

## Some common fallacies about floods and flood management\*

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Floods are an endemic problem in India. The National Commission on Floods, more commonly known by its Hindi name 'Rashtriya Barh Aayog', in 1980 estimated that about 40 mha of area is flood-prone. This was later revised to 33.5 mha (ref. 1). On an average, 7.5 mha area is affected by floods in any one year, in some or other part of the country<sup>2</sup>. Large flood events capture the public attention. Inundations in Mumbai in July 2005, Surat in August 2006, and in Bihar in August 2008 due to breach in Kosi embankments are some of the flood events in the recent past that have resulted in considerable discussion in the public space.

Every major flood event is immediately followed by a flood of a different kind – 'scholarly' articles analysing the flood event and the current flood management paradigm. Almost all such articles say more or less the same thing – the flood is described as man-made, the technology based flood management paradigm is declared as all wrong, the technocrats are admonished for thinking that they can conquer the nature and finally, it is asserted that our ancestors had mastered the art of living with floods, which we should also adopt.

Understanding flood management requires study of hydrology, open channel hydraulics, and river morphology. Amongst those who comment on flood management in the popular media – the newspapers, news magazines, environmental glossies, 'people oriented' websites, and TV channels – there is hardly anyone who has studied any of these subjects. Consequently, the analysis in the popular media present only a set of fallacies and myths, mostly arising out of authors' ignorance. This short paper is an attempt to clear a few such myths and fallacies.

*Fallacy #1:* Despite spending billions of rupees on flood management, the flood-affected area has increased.

No, it has not. Figure 1 shows the area affected by flood annually from 1953 to

2004. There is no trend of any increase (data source: [wrmin.nic.in](http://wrmin.nic.in)).

*Fallacy #2:* Contrary to what the technocrats say, flood embankments are not a solution to the flood problem.

Technocrats never say that flood embankments are a solution to the flood problem. In fact, the more experienced amongst the technocrats are aware that there never are *solutions* (to any problem). There are only options. Each option has its plus and minus aspects.

Deficiencies of embankments are not a new discovery by the Civil Society. Any textbook on flood management will tell that embankments cause an increase in flood heights upstream, greater peaks downstream, create drainage difficulties in the country-side and induce a sense of security that reduces the level of alertness amongst the populace. Yet, embankments remain an important tool in the flood management toolkit, because embankments are the cheapest and fastest executable intervention for providing protection to an area against a flood of specified intensity.

Of course, the embankments have to be maintained properly, else these can breach. But that is true for any human action, from something as simple as crossing a busy street to something as complex as flying an aircraft. Incompetence or negligence will result in damages, and flood embankments are no exception.

*Fallacy #3:* Reservoirs have never controlled any floods.

Reservoirs are the most reliable flood control measure. A reservoir stores some of the water of an incoming flood and releases it downstream at a reduced rate over a longer period of time, thus moderating the flood. On most occasions, the outflow is reduced to a level so that there is no inundation in downstream areas, thus managing the flood completely. Occasionally, a very high flood may impinge upon a reservoir that is almost full. Then, the extent of moderation may be less, causing some inundation in downstream areas. But, even then the inundation is invariably less than what would have been if there was no reservoir.

Figure 2 shows the peak inflow and peak outflow record for 37 floods between 1958 and 2000, for DVC dams

at Maithon and Panchet<sup>3</sup>. In each year, the flood has been moderated and in many years the moderation is substantial. For example, of six floods that exceeded 15,000 cumecs, four were moderated to less than 5000 cumecs, and two to less than 8000 cumecs.

In his exhaustive critique of the Bhakra dam, noted anti-dam activist Shripad Dharmadhikary writes, 'Even after the Sutluj flows were augmented by the transfer of Beas water into the Bhakra reservoir, the reservoir has not filled up in most of the years'<sup>4</sup>. This was probably intended as a critical comment on filling of the Bhakra reservoir. But its implication, which probably escaped Dharmadhikary, is – Bhakra is very successful in flood control. In the years, the dam did not even fill; it is obvious that all the floods were absorbed 100%. And this, despite transfer of a substantial quantity of water from Beas to Sutlej through the Beas–Sutlej link.

