

## The need for studies on amphibians in India

Worldwide decline and losses of amphibians in human disturbed and in relatively undisturbed habitats have become an issue of great concern. Most of the research on amphibian decline, worldwide, has focused either on monitoring or inventorying, to identify the magnitude and geographic extent of decline. Although in India, we have not had studies which have quantified it, a few studies have shown that there are significant changes in amphibian communities. According to a survey conducted by Wildlife Institute of India (WII) in Ladakh, during 1976–78, three species of amphibians *Bufo viridis*, *Bufo latastii* and *Scutiger nyingchiensis* were found. A similar study repeated in August 2000 recorded local extinction of two endemic species (*B. latastii* and *S. nyingchiensis*)<sup>1</sup>. As a preliminary step we need to determine distribution, quantify threats and assess status. Studies should also focus on placing human perturbations (habitat modification, illegal trade) affecting one or more life history stages in the context of overall population dynamics of the species<sup>2</sup>.

One major threat faced by amphibians is habitat loss and modification. A study done on the effects of tea plantations on amphibians in Valparai, encountered only 13 species of amphibians, whereas 30 to 40 species were encountered in a relatively undisturbed forest, though a difference in sampling efforts should be taken into consideration<sup>3</sup>. The Western Ghats has about 18% of all the tea grown in

India. Thirty different pesticides are used to combat several species of arthropods, fungi and plants that infest tea. Recent studies have shown that insecticides such as DDT, dieldrin and malathion affect the immune systems of frogs and herbicides such as atrazine in quantities as minute as 0.1 parts per billion are causing sex reversal. Ironically, the permitted residue of atrazine in India is 1000 times higher than what is safe for an amphibian<sup>4</sup>. Further studies need to be undertaken to substantiate the claim of a suspected change in the amphibian population structure.

Policy issues such as intentional introduction of alien species such as introduced fish also pose a great threat, for example, the mosquito fish (*Gambusia affinis*) is known to destroy amphibian eggs<sup>5</sup>. No studies have been carried out to quantify the possible spread and impact of these alien species on amphibians.

Studies on trade that date back to 1981 show that the frog leg industry in India killed 70 million frogs and the harvest was worth 12 crores<sup>6</sup>. In spite of the ban on trade of frog legs, it has not been particularly effective. *Rana tigrina* and *Rana hexadactyla* are among the main frogs traded in India and their biology, notably breeding biology, needs to be studied.

Habitat loss, trade and introduction of alien species have affected amphibians from the 19th century. However we still need quantitative data linking these factors to the loss of populations and species.

There are also global changes in ultraviolet B (UV-B) radiation levels and the emergence of infectious diseases. Improving our understanding of how factors, which have been causing a decline in amphibian species with these newly emerging factors, would be the key to unravel the complexity of the decline<sup>7</sup>. Given the urgency of the global amphibian crisis and the lack of data, we need to protect unique biotopes and relevant studies which help us carry focused conservation measures have to be carried out.

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## Do you believe in a second green revolution?

Almost four decades have passed since the country bought in 1965, three hundred tonnes of seeds of a Mexican wheat variety which had only limited testing later. A year later, India bought 18,000 tonnes of the same seed from Mexico. Since then almost three decades have passed to claim that we have achieved a lot on food self-sufficiency and in farm research, but the 'green revolution' in fact

was due to borrowed technology. The two main cereals – Mexican wheat and acceptance of Taiwan and Philippine rice varieties – fed us for almost three decades. But serious lacunae can now be observed:

- Poor or no storage facilities spoil large quantity of food grain and due to poor storage or lack of processing facility, a large quantity of vegetables/spices rots

and goes waste. Small farmers have no field implements for land preparation, sowing, harvesting and threshing.

- Big companies are grabbing productive agriculture land for industries and city expansion. Even governments are constructing independent houses under housing schemes for the poor and schemes like SEZ on fertile agricultural land. Expanding farmhouses are engulf-

ing precious agriculture land and rivers taking a large acreage, soil and land on their banks.

