



## Conceptual Ignorance - The Underlying Cause of Amphibian Decline

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### Introduction

Amphibians, the first land vertebrates evolved on this planet are surviving for more than 330 million years [1] and have established themselves as a major component of the ecological food web. They provide multiple ecosystem services through controlling insect (including pests, arbovectors etc.) populations, providing prominent secondary production resources as foods, are the biggest sources of natural bioactive components including antimicrobial peptides and many more. Toad and frog legs are consumed as culinary delicacy in a major part of the world. Last but not the least many of them are kept as pet throughout the world. The last report on global abundance of amphibians published from IUCN describes 5743 species out of which 1856 species fall under IUCN threatened categories comprising nearly one-third of them (32%) [2]. Three major causes of declines reported are over-exploitation, habitat loss and enigmatic causes. Let us try to explore the underlying causes of such losses being increased continuously since 1980. But going to that let us concentrate on the statistics available so far.

### Global number games

- 90 percent of the threatened amphibians are facing extinction risk due to habitat loss; therefore, habitat loss is the primary cause of amphibian decline.
- At least 122 described species have become extinct since 1980, however, the actual figure may be much more.
- Nearly one-fourth of global amphibians (23%) falls under data deficient category and probably a large percentage of them are yet to be described.

- Reportedly 43% of them are facing/have faced population decline [2].
- A 2011 report shows that USA and European Union cumulatively imported 6880 metric tons of frog legs which is equivalent to 1.456 to 4.4 billion frogs being supplied to the dishes from Asian countries [3].

### Indian Scenario

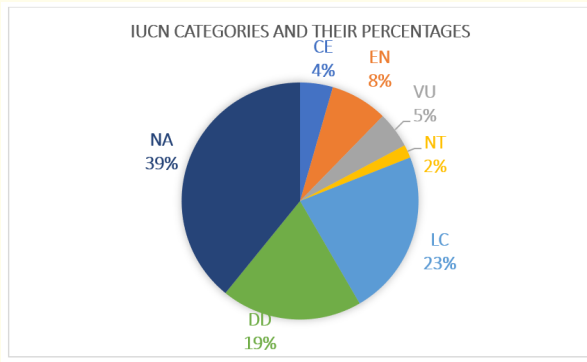
According to the last check list published by Zoological Survey of India in 2020 [4], India harbours 447 amphibian species comprising sixteen (16) families out of which 20 species belong to IUCN critically endangered category. However, this is not the most alarming part, 86 species belong to data deficient group and 175 species are yet to be assessed the detail percentages are depicted in figure 1.

### Causes of decline

Global assessments have categorized three primary causal factors behind the unprecedented decline of the amphibians, over-exploitation, habitat loss and enigmatic decline.

### Over-exploitation

Frog legs has remained culinary delicacy since the beginning of civilization in the eastern part of the world and with time the similar food habit has grown in the western part. The increasing demand resulted in adequate supply, but unfortunately in the form of exploitation not harvesting. This led to severe decline of the frogs within years and then restrictions on collection, processing and ex-



**Figure 1:** Percentage of Indian Amphibians falling under different IUCN red list categories.

port were imposed in the supplying countries. This resulted in two next level damages economic damages of the supplying people and increased illegal trading of the frogs.

### Habitat loss

Again another anthropogenic cause of amphibian decline, to meet the demand of highly over-populated *Homo sapiens sapiens* throughout the globe, natural forests, water bodies, lakes, wetlands, grasslands i.e., the natural habitats of amphibians as well as all other wildlife are being modified into various utilizable areas.

### Enigmatic decline

This is the most crucial part as the causes are yet to be disclosed and confirmed through proper study. One major cause that have been established already is the fungal disease called “Chytridiomycosis” that have resulted in severe decline as well as extinction of several amphibian species in different parts of the globe [5]. However, the roles of pollutants, pesticides, climatic changes as well as various industrial effluents and wastes on amphibian health require thorough studies to determine the extent and level of damages.

### Lags and ignorance

The conservation plans for amphibians are like symptom-based treatment. We do not monitor species at regular intervals and remain ignorant, when we found them catastrophically declined, we

start doing research primarily on their ecosystem services, enlist them in redlist categories and impose rules to conserve them. But we rarely try to understand their physiology, their genetics, their metabolism, their diseases and their pathogen in a holistic approach.

- Amphibian declines as well as extinctions had been reported since 1950, but even after 70 years we are unable to report and identify most of them.
- Global Amphibian Assessment (GAA) was initiated by IUCN, Conservation International and others in 2001; after its strategic completion GAA2 had started in 2009 and completed in 2020. Now, GAA3 is at the starting point. The initiative is global, but the work is not being done simultaneously throughout the world.

In spite of the praise-worthy and dedicated efforts by the herpetologists working under the umbrella of GAAs, the global progress of assessment is not up to the requirement. As per May 2022 data of GAA2 official website (<https://www.iucn-amphibians.org/red-listing/global-amphibian-assessment-2/>), India, China, Europe, Australia, parts of Northern Africa are only within 25% assessment completion coverage.

The Asian Common Toad, *Duttaphrynus melanostictus* has an IUCN redlist status of Least Concerned but was last assessed on 30<sup>th</sup> April, 2004 (more than 18 years ago), so is for *Duttaphrynus himalayanus*, the himalayan toad, *Hoplobatrachus tigerinus*, the Indian Bull Frog, again belonging to IUCN least concerned status was last assessed on 1<sup>st</sup> January, 2008. The major declining factors had their worse effects in the globe during this period. So, it may occur; that delayed assessment due to inadequate work force may not be able to identify the conservation risks within time where we can intervene.

### The underlying causes and possible measures

We need to understand that despite of the best efforts of herpetologists throughout the world, the rate of assessment is very slow, this is due to inadequate work force. Herpetology has rarely been a major subject at the university level throughout the globe. A handful of institutes has herpetology as a small part of the zoology curriculum; therefore, a regular pool of herpetologists is always scanty.

Our veterinary science curriculum primarily concentrates on product giving mammals and birds, though frog legs are having a huge market. We have standardized farming and cultivation of different birds and mammals but never frogs and toads.

We require to know the standard clinical parameters of amphibians, so that their disease pathology could be identified. Until that, we can never reach to their medicines.

All these can be achieved only when we can introduce herpetology as a major subject, yielding a regular pool of new generation herpetologists, who with the help of modern-day techniques will be able to monitor the amphibians much more regularly in every aspect.

Therefore, to summarize may we say that, instead of creeping, we need to run at our full pace to save these creepers.

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