This 'Reservoirs have never controlled any floods' fallacy has its roots in the ideological opposition to reservoirs. Those who peddle this, also downplay hydro-power and reservoir-based irrigation. It is easy to build an apparent case against flood moderation capability of reservoir by ignoring the floods that were successfully moderated. 'No flood' has no news value, and therefore moderation of many successive floods by a reservoir goes unnoticed. 'Flood' has a huge news value, and therefore on a rare occasion when the flood is not moderated adequately, it is hammered in to 'prove' that reservoirs cannot control floods.

*Fallacy #4:* Technocrats are wrong in thinking that they can conquer the nature, e.g. 'For long, we have believed that we can *'conquer'* nature, control the flood and emasculate our rivers'<sup>5</sup>.

Such things are invariably said by those who themselves have no background in technology, because technocrats never say that they are out to conquer the nature. Yet this 'technocrats think they can conquer the nature' charge persists. This is an instance of what is known as 'straw-man technique'.

A straw-man is an incorrect statement attributed to someone, who actually has never said that. It is easy to attack and

\*The views expressed in this paper are the author's personal views, and not the views of the organization he works for.

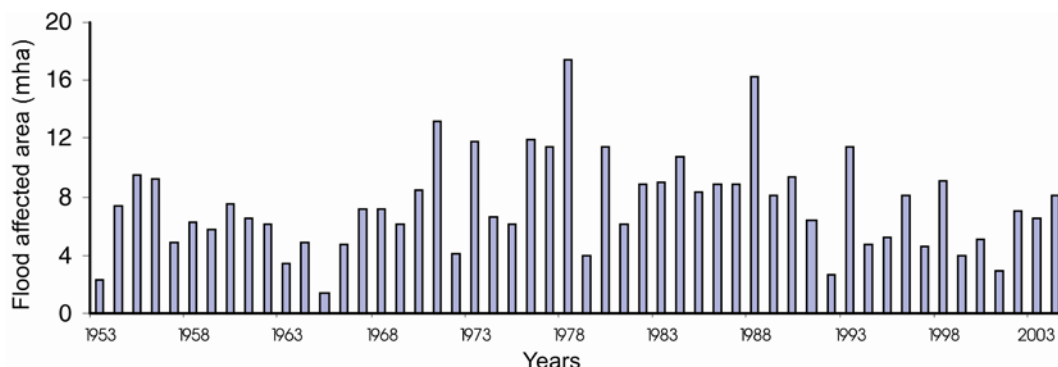


Figure 1. Flood-affected area (1953 to 2004).

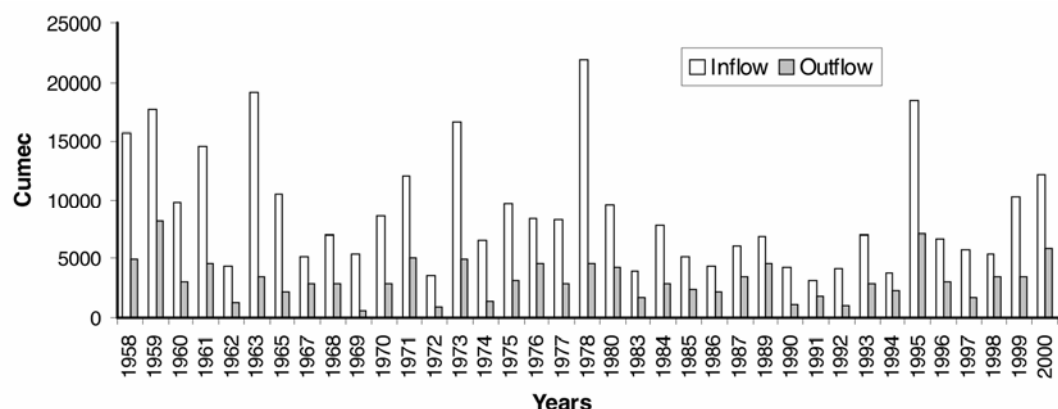


Figure 2. Flood moderation by DVC dams.

destroy such a statement, because it is incorrect to start with. Then one can go around pretending to have won a point.

*Fallacy #5:* Afforestation is the way to control floods.

