni Lodh, Bar, Motikhera, Dasrara, Bachravni and parts of Turka village.

Villagers including elected panchayat representatives told us that they had not been informed about the changed plan for elevating the canal to a huge height at all and therefore they were completely taken aback where work suddenly started with heavy machines. Once the tragic implications of this for their village started becoming clear to them, villagers particularly women marched together to the construction site and protested peacefully against the continuation of this work. This work was stopped at some places but continued elsewhere.

Before more damage can be done, this study team requests higher authorities to immediately order a completely impartial review of the entire project and immediately stop further work on it. Our recommendation is that the project should go back to the original 2007 version which costs much less and also avoids this onslaught on the life and livelihoods of these villagers. Why make such costly changes in the original project which bring avoidable destruction to many villages? It is widely suspected that some powerful construction lobbies are behind this who want to earn crores of Rs. while inflicting heavy losses on public funds as well as villagers. This should not be allowed to happen.

If properly harnessed and supported by the government and voluntary organisations, the Mangal turbine, invented by a Bundelkhand citizen, can save farmers billions of Rs. every year by avoiding the use of diesel or electricity while lifting water from rivulets and streams. In these times of climate change it is equally important that there will be a huge reduction in greenhouse gas emissions.

The study team also came across other examples of very wasteful use of irrigation and water funds. A check dam on Farari nullah was constructed at the cost of about Rs 13 lakh with very little water conservation benefits, whereas same or better results could have been obtained by giving finishing touches in the form of two gates to a previous project at the same site at a cost of just about Rs 5000 or so. Such wasteful use of money should be avoided, and it should be investigated why such wasteful use of funds has been made to ensure that such plunder of public funds does not occur in future.

II. Lalitpur district happens to be the home district of the famous rural innovator Mangal Singh[1] whose innovation popularly called the Mangal Turbine has been widely praised in India and abroad. If properly harnessed and supported by the government and voluntary organisations, the Mangal turbine can save farmers billions of Rs. every year by avoiding the use of diesel or electricity while lifting water from rivulets and streams. All this will translate into saving foreign exchange as well. In these times of climate change it is equally important that there will be a huge reduction in greenhouse gas emissions.

The importance of Mangal Turbine has been highlighted by several senior persons and research documents.

B.K. Saha, former Chief Secretary, Govt. of Madhya Pradesh, said, "The system is extremely cost effective even after taking into consideration the cost of the Stop Dam. Where the Stop Dam is already available the system is even more cost effective. Installation of this device is strongly recommended wherever there is flowing water in small streams by constructing a stop dam and installing one or two water wheels as designed and developed by Mangal Singh. It saves on energy like electricity or diesel and is ecologically completely benign."

Dr. T.P. Ojha former Deputy Director General (Engineering) of the Indian Council of Agricultural Research has written, "Mangal Singh's device offers great promise and possibility of lifting river water for irrigation, fisheries, forestry and drinking purposes. The water head created by putting a check dam across the river or perennial water course generates enough force to rotate the water wheels to operate one or two centrifugal pumps in series..."

According to a comprehensive study of Bundelkhand's water problems made by IIT Delhi and Vigyan Shiksha Kendra, "Several years back, Mangal Singh, a farmer from Lalitpur district, devised a highly efficient, yet inexpensive turbine which can be used for pumping water as well as for electricity generation. Its specialty is that it does not require a large water head: a water head of even one metre or even less is sufficient for its operation. It can easily be fabricated by the villagers themselves, using locally available material.

This model of water wheel is a source of rotational energy which can be used for any purpose. Its performance as a pumping system for irrigation has been found excellent. It is also being used for sugarcane crushing, grain threshing, grinding - and

[1] As Mangal Singh explains, this innovation called 'Water Wheel Turbine cum PTO' machine or simply Mangal Turbine functions on the basis of (i) a specially designed water wheel which can rotate even on a low water head of 1 metre, (ii) stepping up the rotation through a suitable gearbox in the range of 1500-1800 RPM and (iii) using the available mechanical power by connecting one end of output shaft with centrifugal irrigation pump and other with a suitable pulley to operate other machineries and also an alternator to generate electricity.

for operating machine tools.

On the basis of some locational studies within Bundelkhand, some 500 hydro-sites have already been found suitable for its installation. On an average, two turbines per site will have the potential to irrigate 200 hectares of land.

In comparison with the uncontrolled flush irrigation through big-dam-connected trunk canals the irrigation by Mangal turbine can be controlled by local people as per their crops' requirements.

This turbine as a fine example of common people's inventiveness should be encouraged by all means for people's benefit."

This system is thus particularly suitable for decentralised energy systems created and maintained by panchayat raj institutions and voluntary organisations working in cooperation with them.

As the main area of our visit (Bar block) also happens to be the area where the ancestral village of Mangal Singh is located, the study team was particularly keen to see how this important innovation has been used in this area. We were deeply distressed to see that although Mangal Singh had himself worked very hard and with great capability and dedication to install Mangal Turbines at as many as six places, various vested interests and adverse factors worked against this great effort of a rural innovator so that at present none of these turbines is in use. We'll like to emphasise that for several years these turbines had actually worked very well bringing great benefits and even greater hope to many nearby farmers.

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This success of Mangal Turbine has been seen and documented by distinguished visitors and experts, including highly placed officials. The entire tragic story of how many of these pioneering efforts of great hope for the country and its farmers were harmed has been brought out very well in the officially conducted investigation report of Dr. B.P. Maithani, former Director of National Institute of Rural Development (NIRD) who was assigned by the Ministry of Rural Development, Govt. of India, to conduct this investigation. All that has been said in that report need not be repeated here. Suffice it to say that the study team strongly endorses the recommendations of Sh. B.P. Maithani.

The study team appeals to the authorities to take adequate steps to ensure that all the Mangal Turbine projects at six sites can be properly restored. Also other sites in the area particularly where some work had been started but could not be completed should also be tapped so that farmers here can get the most benefits from such an effective low-cost and ecologically friendly technology which actually originated in this area. The government should also take steps to compensate Mangal Singh for all the injustice he has suffered so far along the lines suggested in the report by Sh. B.P. Maithani[2].

III. We also visited some rural areas which were known for their well-built and well-maintained bunding systems. It is a great learning experience to see how previous generations working on their own without any outside support had been able to create and maintain an elaborate system of series of bundings which could conserve rainwater in a very big and effective way. Such a system could not be possible without a remarkable cooperation within the rural communities. There were gates for the releasing of water at the proper time. This can also be seen in the creation and maintenance of very good tanks.

Unfortunately, however the highly useful bundings could not be maintained in recent times. Is growing disintegration of rural communities responsible for this? Perhaps yes, but we should not also ignore wrong and distorted decisions which harmed traditional cropping system and the water system linked to it. For example the bureaucracy supported drive to spread soyabean cultivation in a big way upset the traditional cropping system to which the system of bunding was linked. This harmed paddy cultivation in particular but also many lesser crops which could be grown in integration with each other in a well thought out farming and water/moisture conservation system which gave good yields at low costs and also scored very high marks in terms of sustainability and environmental protection.

Our study team would like to emphasize the need for understanding and protecting and restoring such systems. Once the importance and basics of these systems are well understood, relatively low-cost interventions using existing govt schemes can be made to restore the invaluable traditional systems.

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Bharat Dogra, Raja Bhaiya, Vasudev, and Rajabua Upadhaya

[2] The local administration as well as CAPART and other concerned organisations can cooperate in such an effort.