

ICIMOD Seminar
*Indigenous Knowledge Systems
and Biodiversity Management*



MUKTA LAMA

Rai carrying water in bamboo container

The seminar on 'Indigenous Knowledge Systems and Biodiversity Management' opened with a welcome address by Mr. Egbert Pelinck, Director General, ICIMOD. He thanked the MacArthur Foundation for making the meeting possible and for supporting ICIMOD's project on the Promotion of Agroforestry through Local Institutions in the Eastern Himalayas.

In the 10 years since ICIMOD's establishment, considerable progress had been made in highlighting the plight of the mountain people and their fragile environment, Mr. Pelinck said. This is reflected in a special chapter in UNCED's Agenda 21 on "Sustainable Mountain Development." This growing awareness is matched by an increasing body of knowledge on constraints and opportunities for development, in Mr. Pelinck's view. ICIMOD's library has collected more than 12,000 publications and articles. The task of documenting indigenous knowledge is of extreme urgency. In his view, the old approach to biodiversity management had, or would have, resulted in islands of conservation amid deserts of ecological degradation. Therefore, a new concept that does not end but starts at the boundaries of parks and reserves is required: natural resource management with people and for

people. Mr. Pelinck urged participants to take up the challenge of building on indigenous knowledge while responding to the rightful aspirations of people who are outside mainstream development processes.

Prof. Pei Shengji introduced the topic of the seminar - indigenous knowledge of mountain people and its role in conserving biodiversity in the mountain ecosystems. As the world's largest mountain system, the Himalayan region has unique functions and roles in terms of biodiversity. Prof. Pei referred to the rich biodiversity of the region as "a store of resources." The ecosystem, species, and genetic diversity supported and contributed to human existence and well-being; throughout history the interaction between mountain people and the natural system had helped communities to maintain the richness of species, communities, and genetic materials in both the productive systems and wild lands of the mountain environment. Warning that the fundamental natural wealth is disappearing, Prof. Pei said it is crucial to slow down and halt this process of impoverishment and degradation.

Mountain forests have a cultural value for the local population, said Professor Pei. For example, the *Dai* people believe the forest is man's cradle. Indigenous people have a tradition of indigenous practices to maintain forests as a sustainable resource system characterised by the management of non-timber forest products, as in Nepal, China, and India. Swidden cultivation is practised by all mountain ethnic groups in the Eastern Himalayas, for example, reflecting the man-environment relationship. Therefore, swidden agroforestry systems and local models should be identified, e.g., rattan-swidden cultivation in Yunnan. Professor Pei stressed that the under-

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standing of mountain people's indigenous knowledge of biodiversity resource management is a key to sustainable development in the Himalayan region. Natural resource management systems are localised systems that form a basis in rural people's decision-making. He reviewed indigenous perceptions and practices regarding the management of mountain forests for the protection and utilisation of biologically diverse resources. He also discussed the coexistence of biological and cultural diversity in the Himalayas in view of ethnobotanical approaches. He said that 70 to 80 per cent of the mountain population depended on traditional medicine and health care. In India, Nepal, and China, medicinal plants are the primary sources of medicine. In concluding, Professor Pei said it was important for scientists and planners to understand and improve the prevailing conditions in biodiversity resource management. Grassroots' participation is necessary in biodiversity conservation and development strategies should be based on an understanding of indigenous knowledge. As a science of documenting traditional knowledge on the use of plants by indigenous people and assessing the human interactions with the natural environment, ethnobotany has great potential for contributing to biodiversity conservation in the Himalayas.

Ms. Gurung, speaking on indigenous knowledge systems and their role in development, began by saying scientists and development workers have to accept the challenge of working together in their search for sustainability, participatory processes, and alternative development paradigms.

"Indigenous knowledge", or IK, refers to the empirical knowledge of a group of long-time inhabitants of a spe-

As indigenous communities are absorbed into mainstream societies, there will be a loss of undocumented IK.

cific locale, and the principles underlying its generation, organisation, meaning, and diffusion. This definition includes the knowledge system of "indigenous peoples" who claim to be original inhabitants of an area. Ms Gurung noted that IK is not static but dynamic in nature as it is generally transmitted orally and provides the basis for decisions related to land use, natural resource management, and other tasks. IK consists of dynamic insight and techniques gained through trial and error in response to changing environmental and socioeconomic circumstances and opportunities.

