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## [Whither Koshi River?](#)

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**Dipak Gyawali, former Minister of Water Resources, heads Nepal Water Conservation Foundation. He has been working on water resources for the past two decades. He has written several books on water. He claims that Nepal is not the second richest country in hydropower but has adequate energy to meet its demand. DipakG spoke with Puran P Bista and Ghanashyam Ojha of The Kathmandu Post.**

**Excerpts**

**Q: Why did the Koshi breach its embankment? Who was responsible for the repair work—India or Nepal?**

**DipakG:** It is important to step back a bit to realize that this catastrophe happened because of the unholy confluence of three things: wrong technological choice for this kind of a hydro-ecological regime, wrong institutional arrangements resulting from the Koshi Treaty that are not right for managing this kind of a trans-boundary river system, and wrong conduct in public service over the last half-century, which includes aspects of corruption as well as what people in Delhi like to deride as “Bihari politics”, but has been an intrinsic part of Independent India. After all, when the British left India, Bihar was one of the most advanced states of India, Patna University one of the top universities (which helped found Tribhuwan University), and when my grandmother was ill in Taulihawa, my father and grandfather took her, not to Lucknow nearby or Delhi but to Patna for treatment because the hospital there was the best. Today can we say the same for Independent India’s Bihar? I argue that this decline in Bihar’s prosperity absolutely

matches the rise in “Bihari politics” brought about in no small measure by the Koshi project.

But let us start with the technological aspect, when the lateral, left-bank embankment (not the barrage across the river) collapsed on 18th August: it was not a natural disaster, but a man-made tragedy. The river flow at the time was lower than the minimum average flow for the month of August, and hence not even close to a normal flood, which had not even begun during this monsoon. In the Koshi, it generally occurs from mid-August to mid-September, and when this natural stress is added to a man-made tragedy, together they have all the potential to become a major calamity of a generation.

Q: Why is this project the wrong technological choice?

DipakG: Koshi is one of the most violent rivers in the world because it is not just a river with water in it but also a massive conveyor belt of sediment from the Himalaya to the Bay of Bengal. This is a natural geological process that is responsible for creating not just Bangladesh but also much of Bihar out of the ancient Tethys Sea. Some one hundred million cubic meters of gravel, sand and mud flow out of Chatara every year. Lest we forget, all the collected water and matter brought by Tamor, Arun and Sun Kosi rivers, all the way from Kanchenjunga in the east, through Makalu and Everest to Langtang in the west have to pass through this one gorge at Chatara. And as the river slows down in the flat Tarai plains, the sediment settles down raising the river bed and forcing the river to overflow its bank before finding a new course.

This process has essentially created the inland delta over which the Koshi has swung from Supaul in the west to Katihar in the east, like a pendulum suspended at Chatara. In the last half century, this process has been arrested by “jacketing” the Koshi within embankments at the western extreme of the delta; but this has only forced the river to deposit all the sediment within this narrow “jacket”, raised the river bed, perching the river some four meters above the surrounding land. It was a recipe ripe for this kind of catastrophe to eventually happen, as it has now.

You have to be extremely careful when you start fooling around with such awesome forces of nature. What happens when you do so without proper understanding can be easily studied on the Tinau, south of Butwal: in 1961, India built the Hattisunde barrage on the Tinau’s inland delta to supply irrigation water to Marchawar in the south, but the river changed course in the following year and the barrage has been standing high and dry since then, a tribute to man’s stupidity, and an equally great tribute to his incapacity to learn from mistakes. You don’t build such hydro-technical structures on an unstable delta fan, and the Koshi today is just Tinau repeated at a more massive scale.

Q: What do we know of the science behind these things?

DipakG: We have been studying the Tinau and its problems since the mid-1990s, which is just the same as the Koshi except at a much smaller scale. For the Koshi, the best example is the comparison of current river flow conditions of the lower Ganga with the

map prepared in 1779 by Colonel Rennel for Governor General Warren Hastings. His map shows us that the Koshi actually joined the Mechi-Mahananda, which joined the Teesta. While the Koshi has swung west, the Teesta itself has swung east to meet the Brahmaputra, while the Brahmaputra has swung from meeting the Megna to meeting the Ganga. This shows how extremely volatile the dynamically shifting pattern of this region's hydro-ecological is.

