Faculty positions in scientific/academic institutions and citizenship issues

As is the case for all other jobs in the Government sector, scientific and academic positions in public-funded institutes and universities are by law open only to citizens of India. At the same time, a combination of circumstances and developments in recent years has led to the possibility (at least theoretical) of faculty-level appointments being made without clear verification of Indian nationality of the appointee.

First, a very large number of applicants for faculty positions are persons who intend to return after spending some years abroad, and a few of them may have become naturalized citizens of a second country.

Second, scientific institutions in India are permitted to recruit employees on their own (instead of doing so through the Union Public Service Commission) and, in order to simplify the procedure for people applying from abroad, the institutions often use the biodata and cover letter from the applicant as a substitute for information to be submitted in a proforma application.

Third, information sought on citizenship in the application is itself often ambiguous; for example, that for laboratories of the CSIR asks, 'Are you an Indian national by birth and/or by domicile?', to which an applicant who was born in India as an Indian citizen but who had subsequently acquired the citizenship of a second country may in all sincerity (but erroneously) answer in the affirmative.

Finally, there is considerable confusion in the community concerning the issue of 'dual citizenship' or 'dual nationality', especially after introduction by the Government first of the PIO card and then of the OCI card for foreign nationals of Indian origin. Simply put, the Government does *not* recognize the concept of dual nationality, and no individual can be an Indian national if (s)he holds a valid passport of a second country.

Given the circumstances, it may be important for all publicly funded institutions to take precautionary steps to ensure that, in the matter of the nationality of any of their faculty members, they are not inadvertently transgressing the law (and that they have not done so in the past).

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Need to adopt traditional fishing gears in Senkhi

Senkhi is one of the important streams of the capital town, Itanagar, Arunachal Pradesh, which caters to 70% of the water needs of the urban population. It also contributes 38% of the Icthyofauna of the state and also reported an addition of eight new species for the district, four for the state and one possible new species to science. The stream passes from Senkhi valley down to the semi-urban area and meets with the Chimpu stream at Chimpu. The stream forms a contiguous water body with Pachin and Dikrong, and finally merges with the mighty Brahmaputra at Bedeti (Assam). Senkhi consists of varied microhabitats ranging from deep waters to fast-flowing riffles. It is a perennial stream and hence is important to cater to the day-to-day needs of the urban populace (Figure 1). There has been noticeable reduction of vegetation cover in the catchments areas, which has resulted in low discharge of the once fast stream.

For the last five years we have been observing the Senkhi stream for its native fauna. During the course of our observations it was noticed that people adopted destructive methods instead of using traditional fishing gears. The commonly employed methods for indiscriminate collection of fish were electrocution, use of bleaching powder, liming, blasting and throwing of cast net, thus posing a threat to the fish population, which otherwise would have been sustainable, had they used traditional gears.

Electrocution is done during winter season (October–February) when the water volume decreases. In such an environment most of the bottom feeders are found dwelling under the gaps of stones and boulders. A 3–4 m long, dry bamboo pole was fitted with an with electric wire and a metallic rod was fitted at the tip. The wire was coiled in the middle of the pole so that extension, could be achieved up to 500 m. Single phase of electric current was hooked with wire and electrocation of fishes was found effective within 1 m of site of operation. The metallic rod is introduced between the boulders and a mosquito net placed just below the site of operation for collection. The shocked fishes are collected in the net. The operation is applicable using low to medium current water. The different species of

Figure 1. Senkhi stream passing through the urban landscape.

fishes killed by this method are: *Garra* spp., *Psilorhynchus balitora*, *Glyptothorax* spp., *Amblyceps mangois*, *Olyra longicaudata*, *Psuedolaguvia shawi*, *Shistura devdevi*, *Aborichthys elongatus*, *Barilius* spp., *Mastecembelus armatus* and *Macrognathus pancalus*.

Blasting is carried out in the river nearly stagnant and relatively deep. It is also employed in medium current water. A large number of fishes are killed within a few seconds. This technique greatly affects fishes having larger body size, such as *Tor tor*, *Accrossocheilus hexagonolepis*, *Chagunius chagunio* and *Semiplotus semiplotus*. A large number of juveniles are also unnecessarily killed.