Ms. Gurung said the participation of community members in development processes can be enhanced by the elicitation of IK. She noted that women's knowledge is largely ignored by male members of society and outside development agencies. Similarly, the knowledge of shamans, traditional healers, elders, and midwives is known



Diversity of forest foods prepared by the Yi people of Chuxiang, China

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only to them. This special knowledge must be elicited and recorded. The study of IKs would encourage the local people to feel a sense of legitimacy in their knowledge and belief systems; such introspection could contribute to the empowerment of local communities, enabling them to take an active role in shaping their own future.

She warned that, as indigenous communities are absorbed into mainstream societies, there would be a loss of undocumented IK, which would be a loss to scientists trying to learn sustainable ways of existence with nature. Comparing IKs and scientific systems, Ms. Gurung said that variations in the depth and breadth of local knowledge systems exist due to the capacities of communities and individuals to generate, experiment, utilise, and transfer knowledge, depending on varying socioeconomic and environmental conditions. Nothing that these knowledge systems exist in varying degrees of intactness, she said researchers could assess IKs by adopting an emic perspective. She stressed that the subject has

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to be approached from the indigenous person's paradigm.

Ms. Gurung does not believe there is a need to subject IKs to rigorous scientific testing to render them of value to the world. A marriage of traditional and modern scientific knowledge is necessary to solve the problems of poverty and environmental deterioration. She noted, however, that all local practices are not sustainable. There could be several obstacles to integration of IKs and science such as: 1. loss of IK due to intrusion of the State and market forces as well as the dying out of elders possessing oral-based knowledge which once lost cannot be retrieved; 2. IKs have a spiritual base in that the world views of scientists and indigenous communities are based on radically different assumptions about the nature of the world; and 3. the existence of cultural, perceptual, and language barriers prevents both groups from acknowledging the value of each other's system of knowledge.

Ms. Gurung concluded by saying IK should be returned to the communities to improve their lives in some way: the knowledge is from and for the people. Any development that does not incorporate the culture and values of a society may not be sustainable.

Following these background presentations came the presentation of the results of ICIMOD's MacArthur Foundation-sponsored project in eastern Nepal and southwest China by staff of the two collaborating institutions - SAGUN and the Kunming Institute of Botany (KIB). The findings of this action research project and a description of methods were presented during four panel sessions, led and advised by prominent persons in the field of biodiversity management and indigenous knowledge.

Panel A

Methodologies

Dr. Evelyn Mathias-Mundy of the International Institute for Rural Reconstruction (IIRR) was Panel leader, Dr. Leo Avgeusau was resource person, and Mr. Mukta Lama of SAGUN, Nepal, and Mr. Long Chun-lin of the Kunming Institute of Botany presented project findings.

Nepal

Mr. Mukta Lama (SAGUN) introduced the field site in eastern Nepal and spoke on Participatory Action and Research on Indigenous Knowledge Systems.

Tamku village is located on the southern slopes of Makalu in the eastern hills of Nepal in the Sankhuwasabha district. The village falls within the boundary of the Conservation Area designated by the Makalu-Barun National Parks and Conservation Area Project (MBNCAP) and consists of 25 hamlets (approx 25 households) inhabited mainly by members of the *Rai* ethnic group, which is made up of the *Mewahang* and *Kulung* sub-groups.

The *Rai*, as descendants of the *Kiranti* people, follow a culture and religion that is distinct from mainstream Hinduism and Buddhism. *Rai* myths and rituals, as well as their environmental practices, depict a close relationship between human beings and nature. Mr. Lama pointed out, however, that the indigenous cultural heritage had been affected by the assertive influences of the mainstream culture and people were increasingly developing a "culture of submission."

Rai livelihood centres on food security. They practice relatively stable agriculture on steep rainfed terraces, supplemented by slash and burn culti-

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vation. Despite their efforts, 75 per cent of the families of Tamku experience a chronic food deficit for three to nine months every year. However, the diversity of agroforestry practices in Tamku is rich and their natural resource use pattern exhibits a high level of suitability proven through generations of trial and error, e.g., knowledge regarding forest and fodder plants, their uses, combinations of forest and agriculture species, seasonality of migration within their '*Carri*' (territory), soil fertility management, and genetic resources' management.