This disaster was waiting to happen because the intervention into the natural regime through the Koshi project was bad science that ignored the problem of sediment in the river. As regards science, we should also remember that deforestation has really no significant linkage with Koshi sedimentation: we have more forest cover in the Koshi catchment today, thanks also to community forestry, than we ever did in our past history; and the Myth of Himalayan Degradation (that floods in Bangladesh are due to poor farmers in Nepal cutting trees) has been scientifically debunked over two decades ago. It is Himalayan geo-tectonics coupled with the monsoon regime that is the cause of Koshi sedimentation and floods, and that cannot be battled against with bad science and even worse policy prescriptions of indiscriminate embankment building following from such bad science.

Q: Can we repair the breach once the monsoon is over?

DipakG: I doubt it, simply because the breach now is no longer a rupture in the side embankment that can be plugged once the water level goes down and the Koshi starts flowing along its original main channel. What we are seeing is the main stem of the river itself flowing through it, capturing centuries' old channel and changing its course. To change it back is like damming the Koshi anew with a new barrage, in addition to making the river do a "high jump" of at least four meters to flow along its recently abandoned bed. Believe me, it won't be too happy doing that now or in the coming years, and will find some way to continuously breach the embankment in other weak spots, and no engineer can guarantee that this won't happen, although they will have lots of fun playing with all kinds of expensive toys "to tame the Koshi".

The problem now is no longer just the breach at Kusaha in Nepal: it is totally uncertain where the new Koshi channel will be in the middle and lower delta in Bihar. Currently, satellite pictures show that it might be moving along the Supaul channel; but I think this might just be a massive ponding that is occurring with Koshi filling every depression, canal, old oxbow lake or the space between the indiscriminately built embankments. Since the land naturally slopes eastwards, depending upon whether the coming September floods are a four lakh cusecs flood or a nine lakh one (as happened in 1968) the new Koshi could be as far east as Katihar. Even if it does not go that far this year, it is inevitable it will do so in the years to come. This river morphology dynamics has to be looked at before any new embankments or repairs of old ones can be considered.

Q: What might be correct technology then?

DipakG: First, let us put to rest another wrong technology, a high dam on the Koshi. It is wrong because it would take two or more decades to construct, thus failing to address problems of current and immediate future concerns, is extremely expensive, does not address the primary problem of sedimentation (the reservoir will fill up too soon with Himalayan muck), has no convincing answer regarding the cost of attending to high seismicity in the region as well as diversion of peak instantaneous flood during construction (it is a major engineering challenge with no easy solution), and will create more social problems when indigenous population in Nepal have to be evicted from their ancestral homes. A Koshi high dam would be tantamount to Nepal importing downstream seasonal floods as permanent features of its landscape for questionable benefits to it. I think neither India nor Nepal is in a position to afford the technical, economic and social costs associated with it.

The immediate requirements of Nepal and Bihar (and by immediate I mean from now till ten or so years) will have to be met by new and alternative technologies suited to an unstable but very fertile flood plain. Such adaptive technologies with strong social components have been traditionally used by people in the form of houses on stilts and building villages with raised plinth levels that keep life and property safe but allow the flood to easily pass by leaving fertile silt behind. It will also call into serious question the current design practices in the transportation, housing, agriculture and other sectors, forcing the adopting of new approaches that look not so much to the watershed but to the 'problemshed' for answers. There is nothing called a permanent solution (how 'permanent' is a permanent concrete dam, after all?); but building houses on stilts is a cheaper, more 'doable' and thus a better solution.

Q: Why do you say that the current management setup of the Koshi barrage and embankments was a wrong institutional arrangement?

DipakG: The answer to that question can come from looking at the highly undiplomatic and breathtakingly ill-informed statement that came out from the Indian embassy in the immediate aftermath of the breach by blaming Nepal for it. When forcing the Koshi Treaty on Nepal in the 1950s, India took upon itself all responsibility for design, construction, operation and maintenance of the Koshi project, leaving Nepal absolutely no room to do anything except allow India to quarry all the boulders they like (which incidentally are rarely used in the Koshi but find themselves black marketed to all the aggregate crushers from Muzzafferpur to Siliguri!!)

