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MEETING REPORT

Consensus on prior informed consent and conservation of biodiversity based traditional knowledge systems*

People who have been conserving and adding value to indigenous biodiversity should be formally recognized but unfortunately a majority of them have not reaped the benefits of their efforts even after the implementation of the Convention on Biological Diversity Agreement 1992. In the broadest aspect of intellectual property rights (IPR) and prior informed consent (PIC) of traditional knowledge holders (TKHs), their moral rights are said to have been fully taken into account which has helped tremendously in conserving the biological resources.

To educate the indigenous communities of northeast India about traditional knowledge (TK) and exercising PIC at grassroots level, a series of seven workshops were organized on PIC and traditional knowledge systems (TKS), its use and promoting conservation in northeast India.

The objective of these workshops was to seek the opinion of multi-stakeholders about benefit sharing (tangible and non-tangible), arising from bioresources of the region. The knowledge holders of the Monpa community of Dirang and Tawang (West Kameng and Tawang districts; 72.12%) have emphasized that due recognition and reward must be given to the conservator of indigenous biodiversity. There was a consensus among Monpa TKH (97.68%) that a fair and equitable benefit sharing must be assured on any economic benefits that accrue from TK and indigenous biodiversity.

A majority (>85%) of them have opined that before publishing any research work on TK and related biodiversity, it must be circulated back to the TKHs in the regional language of the community so that a social validation could be made to avoid cases of misappropriation. Every TK based on local biodiversity (whether it is in the public domain or the property of individual) must be processed before use in R&D through a written PIC.

More or less a similar opinion was received from the Khasi community of Meghalaya (87.90%). They also responded (89.13%) that the share of benefits – if it is monetary, must be exercised either through indigenous institutions or through a trust. Village panchayats may be networked with indigenous institutions in an indirect way. Common practices (used in solving day-to-day problems) based on indigenous biodiver-

*A report of on the series of workshops on 'Prior Informed Consent and Traditional Knowledge Systems' sponsored by the NIF, Ahmedabad and Central Agricultural University, Imphal held at the College of Horticulture and Forestry, Pasighat.

sity, may be promoted for livelihood promotion after pooling together and forming a self-help group (SHG) of like-minded people from different communities.

The state-level workshop on PIC and TK held at Pasighat was attended by more than 400 community leaders and women from various communities (Adi, Padam, Pasi, Minyong, Mishing, Nysh, Galo, etc.). The workshop was graced by Tako Dabi, State Minister for Parliament and Water Supply as Chief Guest and the local MLA Bosiram Siram was Guest of Honour. In his address, the Minister urged the participants to share their ethnobotanical knowledge with the right person having PIC. Further, he said that the team of scientists, who elicit the hidden knowledge from local people can properly mediate on the issue of TKSs and related benefits decided through the PIC. He also emphasized that the plants used as food and ethnomedicines must be tested and data on the compounds found in them should be properly validated. This process can add value to the local practices and may help in protection of IPR and equitable benefit sharing among stakeholders. It is time to learn about biocultural knowledge, and also preserve it through proper access and use of PIC.

In the workshop held at the College of Horticulture and Forestry, Pasighat (December 2006), multidisciplinary team of scientists arrived at a consensus that first of all, the TKH of a particular community should be exposed to the types of benefit that could accrue from biocultural resources. Then further, various aspects and steps of benefit sharing should be pursued.

Detailed information about the benefits and sharing, if any in a particular practice of ethnomedicines, biopesticides, etc. should be provided to TKH at the time of documentation of practices. It may be made mandatory for the institutions and scientists that the PIC used in taking agreement and signature of TKH should be in local language. Three copies of PIC should be made. One copy for each should be given to the scientist, institutional library and to the TKH. Some scientists (51.41%) were of the opinion that the other stakeholders along with TKH may come together for detailed discussions on PIC and IPR after a thorough research for the practical execution of benefit sharing mechanism. Initially, a simple PIC may be obtained from TKH to abide ethics of using TK, and then detailed discussions may be made with TKH later on during the process of value addition to TK.