SAGUN began with IK as the starting point, then proceeded to systemise and amplify it by building and strengthening the capability and power of formal and informal grassroots' community institutions through action and in collaboration with external agents. SAGUN initiated Participatory Action Research (PAR) and dialogue with the local people. Mr. Lama explained that the methodology consisted of exploratory and explanatory visits, followed by participant observation; informal but renewed contacts with the villagers; training of local intellectuals and activists (especially on research methods such as Participatory Rural Appraisal); encouragement of the experimental tradition of farmers; identification and organisation of grassroots' groups; identification of crucial issues as well as discussions on them; networking with government agencies, MBCP and NGOs; and awareness-raising

about problems that need to be addressed by collective action.

China

Mr. Long Chun-lin, of the Kunming Institute of Botany (KIB), gave a description of the site in Yunnan, then discussed the methods used by the KIB team to conduct action research.

The project is the Zixi Mountain, located 28 km west of Chuxiong city, capital of Chuxiong Yi Autonomous Prefecture, Yunnan province, on the eastern margin of the Himalayan region. The Zixishan Nature Reserve, an area covering 6,700 ha was established in 1982. In addition to conifers and broadleaf forest species, the reserve is home to many rare and endangered species of animals and plants. Zixishan was a religious site historically, so religion and traditional culture play a significant role in the natural resource management of the reserve. It is home to three ethnic groups - the *Yi*, *Miao* and *Han*.

Two communities which live inside the buffer zone of the reserve were selected as the study sites. Small farmers grow rice, their staple food, and they earn a cash income from the sale of fruit and minor forest products to supplement their subsistence crops. The area's history, ethnic cultures, and scenic landscape make Zixishan a place with considerable potential for tourism. But conflicts between development and conservation have been coming to the fore.

In Mr. Long's view, indigenous knowledge, the strengthening of farm-

ers' organisations, and the use of PRA approaches are fruitful in planning sustainable rural development at the village level. He said different methods were used in different research stages for data collection, field survey, and analysis, e.g., by researching available literature; PRA training workshops for farmers, village heads, and representatives from local organisations; questionnaires and interviews supplemented by PRA; ethnobotanical methods and analysis of natural resource management within the conceptual framework of human ecology. After training, workshop participants were treated as investigators/researchers/informants. Farmers, informants, students (including outside investigators) worked together. The selection of persons for interviews was based on age, gender, and social status. Women and men (old, young, educated, and illiterate) were both included.

Mr. Long highlighted three major factors that are hindering rural development and nature reserve conservation in Zixishan - fuelwood shortage (private forestlands cannot meet the demand), lack of fruit tree management techniques (fruit is the principal source of cash income), and animal husbandry (which is affecting the forests negatively). Through project activities, energy-saving stoves have been popularised (482 households out of 484 use these stoves) and both the Zijin and Yunqing communities have established Horticultural Associations for scientific management of fruit trees. He mentioned that musella cultivation and beekeeping, two examples

RESOURCE PERSON *Dr. Leo A. von Geusau is a senior researcher at the Mountain People's Culture and Development, Educational Highland Research Institute (MPCDR-HRI). The MPCDR-HRI was born, rather than "founded" in 1978, in Chiang Mai, as a result of a tribal movement that demanded equal access to modern education and communication with the outside world. Since then it has incorporated Thailand's six major tribal groups*

Tribals uplifting themselves

The Association for the Mountain People's Culture and Development, Educational, Highland Research Institute (MPCDE-HRI) was born, rather than "founded," in Chiang Mai in 1978 as the result of a tribal movement for equal access to modern education and communication with the outside world. Six major tribal groups in Thailand have been incorporated into the association, and the MPCDE Foundation serves as an umbrella for several tribal NGOs.

The aims and goals of MPCDE-HRI are i) to be a service unit, cooperative, and resource centre; ii) to promote cultural studies (practical and future-oriented) by mountain people (action research on traditional knowledge, e.g., ecological, medicinal, nutritional, etc, and support of sustainable responses and adaptations to threats to tribal culture and rights); iii) to promote higher/advanced and vocational studies (older and committed, urbanised tribal students, preferably women) including a leadership-training student programme (matching modern education with a non-formal traditional knowledge curriculum); iv) to foster the mountain people's self-identity by promotion of songs/dances/handicrafts, etc; v) to promote grassroots', action-oriented research by tribal experts; vi) to promote and assist the formation of independent ethnic minority NGOs and centres in the lowlands, including political training and safeguarding; vii) to coordinate common activities and programmes; viii) to assist researchers, media persons, tourists, and others in a guest-programme; and ix) to network with other NGOs for economic self-reliance.

