

CASE STUDY

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Adaptive Livelihoods in Waterlogged areas: Kosi farmers on a new path





Embankments built to tame the mighty river Kosi in 1955 gave rise to umpteen issues for the land and the people living in the basin area. Communities here face an ongoing battle with the greatly altered environment, of which waterlogging still continues as a persistent cause of concern for them, their agriculture needs and their cattle rearing capabilities. Many schemes were carried out to drain out the unwanted water, but the problem of waterlogging has only increased here. This waterlogging makes the soil saline, reducing the fertility of the land; plays a role in the deteriorating health of the community, affects marine life, influences the water quality of the region and has had a major impact on the livelihoods of the people who live here. And after the government's green signal in 2004 to go ahead with the Golden Quadrilateral Highway Network Project, and with the consequent construction of the

Mahasetu and other guide embankments over the Kosi river, this deplorable situation has only worsened. The embankment seems to have washed away the foundation over which livelihoods were once built and flourished.

Things have not been like this way always; 150 years before the embankments came up, the Kosi river still flooded the area year after year, from east Purnia to Darbhanga district, but also left it enriched, abundant with silt. Communities who lived on the banks understood this cyclic nature of the river and lived in sync with its natural environment. For nearly 3- 4 months every year, the water would rise and then fall periodically. But, people, even those with small land holdings were able to cultivate a variety of crops on their land, as per their individual need and requirement. Prior to the 1960 decade it was a traditional type of mixed, flavoured and nutritious farming

that was prevalent here. Farmers grew maize, rice, legumes, *bajra*, *jowar* and many other crops with ease. Fruits, green leafy vegetables and bamboo too grew in abundance here. Many types of fragrant, nutrition rich rice flourished here, with farmers planting rice varieties that thrived even in all that excess water.

Post the 1960 decade, after the embankments came up, knowledge of traditional, locally suitable seeds, self-reliant farming and indigenous cattle breeds began to soon lose ground. As many local species of fish began to disappear, so did the livelihoods associated with them. Soon many villages dependent upon these livelihoods started to shrink, even as water levels began to rise and the problem of waterlogging intensify. As floods, erosion, displacement of land and people, and waterlogging increased, the community fell

back on its own perception and knowledge to both protect and develop their land. This gave rise to many distinct innovations in farming practices, which are specific to this particular region.

Garma Dhan

Most of the area in Saraigarh, block Bhaptiyahi in Supaul district in the Kosi basin, is both flood prone and waterlogged. As per census 2011, this block is spread over 206.4 sqkm, where there are 22,626 households with a population of 1,22,772 of which 15,663 work as farm labourers; of these there 10,541 men and 5,122 women. There are 12 *panchayats* and 39 villages here, of which 11 villages are affected by waterlogging. Recently in April 2020, as per information collected from *panchayat* representatives, social workers and farmers, if the 11 villages that lie outside the embankment area are also included, nearly 1500 acres of land is waterlogged. Of these the two villages, *Sadanandpur* of *Jhila Dumri panchayat* and *Kalyanpur* of *Bhaptiyahi panchayat*, are the worst affected.

As per the 2011 census, *Kalyanpur* has 560 households (HH), land assets of 291 ha, a population of 3225 and 497 agricultural labourers; while *Sadanandpur* has 559 HH, 459 ha land, population of 3382, and 435 agricultural labourers. As per the locals, nearly 50 percent of the combined land of both the villages is under *Garma Dhan* irrigation undertaken by about 100 farmers, while nearly 30 percent is under *Makhana* cultivation carried out by 75

farmers. And still, 20 percent of the land lies unused.

The older generation has a different story to tell. They say that this problem of waterlogging started in 1972. Though farming continued here nevertheless, but after 1982 it seemed that agriculture in this area would no longer be feasible. A persistently rising river level, increasing waterlogged areas, loss of livelihoods and the worry of an uncertain future, of how to continue to feed their families; all of this became a constant source of anxiety for the people here. The community would sit to discuss these issues at length, but no solution seemed in sight.

Then in 1990, a farmer, *Surya Narayan Mehta* brought in some *Garma Dhan* seeds from neighbouring villages in Supaul district. Along with a 4-5 other farmers, he sowed this *Garma Dhan*, and that year they reaped about 20 quintal of crop from one acre. Slowly this trend caught on, and many farmers from both the villages began *Garma Dhan* farming. For the small and marginal farmers, this turned to be more lucrative than the traditional farming that they followed, and this agricultural practice of *garma dhan* farming increased slowly, but surely.

In the upper region of this waterlogged area, this practice continued. But closer to the eastern embankment where in 1998 the Kosi river changed course and moved nearer, this practice of *Garma Dhan* farming was affected a little. But when the construction of a channel in 2010-11 failed to have the desired effect of reducing waterlogging, the popularity of *Garma Dhan* farming did not dim, and farmers carried on their cultivation uninterrupted.

