

in 2005. **The deadline for receipt of nominations is 31 July 2005.**

Nominations may be sent to director@ictp.trieste.it, describing the work of the nominee in adequate detail. Two supporting letters should also be arranged. Further details can be found on the ICTP website: www.ictp.it/pages/mission/prizes.html.

Prizes for Leadership in Science and Public Life

ICTP has announced the establishment of five annual Prizes for Leadership in Science and Public Life. The Prizes are being funded by the Templeton Foundation. The goal is to recognize and encourage young scholar-leaders who wish to examine the interaction between Islamic culture and modern science. Each Prize carries a cash award of US\$ 20,000. Prospective candidates should have a doctorate degree

and be younger than 45 years of age at the end of the year of the award. Applications should be submitted in English within the following five prize categories:

- Abdus Salam Prize for Leadership in Islamic Thought and Physical Sciences.
- Ahmed Zewail Prize for Leadership in Islamic Thought and Biological Sciences.
- Ahmed Zewail Prize for Leadership in Islamic Thought and Chemical Sciences.
- ICTP Prize (two in number) for Leadership in Islamic Thought and Applied Sciences (Medicine, Agriculture, Engineering, Technology).

All applicants will be required to write an essay, less than 5000 words in length, describing how their proposed work has served to advance constructive interactions between Islamic thought and culture, and institutions of modern science and technology. The evaluation of applications

will focus on past performance and future promise to advance: (i) scholarly writings for peer communities in science, and (ii) writings for a wide public audience (as, for example, newspaper editorials). Applicants are encouraged to submit samples of published work both in their own field and also articles published for general audience. All candidates should arrange for two letters of support from persons who can speak authoritatively on their abilities. Nominations with adequate details are also welcome.

An international panel of distinguished judges will oversee the selection process. **The deadline for applications and nominations is 31 July 2005.** The first prize-winners will be selected in 2005. Applications and nominations may be sent to director@ictp.trieste.it. Further details can be found on the ICTP website: www.ictp.it/pages/mission/prizes.html.

MEETING REPORTS

Retceding glaciers in the Indian Himalayan region*

The Himalaya, the youngest and fragile mountain system of the earth, has direct influence on climate control, regional hydrology and environment of our subcontinent. About 17% of its mountain area is covered by glaciers. These glaciers are receding faster than those in other parts of the world. To develop a comprehensive study plan on causes and effects of glacier retreat on Himalayan environment and development, a Brainstorming Session was organized by the G.B. Pant Institute of Himalayan Environment and Development (GBPIHED), Almora. Inaugurating the session, Prodipto Ghosh, Secretary, Ministry of Environment and Forests, Govt. of India, highlighted that the issue of receding glaciers is not only a matter of academic interest, but also an integral life support system of North India through river linkages. Further, he stated that research should be conducted to compute the cost of environmental

services both upstream and downstream of the glaciers and find ways and means for compensatory mechanisms.

The discussions were carried out by different panels. Panel-I focused its discussions on retreat of the glaciers in the Himalaya. In his presentation, V. K. Raina stated that recession of glaciers in the Himalayas is not an abnormal phenomenon. It has been happening since the last glacial cycle. Citing examples of four glaciers namely, Machoi and Siachen glaciers in J&K, Gara glacier in Himachal Pradesh (HP) and Gangotri glacier in Uttaranchal, he presented the nature of retreat of these glaciers over time and concluded that whereas the glaciers in the Himalayas are retreating and their volume and size is shrinking, their general retreat rate (about 8–15 m per year), at present, is not what can be termed as abnormal when viewed from the perspective of geological history. It could be a normal cycle of nature, Raina said. Based on his study of ten Himalayan glaciers, Raina also observed that while melt-water release from the glaciers was affected by variation in mass balance, it was the winter snow precipitation that had direct impact on the annual melt-water

yield. He submitted that it would be premature to state that the recession of the glacier is due to global warming. On the other hand, Raina was of the view that the increase in the rate of decay of glaciers in recent times, could be due to decreasing snow precipitation. B. D. Acharya said that the Department of Science and Technology (DST), New Delhi had been coordinating a programme on glaciers over the last 20 years, but the impacts of global warming on glaciers were still inconclusive. He emphasized that the Himalayan glaciers needed to be studied independently with the help of modern tools such as remote sensing. Studies should also be taken up in the area of snow crystal formation and melting patterns to obtain quantitative run-off data, environmental impact of glacial retreat and its relation with global warming. S. Mukherjee emphasized the need of using authenticated scientific reports for media publications to avoid unnecessary sensationalizing of issues. While presenting his findings on glacier flow modelling, K. D. Sharma, stressed on the importance of monitoring weather conditions, water yield and wind speed in all glacier studies.

*A report on the Brainstorming Session on Retceding Glaciers in the Indian Himalayan Region: Environmental and Social Implications held at G. B. Pant Institute of Himalayan Environment and Development, Kosi-Katarmal, Almora on 11 September 2004.