Forests do reduce the intensity of floods, but their impact is significant only for small floods. For large devastating floods, the impact of forest is so small, as to be imperceptible.

Forests reduce the quantity of run-off by interception of some rainfall by the foliage of the trees, and by changing the soil parameters, thus aiding more percolation. But the quantity of water thus taken away from run-off, is a fixed quantity, e.g. suppose the foliage of a certain forest can intercept 10 mm of rainfall, then it is 10 mm irrespective of whether the rainfall is 25 mm or 250 mm. If the total rainfall in an event is only 25 mm, then the 10 mm interception means 40% of it taken away, and that is significant. But if the total rainfall is 250 mm, then the 10 mm takes away only 4% of the rainfall, and that is not significant. This also holds true for percolation, reduction of flood peak, etc.

The perception that afforestation is the right strategy for flood management persists because it is seen in purely *qualitative* terms. It collapses the moment it is examined in *quantitative* terms. Those who say that forests will reduce flood intensity, never say how many hectares of what kind of forest, in what kind of catchment, will reduce by what fraction a flood of what size.

*Fallacy #6:* Floods bring silt and improve land fertility.

If that be so, then the farmers should be happy when flood water enters their fields instead of trying to control the flood waters we should actually try to spread these on farm lands, and the inundation in Bihar after the breach of Kosi embankment in 2008 should leave the inundated areas rich with freshly deposited fertile soil. Is any of these relevant? Obviously, there is something seriously wrong here.

First, most rivers bring more sand than silt. And sand is terrible for farmlands. Second, even in rivers that carry sand-free silt, the spread of silt through flood waters is restricted to a very narrow

stretch along the river. This may have been significant when the human habitation, and hence the cultivation, was mostly along the river only. Now, a major portion of cultivation takes place far away from the river, where the flood-brought-silt does not reach. Average flood-affected area in a year is 7.46 mha, which is just 5.3% of the net sown area (141.23 mha)<sup>6</sup>. There are less destructive ways to improve land fertility.

*Fallacy #7:* Our forefathers had mastered the art of living with floods.

This is as brilliant as saying – our forefathers had mastered the art of living with smallpox. And what exactly did they do to ‘live with the floods’? Actually, nothing. Just as they could do nothing about the smallpox, likewise they could do nothing about the floods. Smallpox, floods, famines, earthquakes, epidemics, etc., all these were considered a consequence of the wrath of God. To the extent possible, people built their habitations on higher ground. This they could do because the population was a fraction of what it is now – a factor the Civil Society always ignores – and the

pressure on land resources was nowhere near what it is today.

We Indians seem to be particularly susceptible to this 'romancing with the past'. Everything, be it water management, or agriculture, Ayurveda, mathematics, literature, astrology, etc., we like to believe that in India all learning had reached its peak in some distant past, and the best thing for us to do is, to continue to do what our ancestor's did. And this is given a lofty name 'wisdom of the centuries'.

A closer scrutiny however reveals that the ancient India was unable to produce enough food even when the population was a fraction of what it is today. Widespread famines occurred at frequent intervals and killed millions. Some of the famines (AD 941, AD 1022) were so bad that cannibalism was reported from the affected population! Until as recently as 1960s, India had to depend on food imports. Epidemics of cholera and plague were common and killed millions of human beings. Average life expectancy was less than 35 years.

The point of all this is, India of 100, 200 or 500 years ago was not a paradise with plenty of food, pure clean water, clean environment, and no diseases, as is sought to be portrayed by the advocates of 'wisdom of the centuries'.

**Fallacy #8:** Civil Society has better ideas for flood management, but the technocrats won't listen to them.

This is a continuation of fallacy #7. Be it flood management, or water management, water supply, river pollution, aquifer management, agriculture, irrigation, or whatever, Civil Society claims to be more knowledgeable than those who are trained to deal with these problems, and claims to have a solution that is not only inexpensive, but also decentralized, democratic, traditional, people-oriented, appropriate, eco-friendly and sustainable (whatever all these phrases mean). How true is this claim?