Scientists involved in exploration and validation of practices should also be made party to benefit sharing as perceived by scientists (76.23%). The signed PIC along with detailed TKS of TKH can be kept as closely accessed documents (CAD, confidential) in the district or nearby college library for ready reference. In case of any disputes arising over a particular knowledge or practice of the concerned region, the PIC reserved in CAD can be used as a legal document in a particular dispute or even filing the patent on TKS. It can also build the credibility and trustworthiness of formal institutions with TKHs.

Further, scientists (65.34%) pointed out that, to avoid the possibility of TKHs changing their opinion on benefit share issues, remedial measures should be taken at the time of taking consent. In case of the contribution of a scientist who adds value and modifies a particular product or develops a new formula over a plant-based practice/knowledge, his/her percentage of benefit share may be kept higher. The second major share of benefit can be given to the TKH/innovator for his knowledge.

Scientists further emphasized (59.45%) that TK held in public domain (PDTK) should be made available in local/common literature and electronic sources to lead the discussion for conservation and promotion. When an aged person dies, a living encyclopedia and database of the society is lost. So, an idea can be diffused among the social systems that before death, a TKH should pass on the knowledge to his/her offspring. That could be one of the remedial measures for saving TKSs.

On the basis of feedback received from earlier workshops, a national level seminar on PIC and TKS was held at the College of Horticulture and Forestry, Pasighat. The event was inaugurated by Bosiram Siram. Ranjay K. Singh, Coordinator of the programme, briefed on the activities and achievements made on the PIC and TKSs through various workshops organized among the community members of northeast India. Singh informed the participants that teams of scientists have explored more than 800 examples of ethnomedicines, ethnoveterinary practices, nutritionally and medicinally important foods and valuable plants resources used as biopesticides, fishing, etc. The data on these practices were obtained from knowledge holders with the use of PIC from TKH to ensure proper use of TK in future. During the seminar, live specimens were displayed by participating TKH at the programme venue. Also women displayed plant-based technology, handicrafts, food products, cloth made from plants, paintings, etc.

The Chief Guest, S. N. Puri (Vice Chancellor, Central Agricultural University, Imphal) distributed awards to six TKHs for their outstanding performance in biodiversity contests organized in the state. Awards were also given to community leaders who created awareness among local communities for conserving threatened plant biodiversity. In his address, Puri communicated that there are different kinds of TKSs found in society; for example, the use of local plants in healing, painting, weaving, agricultural crop protection, etc. which solve day-to-day problems of resource-poor communities. He compared modern knowledge systems and TK; and summarized the parameters of ecofriendliness, cost effectiveness and sustainability with an example of an eco-friendly painting practised by the women of Maharashtra. The grandparents and elders of any society are like encyclopedias and a rich source of knowledge which can be transferred to future generations. It is high time we document such precious resources for conservation through the implementation of PIC.

Further, in the meeting, scientists emphasized (88.91%) that proper acknowledgement of TKH and ethical norms on using biocultural knowledge must be standardized at the national level. A group of scientists (47.98%) have pointed out that, maximum percentage of benefits arising from TK must be given to the community knowledge holders and for conservation of respective plant resources.

Further, Puri advised that such village and regional workshops on PIC and TK should be held at district headquarters and in different villages of northeast India in order to maximize the participation of TKH and note their feedback. He appealed to the scientists and students of NE region to contribute significantly towards exploring TKSs and make people aware of PIC. He suggested to the

scientists and faculties of College of Horticulture and Forestry that they could conduct a meeting before every semester break and assign students work with proper training to explore TKSs. The best contributing student should be rewarded and trained at the centre of excellence. Complimenting this suggestion, Vipin Kumar (National Coordinator (S&D) of NIF, Ahmedabad) announced that five best students who would explore TKSs and spread awareness among local communities about PIC, would be invited for learning and training at the Indian Institute of Management (IIM), Ahmedabad under the guidance of Anil K. Gupta.