A. V. Kulkarni, highlighting the field investigations conducted in Baspa basin, said that seasonal snow starts melting at high altitudes in the middle of winter and this augments winter stream run-off of rivers. In addition, the size of many permanent snow and ice fields has been reduced, causing scarcity of water in many villages in the tribal region of HP. In his opinion, large glaciers such as Siachen and Gangotri can take around 100 years to respond to climate change and it will take some more time to influence their mass balance. Small glaciers like Gara may respond more quickly to climate change. However, glaciers are showing small snout retreat and more shrinkage in higher regions, suggesting debris cover in lower regions. P. C. S. Devara highlighted the use of high-resolution topographic maps (1:10000 and 1:5000 scale), high-resolution satellite data and airborne laser altimetry in glacier studies. Summarizing the discussion, Ghosh, noted a general consensus on retreat of Himalayan glaciers and need for a comprehensive study of selected glaciers related to cause-effect of glacier retreat using sophisticated methods.

In Panel-II, the discussions were focused on Himalayan glaciers – perspectives for a modern research agenda. In his theme lecture, V. K. Gaur deliberated on the fact that responses of different glaciers are different due to mass balance and the climate change impact it carries. In the past century, the average global temperature has increased by 0.6°C. Based on isotope studies of ice-cores, Gaur showed that temperature has risen after AD 1800. The atmospheric CO₂ emission was estimated at 6.3 gtc yr⁻¹ in 1990s. Glacier lake outburst floods and other associated hazards are more common in recent times due to possible climate change. Glaciers are complicated thermodynamic open systems, where input is counterbalanced by output. Stressing upon the need to study glacier responses derived from ‘glacier response function’ to mitigate changes in downstream habitat, Gaur presented the concept of a scientifically designed study with well-defined deliverables in some representative Himalayan glaciers using modern methods and technologies. He elaborated a framework for establishing a specially funded ‘Glacier Studies Centre’ in GBPIHED for coordinating such a study in collaboration with institutions of the region as well as with those at other places. M. Sanjappa, speaking on his own and on

the basis of discussion with H. Y. Mohan Ram, suggested that floristic changes, including the algal and fungal floras, avifauna, and changes in cropping pattern in the influence zone of glaciers should be documented, which have not been worked out by the Botanical Survey of India. R. K. Sood acknowledged that in HP, rainfall was decreasing, temperature was increasing in different altitudinal zones and the cropping pattern changing consequently. In his concluding remarks, R. S. Tolia emphasized on the need for a holistic study based on the glacier response function model for working on glaciers.

The third panel was on Impact on glacier retreat: Economic and social perspectives. In his keynote address, Ramesh Chandra stated that the socio-economic concerns were often ignored while studying glaciers. Ethnographic studies are required and similarly, the livelihood pattern and adaptive mechanisms should also be studied in glaciated catchments. There is also a pressing need for disaster management and rehabilitation policy in areas affected by glacier retreat, particularly focusing on agriculture, pastoralism and other livelihood support practices of local people. R. Mandal emphasized on the need to study the response function of glacier retreat to devise suitable strategies for socio-economic remedial measures. There may be local impacts of glacier and fresh snow melting due to debris deposition in reservoirs and lakes. The impact of disposal of garbage and settlements in glaciated areas is also a matter of concern, he said. R. Kumar suggested that the flood-forecasting system should be strengthened as debris transported through flood creates downstream choking of water bodies.

During general discussions, Gaur mentioned that glaciers would respond differently at different timescales as they have large inertia and this aspect should be considered in the study. Glacier study necessarily requires collaboration of different disciplines such as geological/geographical/environmental sciences and mathematical modelling. A. V. Kulkarni emphasized on studying melting pattern of snow cover in high altitude areas. According to him, in winter about 75% of the mean increase in run-off in Baspa basin is recorded due to snow melt. Sood said that HP was planning hydro-electric projects on a 100-year basis. But in view of the climate change, he proposed that the planning should be on a 50-year basis to

save cost of planning. Ghosh suggested that short-term perturbation in inputs and long-term change in precipitation would both affect the glacial retreat. These changes can cause short-term impacts in the melting regime and downstream effects. The socio-economic connections of such changes need to be established. Devara stressed on the importance of feedback processes between output and input mechanisms.

Naqushbandi observed that many glaciers, including Durung-Durung glacier in J&K were receding at a rapid rate and small glaciers (less than 1–2 km² area) had disappeared; this has affected the productivity of high-altitude pastures. There is a need for better cooperation among Himalayan states to share scientific knowledge on these aspects. Prasad drew attention to the need for a course on glaciology, which can be started in Uttaranchal, so that skilled manpower can be produced for future.

In his concluding remarks, S. L. Bahuguna, expressing the concern of the common man, said that a desert is marching towards Gaumukh (Gangotri). There is a need for adopting conservation measures in the form of austerity, alternatives and afforestation to combat water resource conservation, including glaciers. He said that the mountains should be kept under Protection Forestry and not Production Forestry to harvest water, ensure soil fertility and provide clean air as the main products of forests instead of timber and resin. Bahuguna mentioned that afforestation or tree farming is beneficial as it does not require irrigation, ploughing of land and fertilizers. He urged scientists and intellectuals to create a second line of action by students to spread their scientific knowledge among rural people to bring prosperity. The wisdom of generations of the local people needs to be combined with science to achieve Sarvodaya (good for all). Veena Upadhyaya stressed on the need for incentives, facilities and sophisticated methods to generate long-term databases to pursue studies on glaciers for the well being of mountain folk as well as downstream people.

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