This region of Kosi basin seems appropriate for small and marginal farmers to practise *Garma Dhan* farming. Here, in the first 3 months from July to December/ January, the threat from floods is the maximum. After this period, danger from floods diminishes, water level in the river reduces and the flood waters drain away easily. Thus, January becomes a good month to begin planting this rice that flourishes in the heat. The soft, floodwater enriched soil then is conducive for planting the nursery and getting ready to plant the saplings. The seedlings are soaked in water for 2-3 days till they germinate, then these are raised in a readied field. The nursery is ready in about 20-25 days, after which the saplings are transplanted. Farmers say that

In 1990, I along with 4-5 farmers brought *Garma Dhan* seeds from *Andauli* and other villages in *Kishanpur* block of *Supaul* district itself and started *Garma Dhan* farming. We harvested nearly 20 quintals crop from 1-acre land, and looking at us, slowly, most farmers from both the villages started following *Garma Dhan* cultivation.

Surya Narayan Mehta,
Farmer,
Kalyanpur

the irrigation of the water filled land before paddy can be sown is not a requirement here. This is because the fields are bordered by 4-5 feet deep ditches, where the seepage water flows the year through. This flowing water automatically ensures that the irrigation of the paddy field happens conveniently.

The crop is thus ready in four months and harvested before the monsoon season. The farmers also say that there is no labour cost for weeding, as they are able to manage this work themselves only. Once the seedlings have been transplanted, the only care to be taken is for timely irrigation in the fields. Compared to the seasonal crop of conventional rice, *Garma Dhan* can be readied with a much lesser amount of money, saving the farmer input costs. Being a flood prone area, no crops can be irrigated on the water filled lands in the months of June and July. Whatever is to be harvested has to be done prior to the floods and the rains. From this viewpoint *Garma Dhan* seems appropriate, the crop is collected well before the

Garma dhan, is a rice variety suitable for waterlogged areas, as the soft, wet land is conducive for the paddy seedlings to flourish. There is also no need to irrigate the field before transplantation as the fields are bordered by ditches, where the seepage water flows throughout the year which ensures that the irrigation of the paddy field occurs conveniently. The crop is ready in four months and harvested before the monsoon season. Compared to the seasonal crop of conventional rice, *Garma Dhan* can be readied with a much lesser amount of money, saving the farmer input costs.

rains beat down or the flood waters begin to rise up. Initially the inputs required for this farming were limited, as the requirement for insecticides, manure and labour was much lesser; but this has been increasing consistently every year. As of today, nearly Rs 12,000 per acre is needed for *Garma Dhan* cultivation, while the profit reaches anywhere between Rs 15000-20,000. And so the farmers in this waterlogged area, may bear the rains, floods and heat stoically, but follow *Garma Dhan* farming in more than 50 percent of the land, content and happy on their lands.

Makhana cultivation

Surya Narayan Mehta, a sixty year old farmer and social worker from Kalyanpur village

talks of how Bhola Sahni, an experienced farmer of *Sadanandpur* village, district Darbhanga was the first to start *makhana* farming. Four years later farmers from Saharsa district too joined this farming enterprise. Soon, by 1985-86, farmers from both the villages began to follow *makhana* cultivation seriously. The three farmers who took on this challenge were first and foremost Surya Narayan Mehta, secondly Bharat Mukhiya and thirdly Vijay Yadav, all of who played a major role in this new, unconventional crop farming. All of them not only sold their produce in the local market, but also created a business that reached the shores of Kanpur city too.

Farmers further elaborate that *Makhana* cultivation is carried out in nearly 30 percent of the waterlogged area, and of the two villages, today nearly 75 percent of the farmers are associated with this farming. This is carried out even in the lower most region of the waterlogged area.

Every March-April, the seeds are sown and the by July-September the crop is ready to be harvested. The cost per acre is about one lakh rupees, which



brings in a profit of nearly two and a half lakh rupees. The foundation for this crop is both human labour and traditional knowledge. This farming utilises land that is unusable, incapable of providing any useful output. Being labour intensive, it is also a good opportunity for local workers, who can easily earn their livelihoods without feeling the urge to migrate to far off cities for work.

Vijay Yadav from Kalyanpur talks of those farmers who have taken up *Garma Dhan* along with *Makhana* cultivation in the upper and lower regions of the waterlogged areas, and raked in the profits. Keeping in mind the high labour requirement in *Makhana* cultivation, he says that if this type of farming is aided by better processing methods and greater business prospects, it can turn into a boon for the unemployed youth in this region. Vijay adds that if local fish rearing too is added to these two initiatives, employment will become even more advantageous here. If both government and non-government agencies make an effort to promote fish rearing, then not only will the water be utilised judiciously, but this collaborative effort will make way for a new dawn of better, prosperous employment.