Dinesh Mishra of *Barh Mukti Abhiyan* (Campaign for Freedom from Floods), is a civil engineer and is perhaps the only amongst the Civil Society flood management commentators to have studied hydrology and hydraulics. He is credited with having 'extensively researched Kosi and other river systems in Bihar', and has written several books on this subject. Mishra therefore has the credentials to speak about flood management, and if

anyone amongst the Civil Society has any better idea, he should be the one to know it.

Soon after the inundation in Bihar 2008, an interview of his was reported in the *Times of India* on 29 September 2008 (ref. 7). At the end the interviewer asks him, 'Has the existing flood-control strategy failed? What are the alternatives available?'. Mishra replies, 'We must look at the tradition of these flood-prone villages where people had learnt to live with moderate levels of floods ... the experts should speak a lot to people, particularly elders, and learn about their coping mechanisms.'

So, even the person credited with having 'extensively researched Kosi and other river systems in Bihar', does not really know what these 'coping mechanisms' were, and can only suggest that 'we should talk a lot to the people, particularly the elders' (it is a question why he himself did not do that when he extensively researched Kosi and other rivers in Bihar). Also, it is to be noted that he has said that this 'living with floods' was only for 'moderate' levels of floods.

**Fallacy #9:** Civil Society provides an independent analysis/opinion.

This is the mother of all fallacies. Independent of whom? NGOs also need money, and have to toe the ideological line of their financiers. And very rarely it is known who exactly is funding them. To borrow a phrase from the Civil Society, 'no information is available in public domain' regarding the magnitude and source of funding received by the NGOs active in water and environment sector. Donations from foreign countries to Indian NGOs were estimated at Rs 122.9 million in 2006-07 (ref. 8). Recipients of Rs 122.9 billion of foreign money can hardly be considered independent.

## Conclusion

Commentary on the water and environmental issues – the two are closely connected – appearing in the popular media is mostly by Civil Society actors, and not by the water management professionals. There are several reasons why this is so. The two most important are: (a) After an event, popular media wants comments now, not tomorrow. But professionals react only after analysing the data, and that takes time. Civil Society is willing to

comment quickly, without any data and analysis. (b) Flood management professionals are invariably public servants and conduct rules forbid them from expressing themselves freely in the popular media.

Thus, the commentary is invariably written by those who have not studied hydrology, open channel hydraulics, and river morphology; the three subjects crucial for an understanding of flood management. The popular media neither subjects such articles to peer review before publication, nor allows a discussion post-publication. Any comments are restricted to a few column-inches in the 'Letters to Editor' column, and the space is insufficient to make any meaningful statement. The periodicals devoted for environmental causes are actually captive publications of NGOs who espouse a certain ideology, and do not provide space for a contrary view. What is often thought of as a 'public debate' is actually a one-sided monologue. Consequently, and a rare exception apart, what one reads in the popular media about flood management, is just a mix of fallacies and myths, arising out of authors' ignorance and pre-conceived notions, or deliberately promoted to push some ideology.

1. MoWR; <http://wrmin.nic.in/index3.asp?subsublinkid=359&langid=1&ssid=355>
2. 52 years data, 1953 to 2004, MoWR; <http://wrmin.nic.in/writereaddata/mainlink-File/File436.pdf>
3. Sinha, S. K. and Srivastava, R., Role of large dams in flood moderation. Paper presented in the First Congress NIDM, November 2006.
4. Dharmadhikary Shripad, Unraveling Bhakra', 2005, p. xix.
5. Sunita Narain, Editorial, *Down to Earth*, 7 November 2008.
6. <http://www.faarap-apcas.org/india.html>
7. [http://timesofindia.indiatimes.com/India/Limitations\\_of\\_embankments\\_dams\\_are\\_being\\_realised/articleshow/3537790.cms](http://timesofindia.indiatimes.com/India/Limitations_of_embankments_dams_are_being_realised/articleshow/3537790.cms)
8. [http://economictimes.indiatimes.com/LATEST\\_NEWS/Foreign\\_funds\\_to\\_Indian\\_NG-Os\\_soar\\_Pak\\_among\\_donors/articleshow/3883804.cms](http://economictimes.indiatimes.com/LATEST_NEWS/Foreign_funds_to_Indian_NG-Os_soar_Pak_among_donors/articleshow/3883804.cms)

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