

Floods in Barmer and other Tertiary terrains in Rajasthan

The August 2006 floods in Barmer area, Thar Desert, western Rajasthan have affected around 8 lakh people (ca. 30% of the population of Barmer district) as well as livestock. Floods in the area have taken a few hundred human lives and a few thousand cattle have also lost their lives.

Heavy rains (601 mm against the normal annual rainfall of 227 mm) in Barmer area flooded the depressions and plains particularly underlain by clays – bentonite and fullers earth (Tertiary) and gypsite (Quaternary). The most affected villages include Malwa, Kavas and Bhadaka (*Rajasthan Patrika* dated 27 August 2006 and 19 September 2006 and *Times of India* dated 27 August 2006). In the absence of any effective drainage and negligible downward percolation of water, the conditions worsened and took the shape of a disaster.

During heavy rains, the areas underlain by clays and gypsite in parts of Barmer, Jaisalmer and Bikaner are invariably targets for waterlogging and floods. One of the authors (V.P.L.) carried out geological

mapping in parts of Jaisalmer basin covering large parts of Jaisalmer and Barmer districts. Geological and geomorphological observations indicate that several depressions and plains are underlain by Jurassic shales, Tertiary clays and Quaternary gypsite which turn into water bodies after rains. Ranns (Mitha–Khara–Kanod Ranns) resemble lakes after receiving rainwater. A few buildings with foundation in Tertiary bentonite of Sam area, Jaisalmer district had earlier developed cracks, which may be attributed to the swelling nature of bentonite clay. Such a problem is also reported from Ramgarh area near Indira Gandhi canal. Waterlogging is a major problem along the canal because of the presence of clays and gypsite in the area. Earlier, Bikaner Tertiary terrains experienced floods and waterlogging. It is now clear that during rains, Tertiary terrains in western Rajasthan invariably become sites of waterlogging and floods.

Keeping in view the frequency of the problem of waterlogging and floods in the above areas, proper water-management

approach is required to reduce the loss of life, property, agricultural products and materials in future. Proper water management may include development of a network of canals/minor canals for draining out water for its utilization in irrigation and storage purposes, construction of suitably spaced wells and bore-wells for recharging well-identified aquifers, channelizing water to already identified palaeochannels and unused barren depressions, construction of more water tanks and enlarging existing tanks and ponds to increase their water-storage capacity. Lathi Formation (Lower Jurassic), a well-known sandstone aquifer covers large parts of Jaisalmer and Barmer districts, which may be recharged.

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Government fellowships for postdoctoral studies abroad

With more and more funds being allocated in the S&T sector in India, time has come to address some of the serious issues that plague this sector, like shortage of quality manpower in our universities and institutes. Time has come to take some bold decisions that may make the faculty recruitment process easier. One way to do this is to 'invest now to reap the benefit later'. Often our students miss opportunities, after completing their Ph Ds, to work in laboratories of world-renowned professors due to lack of funds. Students then have no option but to join lesser-known laboratories that provide limited scope for either knowledge or career improvements.

Government agencies like DST can step in and help students secure funds. They can provide postdoctoral fellowships for two years to fresh Ph D students from Indian universities. It can be a variant of the present BOYSCAST fellowship, only making it accessible to fresh Ph Ds. Will it be available to all? The answer is no. It is to

be given only to talented and bright students who can be selected through an appropriate and thorough selection procedure. An endorsement from the foreign professor is the first step in the selection process. A set of questionnaires can be sent to the professor to critically evaluate and grade the applicant student after going through the CV of the candidate. This evaluation can be utilized by the national selection committee set up for this purpose. A sum of say US \$2000 per month will cost our Government approximately Rs 22 lakhs for two years per candidate. The total number of fellowships to be given each year, say 20 can be decided by the Government.