- Mining and submersion of land due to dams and even division of land among families created bunds, which go as unproductive field fences and which further reduce cultivated area. Arable land is shrinking. This land is permanently lost.
- Climate change, rise in temperature, deteriorating soil health due to soil-borne pests/indiscriminate use of fertilizers, air pollution (gases, inert particles) due to mining and industries are all responsible for low productivity and poor harvest.
- Use of underground water (tube wells) for growing high water demanding crops, e.g. sugarcane and paddy which reduce crop area of wheat and even other crops that require less water.
- Promoting cultivation of medicinal and aromatic plants by the Government and other agencies reducing area of staple food crops. *Jatropha*, a wasteland shrub (in the name of bio-diesel), is now being cultivated on productive land.
- Poor functioning of co-ordinated research projects which were started with very novel concepts but with lack of proper technical staff, frequent shift of staff on the pretext of administration, no time frame, and repetition of research programmes all thwarted the progress of most

projects. After import of wheat, all our claims of farm research are under a cloud.

- In most of the cases, breeding is replaced by selection. Every time testing of fertilizer for each variety, poor attention/breeding for endemic/pest problem and no in-depth study have created big gaps in basic research.
- Universities are the backbone of basic and applied research but posts are lying vacant due to retirement or ban by the state Governments on recruitment or in the name of 'backlog'. This has created a vacuum in research. The greying faculties are overburdened due to introduction of new courses and teaching load; as a result, the research has taken a 'back seat'.
- Research is further hampered due to delay in project sanction, late release of grant, long chain of sanctioning formalities, bureaucracy at every step, delay in appointment of subordinate staff and no accountability. These are reasons for malfunctioning of the projects.
- The system is suffering losses by not making use of trained young workers; instead private companies are recruiting them in thousands for their profit-making export ventures. On the other hand, poor farmers suffer due to lack of proper technical guidance leading to, as a result, incidences like mass suicides in Vidarbha.

- Most fertilizer recommendations for crops are based on old soil surveys without soil test values, as soil-testing laboratories have no technical staff and chemicals.
- Poor farmers are not getting the advantage of crop insurance. Several problems, which disturb the farmers include minimum support price, bad road/transport facilities, nonavailability of electricity at crucial time, bank loans at high interest rates and meagre help from the Government/officers.
- The country is passing through a very tough time by aging politicians with poor vision, greying laboratories, bureaucracy at every step, technological gap, poor research planning pushing rusted research projects, no attention being paid to real problems, no alternative/insurance to farmers committing suicide. The problems are before us but planners are shirking the solutions. Under these circumstances, do you believe in a second green revolution?

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## Mango – A new record for *Helicoverpa armigera* (Hubner)

Mango (*Mangifera indica* Linn.), belonging to the family Anacardiaceae, is an important tropical fruit crop. Being delicious and succulent, it is known as the king of fruits.

Despite the large area coverage of mango under a number of varieties, the productivity of mango in India is rather low. This might be attributed to ravages inflicted by a variety of insect pests.

Over 400 species of insects have been reported to infest mango crop<sup>1</sup>. Among these, leaf hoppers, stem borers, stone weevil and fruit flies are known to cause economic loss. Recently, *Helicoverpa armigera* (Hubner) was recorded in most severe form, in mango orchards of

Dharwad taluk and adjoining Kittur area, Belgaum District, Karnataka, India.

*H. armigera* is a polyphagous pest, which is known to attack more than 200 host plants all over the world. The pest was noticed in old orchards (12- to 15-year-old plants). Activity of the pest was restricted to only reproductive parts, i.e. inflorescence and small fruits with larvae feeding on inflorescence leading to poor fruit set. Also, small fruits were partially fed by the larvae. The infestation level was to the tune of 30–40% and on an average each inflorescence had 0.75 to 1 larva. Since no annual host crops were found near the orchard, it is felt that infestation was due to migration population

of *H. armigera*. Breeding studies on mango are in progress.

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