The Koshi Treaty has been criticized very often for many reasons, but the reason some of us from the socio-environmental solidarity to criticize it is because of the neo-colonial mode that is built into its institutional make-up. Instead of a proper bi-national management arrangement, Nepal can only be a by-stander even for matters within its own territory: it can't order the opening of gates during floods or the supply of irrigation

waters to its fields during the dry season. Everything is in the hands of the Delhi hydrocracy, which has conveniently (and to my mind, illegitimately) washed its hands off it by hiving it off to the Bihar hydrocracy. There is institutional irresponsibility built into the treaty at every level, which was seen at the time of its signing as a “construction” treaty rather than a management one, hence you can never get sustainable and scientific management out of it. In a tragic and perverse way, the current catastrophe has washed away the very foundations of that treaty and calls for revisiting the management of the Koshi in a more sane and equitable manner.

Q: What exactly did you mean by “bad conduct”, then?

DipakG: Even if you had a wrong institutional arrangement, right conduct could have still got things done more than semi-right. What happened here was that the entire Koshi project has become a synonym for the corruption that goes by the name of Bihari politics, which “New Nepal” seems to be importing with glee. Consider the following quote from an Indian scholar studying the problem.

Such is the racket of breaches that out of the 2.5 to 3 billion rupees spent annually by the Bihar government on construction and repair works, as much as 60 percent used to be pocketed by the politician-contractors-engineers nexus. There is a perfect system of percentages in which there is a share for everyone who matters, right from the minister to the junior engineer. The actual expenditure never exceeds 30 percent of the budgeted cost and after doling out the fixed percentages, the contractors are able to pocket as much as 25 percent of the sanctioned amount. A part of this they use to finance the political activities of their pet politicians and to get further projects sanctioned. Thus the cycle goes on. [The result is that...] the contractor’s bills are paid without verifying them. The same lot for boulders and craters are shown as freshly purchased year after year and the government exchequer is duped of tens of millions. Many of the desiltation and repair and maintenance works shown to have been completed are never done at all and yet payments are made....So much is the income of the engineers from the percentages that the engineers do not bother to collect their salaries.

(Fighting the Irrigation Mafia in Bihar, by Indu Bharati in the Economic and Political Weekly from Bombay in 1991, quoted by Dipak Gyawali in his book *Water in Nepal/Rivers, Technology and Society*, Zed Books, London and Himal Books, Kathmandu, 2001.)

This is what I mean by “wrong conduct”. My understanding, based on information filtering out of Saptari and Sunsari and on local FM channels, is that local cadres of ruling political parties got wise to the corruption practiced from across the border and began to demand a share, which was difficult for the Bihari contractors to agree to because of the high rake-in demanded by their traditional political and civil servant bosses in Patna and higher up. There were, it seems, tough negotiations going on before the start of the monsoon season, but no agreement could be reached. No formal approach was made by the Koshi officials to the most India-friendly government in power in Nepal because the issue to be resolved was not doing the work but sharing the booty. Which is

why the complaint that the contractors had come on August 8 to strengthen the embankment but were not allowed to, itself begs the question: how come you come to do the repair works (if that is what you wanted to do) in the middle of the monsoon and not in January?

Q: What should be the priority now?

DipakG: There are three things needed to be done on a war footing in order of priority:

First, this is a major humanitarian tragedy of global proportions, and it should be attended to with an open heart, generous pockets and caring hands. If Biharis are coming into Nepal because that is where the only high ground is, they should be welcomed, all relief should be provided to them too, but a record should be kept and they must be handed over to the Indian government soon after the monsoon. It must be recognized that the displaced fifty thousand or so Nepalis are in all probability permanently displaced (over their village, the new Koshi probably runs and will do so for the foreseeable future) and need to be housed in camps before a permanent settlement is found. Perhaps the now emptying Bhutanese refugee camps should be used for the purpose.

Second, a bridge should be constructed over the Koshi at Chatara on a war footing and the traffic along the Mahendra highway restored to connect east Nepal with the rest of the country as soon as possible. The current Kosi barrage bridge will in all probability remain as the Hattisunde barrage on the Tinau, a defunct monument of interest to future archaeologists; but even if restored, we will need a ferry system over the new Koshi channel before we can get to it.

Third, a serious public review and debate must ensue over the Koshi project and the treaty that brought about this catastrophe. The investigations and debate must be conducted jointly by civic movements in Nepal and India so that a sane path forward can be charted. Hydrocracies of both countries can contribute to this exercise, but their judgment and legitimacy are now in question, as is their hitherto unchallenged policy hegemony.

SOURCE: The Kathmandu Post. Sept 01, 2008

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