Kumar also assured that, if a TKH or group of TKHs are willing to establish TK-based micro-enterprise, then NIF would be pleased to support such efforts technically and financially. NIF would also try to process in protection of IPR of TKH on unique knowledge explored through PIC and proved by scientific validation. Community members of Adi community of Berung, Miram, Yagrung and Sibut participating in workshops in February 2008 and March 2009 (94.18%) wanted to ensure implementation of PIC by institutionalizing it with Kebang (customary institution) and village panchayat. They also emphasized the need for rights to be given to these institutions for controlling and monitoring any activity or the access of genetic resources and related TK at the village level. On account of series of workshops and seminars, the following recommendations were made.

First of all, a massive awareness campaign about the PIC among the community members of northeast India is required. Series of meetings and seminars are required exclusively on the PIC implication in use and research on indigenous biodiversity and ensure the equitable benefit shares for the knowledge holders. The role of the panchayat should be defined in the implementation of PIC at the grassroot level. To ensure proper implementation, there is need for training programmes on PIC and plant/animal based TKS for the members of panchayats. Formal participation of customary chief of tribal communities, who still play a pivotal role in decision making at community level is necessary. The customary chief needs to be well trained in the use and implementation of PIC in proper coordination with village panchayat in the era of IPR and protection of biocultural knowledge systems. Use of PIC should be made mandatory to all scientists and related institutions as well as publications working on TK and biodiversity. The benefits (tangible and non-tangible) must be properly passed on the TKH. There is urgent need to devise a model of benefit sharing with the stakeholders of TK and conservators of biodiversity.

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MEETING REPORT

Engineering education in the 21st century*

'I am an optimist ... so, in spite of the problems that I am going to talk about I believe the world's getting better; larger number of people are being educated.' – this was the preliminary statement of Charles M. Vest (Massachusetts Institute of Technology (MIT) and National Academy of Engineering). He gave a public lecture on 'Engineering education in the 21st century' at the Indian Institute of Science (IISc), Bangalore. In his introduction of Vest, P. Balaram (Director, IISc) remarked that MIT became the envy of every other academic institution in the world when Vest had been its President (1990–2004).

Vest described a current project of the National Academy of Engineering namely 'Grand challenges for engineering'. A Grand Challenges committee was formed, each member of which has a rich history of innovation, creativity and accomplishment. The chair was William Perry (Stanford University). The group wanted to execute four items on the agenda namely, challenge, inspire, educate and innovate.

'Challenge' to forge a better future. Fourteen 21st century challenges were chosen for possible solutions through engineering. These are (1) make solar energy economical, (2) provide energy from fusion, (3) develop carbon sequestration methods, (4) manage the nitrogen cycle, (5) provide access to clean water, (6) restore and improve urban infrastructure, (7) advance healthcare informatics, (8) engineer better medicines, (9) reverse-engineer the brain, (10) prevent nuclear terror, (11) secure cyberspace, (12) enhance virtual reality, (13) advance personalized learning and (14) engineer the tools of scientific discovery.

Basically, there are four grand challenges: (i) of energy, environment, global warming, sustainability; (ii) improve medicine and healthcare delivery; (iii) reduce vulnerability to human and natural threats; (iv) expand and enhance human capability and joy. Meeting these challenges requires vision, science, imagination, boldness, priorities, policy, markets and perseverance. All this requires what Vest calls 'serious engineering'.

'Inspire' ourselves and others to work at the frontiers of technology. Engineering frontiers can be grouped into tiny systems (bio, info, nano) and macro systems (energy, environment, health care, manufacturing, communications, logistics). The tiny systems are getting smaller, faster and more complex, while

*A report on the public lecture 'Engineering Education in the 21st Century' by Charles M. Vest. The lecture was organized by and held at the Indian Institute of Science, Bangalore on 19 January 2010.