In stream where it has bifurcation, one of the channels having less current is blocked using boulders, concrete and sand and bottom is sealed to prevent leakage of water and escape of fishes. Such a blocked stream is selected for this method. The heat and extreme irritation causes blinding of the bottom-dwellers and results in them escaping out and their subsequent easy trapping within 30 min. Several aquatic organisms come out from the gaps of boulders, including the larva of frog. These illegal operations are mostly carried out upstream, where numerous boulders and pebbles are found creating an ideal hideout for aquatic organisms.

Another method employed is the use of cast net, during the rainy season. The boulders are covered with the net from the top and shaken with the help of a shovel, which results in the fishes coming out and getting trapped. The species caught by this method are *Garra annandalei*, *Garra gotyla gotyla*, *Glyptothorax* spp. and *Mastecembalus armatus*. Such practices are less common nowadays as the catch rate has diminished owing to the adoption of more destructive methods. *Semiplotus semiplotus* is a species which is already endangered due to the frequent use of cast net during the rainy season.

Further habitat destruction was observed in the lower reaches of the stream due to sand mining, and collection of boulders for construction purposes. This practice is increasing at an alarming rate due to increasing urbanization demands. Much of the upstream areas in the Senkhi which supply water and are an important source of allocthonous input for aquatic life have low vegetation cover. Therefore, adoption of such practices would only aggravate the already existing problems, first by destruction of the minimal viable population and secondly, by the destruction of the habitat itself.

The fish are part of the tribal folklore and an important source of food. In view of such hazardous techniques being employed in the stream, there is an urgent need to take up conservation measures on the aquatic biodiversity of the stream. One can emulate examples from the state itself, where the tribal customary laws protect the flora and fauna. Public awareness regarding the importance of aquatic biodiversity conservation and its ecological significance has to be in place. If urgent steps are not taken, there will be irreparable damage done to the stream.

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Need of innovative approach for climate change studies in alpine region of India

The Garhwal Himalaya is famous for its rich biodiversity. A great deal of work has been done on the alpine communities of Garhwal[1,2]. Alpine plants have been divided into different life and growth forms. This region is also the source of many medicinal plants used in different ayurvedic formulations. Due to the rising CO_2 levels, increasing temperature and other anthropogenic pressures, these plants are facing threat of survival in their natural conditions. Although it is not proven that the threat is due to global warming or any other factor, a question arises as to what will happen to the alpine plants due to climate change.

Several harsh conditions affect the plants in the alpine regions leading to morpho-physiological changes; these are low air temperature, high wind velocity, low partial pressure of gases, high light intensity and scanty rainfall. The consequences are changes in the growth cycle, development of different growth forms, and senescence and dormancy.

The Intergovernmental Panel on Climate Change (IPCC) has made important observations in its Fourth Assessment Report that global warming is occurring at the rate of 0.2°C per decade and human activities, greenhouse gas (GHG) emissions (carbon dioxide, methane, nitrous oxide, hydrofluorocarbon, perfluorocarbon and sulphur hexafluoride) are responsible for the warming effect[3]. Currently, as the rate of CO_2 enrichment in the atmosphere is rapid, the total climatic responses are unpredictable. Most of the work under elevated CO_2 conditions in India is being carried out on crop plants[4], whereas the alpine plants remain untouched for such studies. What will happen to the alpine plants due to elevated CO_2 and increased temperature? We summarize that:

1. Increased photosynthesis in the plants results in increased productivity.
2. Altered growth behaviour will result in altered growth cycles of alpine plants.
3. Active constituents of the plants may change due to physiological changes.
4. There may be an altitudinal shift in the species abundance or certain genotypes in community.
5. Dominant species may change in recessive and vice-versa.

The above-mentioned results of global warming on alpine plants are still to be investigated and confirmed. Thus for giving a shape to a hypothesis, we need an experimental design or set-up through which we can generate a theory. For this, the experimental design should be such that it can withstand the harsh climatic conditions in the alpine region. Many climate-change studies have used growth chambers/polyhouses for providing controlled environmental conditions. However, inside these chambers the chamber effect is more and it does not provide natural conditions. Now a days global climate change studies are being done in OTC (open top chambers) which are capa-