The MPCDE-HRI provides i) information and documentation (RDI) services; ii) a resource library; iii) a clipping service (covering most issues); iv) legal and medical unit services; and v) the MPCDE-HRI guest-programme. The Highland Student and Education Programmes consist of assistance for study matched with a non-formal Working Students' Training Programme and Highland Operational Research on Cultural Education for the Future (GORCEF) to bridge the gap between traditional and modern knowledge. The United Tribal Women (IMWECT) programme, aimed at giving a greater role and voice to tribal women and the quadrangle people's programme which has the objective of common development of the quadrangle area (*S. China, Laos, Kampuchea, Vietnam, and Burma border area*), involving the *Hani/Akka* people. The Participatory Action-Research Unit was established to encourage "grass-roots research about, by, and in the advantage of tribal peoples themselves." The MPCDE-HRI often relies on short-term funding from a variety of foreign agencies and it prefers to match funding with services to create an adequate bilateral relationship.

of indigenous practices, demonstrated the advantage of using PRA as an action research tool. Farmers shared the investigation and PRA results, which increased their participation and cooperation in planning and project implementation. The result was the construction of a base for sustainable rural development.

Dr. Evelyn Mathias-Mundy, of the International Institute of Rural Construction (IRRI), believes that a wide array of methods is available to record IK. They range from anthropological long-term studies to short-term appraisals. There are also "mid-term" studies that draw on both methods. Recorders have to decide on a case-by-case

basis which combination of methods best fulfills their purpose and subject, Dr. Mathias-Mundy said. In the past, IK recording was dominated by anthropological methods. Later, multidisciplinary approaches such as Rapid Rural Appraisal and, more recently, Participatory Rural Appraisal had become popular. PRA provides a basket of useful techniques, some identical with well-established anthropological methods. Examples include direct observation, the development of seasonal calendars, ranking games, and the reconstruction of local histories. Although the "rapid" methods are not specifically developed to capture technical IK, they have been used successfully to

do so. The participatory methods of PRA often yield valuable information on IK because they involve farmers as actors rather than as respondents. Farm maps drawn by farmers, for example, provide insights into a community's resource classification and use. Mixed approaches have been or could be used to record IK. For example, Mathias-Mundy et al. (1992) combined anthropological and appraisal methods with veterinary diagnostics to assess the ethnoveterinary knowledge of farmers in West Java, Indonesia. Surveys based on structured questionnaires are less suited to capture IK. The "discovery" of new IK requires recorders to be willing and open to techniques/practices that do not conform to patterns they learned to recognise during their studies.

Dr. Mathias-Mundy said that IK is what people do unconsciously and thus reports the ideal situation but the validation of IK had to come from other methods besides direct observation. Building rapport with villagers was crucial. Practices that could be used or recommended had to be identified. She concluded that the communities should have access to the study results to benefit the end-users.

■ Panel B

Indigenous Knowledge Systems (IKS)

The leader of Panel B was Dr. P.S. Ramakrishnan of Jawaharlal Nehru

University; Mr. Long Chun-lin of the Kunming Institute of Botany and Mr. Barun Gurung of SAGUN presented project results; and resource persons were Mr. Yu Xiaogong of the School of Environment, Resources and Development, Asian Institute of Technology, and Mr. Songwit Chuamsakul of MPCDE-HRI.

China

Mr. Long gave a slide presentation to illustrate the IKS of communities residing in the Zicishan Reserve. According to ancient Chinese legend, water and rain are controlled by dragons. The Zixi Mountain is the backbone of the dragon, which does not work unless the mountain forests are well maintained. Therefore, the water source forests in Zixishan are protected by the local communities for the sake of water. Recently, two stone tablets were found that describe in detail how to manage dams, streams, and drains; how to use water in the lower areas so that irrigation is unnecessary; and how to protect water sources and forests in the upper areas.