Silkworm rearing

About 500 meter from the eastern Kosi embankment lies the village *Sadanandpur*. Before it came under Supaul district, it lay within East Saharsa district. Under the then Santosh Mathew 1990-91 plan, 6 blocks of 47 acres in Saraigarh *Bhaptiyahi*, 24 acres of Triveniganj, 17 of Chhatapur, 84 in Pipra, 33 in Basantpur and 87 acres in



Raghopur, that included 160 farmers, were chosen for an ambitious silkworm rearing programme started there. Every farmer planted *shahtoot* (Mulberry) trees in half an acre of their land. Along with profits for the farmer, the idea was to start a small industry for silk production, whose responsibility was given to the *Khadi Gram Udyog Society*. For many years this project ran well, and the farmers reaped the profits even as the thread production, cloth weaving, marketing etc were dutifully carried out by the society. However, as time passed, this initiative lost steam due to various reasons.

But one brave farmer continued with silkworm rearing on his half acre land. This was 70 years old Gyandev Mehta from *Sadanandpur* village. He put in his own money and continued with the *shahtoot* plantations. He believes that the soil in the Kosi basin, especially that from the land that lies outside the embankment area and is free from waterlogging, is conducive to this type of farming. Every year he puts in 15-20,000 rupees and gets an income of one lakh rupees, from this half acre

farmland. He strongly advocates the re-emergence of silkworm farming in this area, and believes that with enough government stimulus and interest, this could be the harbinger for improved livelihoods for the farmers here.

Challenges

- ◆ The fate of the ambitious silk worm rearing programme still hangs in balance. For *Garma Dhan* cultivation, in 2010 the government had distributed seeds, but these did not to be prove of much use to the farmers. Attack from pests, excess use of insecticides and manure, quick spoiling of the manure needed for hybrid seeds; all this prompted farmers to forego the government seeds and opt for traditional, local seeds that farmers from nearby areas shared with them.
- ◆ *Garma Dhan* farming generally begins in the cold month of January. June-July are the months for harvesting, and that is the precise time when the river rises, as does the level of water in the waterlogged areas, along with occasional seasonal storms, rains or even hailstorms; and

all of these can easily ruin a standing crop in the fields.

- ◆ The input costs for *Garma Dhan* farming in terms of manure, insecticides or irrigation is increasing day by day. Many farmers find it tiresome to irrigate their fields multiple times too.
- ◆ Migration of labourers from Kosi basin also affects *Garma Dhan* cultivation. Between the summer months and the monsoon season, harvesting time is limited and very crucial for the farmers. Unavailability of labour when required, affects their financial and emotional state. And for the women farmers, this problem becomes even more acute and troublesome.
- ◆ There is no impetus from the government for farmers who follow *Makhana* cultivation. No new technological improvements have been made in this field. There are research centres in Darbhanga, but nothing substantial is available regarding new type of seeds, techniques or processing methods.

Opportunities

The whole Kosi basin waterlogged areas can benefit greatly from *Garma*, *Makhana* and fish cultivation. Already farmers are increasingly shifting

to this type of livelihood practices here. Besides the waterlogged area that lies outside the embankments, similar type of land around roads, railway lines or canals now boast of *Garma* and *Makhana* cultivation. Fish rearing along with *Makhana* cultivation are an answer to traditional waterbodies conservation and the '*Jal Jeevan Hariyali Abhiyan*' initiated by the government. So the government needs to take these development plans for areas that are waterlogged ahead, in order to develop them into schemes that can be executed further. They must include:

- ◆ Involvement of farmers and water managers from the waterlogged areas in any collaborative scheme decided and finalised upon.
- ◆ Steps to ensure *Makhana* farming is turned into an employment and business scheme so that local youth find employment opportunities here itself. For this, *Makhana* Research Centre, Darbhanga and *Makhana* processing unit, Jhanjharpur, Madhubani, must be given the responsibility to take these schemes ahead.
- ◆ Use of banana and *purni* leaves during festivals in these regions is now on the wane. Stress must be made to take

up farming of both banana and *purni* plants again.

- ◆ Utilisation of the waterlogged areas through fish rearing, needs to be taken up on a large scale as a business proposition.
- ◆ Land above the waterlogged villages needs to be encouraged once again as silkworm rearing areas, while the waterlogged area can be utilised for *Singhara* cultivation.
- ◆ *Pater* cultivation in waterlogged areas can be used for manufacturing *chattais* (floor mats) and other useful materials and this too needs to be encouraged.
- ◆ For all of these livelihood opportunities to open up, it is imperative that a synchronised effort is made to ensure further study and understanding in research, technical knowhow, financial aid, latest equipment and ready markets for these new adaptive farming practices.



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