The candidate must be provided an assured job in universities/national institutes where they have to serve compulsorily for a specified period of time after returning from abroad. We have to be sincere and respect their opinions and sentiments while offering them various options and places of work. Maybe these offers can

be made to them tentatively, and well in advance, in consultation with the job-offering institutes/universities. Maybe even before they accept these fellowships, they should have an idea about the kind of jobs that they may get after successfully completing their postdoctoral assignments.

DST can host a website with the detailed CVs of the successful candidates and keep updating them by monitoring their performances periodically during the tenure. Interested organizations can browse this website to have a look at the brain-pool available. They may even sponsor the candidates of their choice, partially or fully, in this programme. The final offer or scale of pay after completion of their postdoctoral studies will be decided on the basis of their performance during the period, so that they fully utilize this training period and take it seriously. If they decide not to come back, or discontinue after few months, or join other private

organizations in India, they have to return the fellowship amount plus a soft interest on it within a reasonable period. Appropriate mechanism will have to be formulated to recover the money from the defaulters. Maybe the Government could allow them to go abroad only with temporary student passport for this purpose.

Every year about 1500–2000 students enroll for Ph D in India through the NET

process. Even if a small percentage of these students seriously think of joining universities/institutes, and decide to take up this fellowship, we get a reasonably good number of personnel trained in some of the best laboratories in the world to meet the growing demands of faculties in our country. Does this idea sound stupid? Will it work? Is it a big gamble? I do not know. Let us not be cynical or fear about

the failure of a scheme even before it is implemented. Let us be optimistic and give this a try for few years. It is not that big a risk. We have nothing to lose if it fails, but lot to gain if it works.

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Is the dissection of animals in zoology redundant?

Dissection of both animals and plants was practised by biologists to observe internal organs and determine their structure and function, which were till then unknown. Animals are killed for dissection, but only parts of plants are dissected.

The dissection of animals has been practised in zoology courses in colleges and universities. Earlier, dissection provided students with an opportunity to observe, examine and document the characteristics of an organism under study. Unfortunately, this method has been altered to assess the skill of students in dissection and in the display of internal organs. Rather than real learning taking place, animals are needlessly slaughtered. Even though the dissection of a single animal is enough to educate a group of students, individual students are given animals to dissect.

In zoology-practical classes, dissection of various animals such as earthworms, cockroaches, leeches, starfish, crayfish, frogs, sharks, fishes, reptiles, pigeons, mice, rats, etc. is common. The dissection of nervous, circulatory, digestive and reproductive systems and other vital organs such as the heart, brain, kidney and liver in various animals is part of the zoology practical curriculum. In addition, wild frogs (Figure 1) are dissected in animal physiology to estimate the quantity of proteins, glycogen and cholesterol present in various tissues. As dissection in routine practical classes and examinations is compulsory, animals such as frogs and fish of a single species are collected in thousands and

supplied to colleges and universities every year. Undoubtedly this practice has endangered the existence of certain species of animals.

Students who dissect animals in zoology courses never deal with these animals later unlike veterinary or medical students. Dissection in veterinary and medical courses is absolutely necessary because these students, as qualified professionals treat various ailments and conduct operations to save lives. Moreover, in the veterinary and medical sciences, dissection is performed on dead animals and human beings.



Figure 1. Dissected frog.

In my opinion, dissection in zoology is beneficial to neither students nor animals. Moreover, in this age of advanced technology, photographs of dissected animals and recorded video clippings of dissections are more useful in understanding the internal organs of animals than dissection used to assess the skill of the students. Today, virtual dissections and interactive tutorials utilizing 3D constructed images and models of many organisms are available on the web. All these resources can be utilized as alternatives or supplements for teaching students. Some of these sources demonstrate how to perform the dissection, while others provide the names of the internal organs. Instead of killing animals for dissection, the zoology curriculum should utilize website sources to help students to understand the anatomical structures of various organisms.

The killing or torturing of animals for dissection is not the only issue. Indiscriminate large-scale collections of the same kind of species will create an imbalance in nature and drive a particular species to extinction. It is high time that alternatives to animal dissection in colleges and universities be adopted to save the lives of precious organisms.

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