Traditionally, biodiversity management in Zishixan took the form of worship of holy trees, holy forests, ancient trees and plants in temples, and totems like *mayinhua*, *Rhododendron delavayi*, and the tiger. Mr. Long described the general model of agroforestry in Zixishan as "fruit trees + ground lotus (*Musella lasiocarpa*) + subsistence crops + beekeeping." The major agroforestry systems can be clas-

RESOURCE PERSON *Dr. Evelyn Mathias-Mundy is coordinator for the Regional Programme for the Promotion of Indigenous knowledge in Asia (REPPIKA), which was established in 1990 at the International Institute of Rural Reconstruction in Silang, Cavite, Philippines. The programme was designed to support the efforts of national centres in Asia to record, document, and utilise indigenous knowledge (IK). These centres are linked with the global network by: providing logistic support; facilitating the exchange of information and materials; and fostering collaboration between projects for recording, documents, and dissemination of IK.*

sified into five types and 15 system units. Among them, the most common and traditional type is agro-silvo-beekeeping, pastoral systems. Pear planting is a common practice; *Pyrus pashia*, a stock species of pear, is found all over Zixishan. Ground lotus (*Musella lasiocarpa*) is an indispensable component of the local agroforestry system. It is a pig fodder, a vegetable, and used for controlling erosion, ornamental purposes, weaving, and wine-making.

The practice of agroforestry is to increase the utilisation of lands, control soil and water erosion, improve soil fertility, reduce the pest population, and improve the fruit quality. The lotus plant is burned in winter when the leaves dry up because faster burning improved crops the following year. Holy trees and forests are central features of *Yi* society; villagers never cut sacred trees. Other traditional practices include the *Yi* adoption of *Rhododen-*

dron delavayi as a totem, the local people's preservation of a 600 year-old *Camellia*, and beekeeping. Bees played an important role in pollinating crops and trees within the system. The bee house is usually made from round wood, the open end of the wood sealed with buffalo manure, leaving a small hole for the bees to enter and exit. Though there are differences between different ethnic groups regarding IK, the indigenous communities have preserved traditional knowledge in one form or another.

Nepal

Mr. Barun Gurung, of SAGUN, gave a presentation on the IKS of the *Mewahang Rai* in Tamku, in the eastern district of Sankhuwasabha. The Rai are a distinct ethnic group who, together with the *Limbu* further east, are known as the *Kiranti* people. The *Mewahang* are a *Rai* subtribe. The gen-

Water Resources' Management

Water is a key factor for human survival. How to manage water resources becomes a part of indigenous knowledge, especially in the region inhabited by the Zijin and Yunqing communities in the Zixishan Reserve, where one of the only two water sources is to be found (the other one is in heaven!). In addition to irrigating the paddy fields and upland terraces, water from the forest of Zixishan is also used for humans and animals. According to an ancient Chinese legend (common to almost everyone), water and rain were controlled by dragons. When it was too rainy or dry, a dragon-worship ceremony would be held throughout a given region. There is a belief that the Zixi Mountain is the backbone of a dragon and is dependent on the gods who control the hills, forests, villages, lands, and water. The mountain is the foundation of the forest and the forest is the source of water. The dragon's backbone does not work unless the forests on the mountain are well maintained. If the forests are destroyed, the water will decrease and drought will occur. Therefore, the forest water sources in Zixishan have been protected, for Dragon worship is common throughout China. In the Zixishan region, dragon worship is manifested in the worship of forests and mountains and is connected with water resource management, as mentioned above. Forests in which the dragon is believed to live are preserved by traditional culture and folk regulations. Four stone tablets describing the relationship between dragons and forests were found in this region. They more or less have been acting as a basis for the rules of forest and biodiversity conservation since they were made 200 years ago.

Indigenous Knowledge of Plant Species

Use	Preference Ranking	No. of Species
Fuelwood	1	56
Fodder	2	84
Ag. Equipment	3	2
Timber	4	9
Fencing	5	9
Ritual	6	11
Rope	7	2
Household Equipment	8	15
Food	9	35
Shade	10	3
Medicine	11	18
Dyes	12	1
Erosion Control	13	16
Poison	14	4
Animal Feed	15	13
Roof	16	2
Manure	17	12
Animal Bedding	18	7
Mulching	19	4
Soap	20	3

eral body of the environmental knowledge of the *Mewahang Rai* ranges from resource classification to extensive utility and management practices. Their exploitative strategies cover a vertical range from 500 metres to 2,100 metres above sea level. They are able to identify over 200 plant species, some with multipurpose uses, e.g., 20 household articles and 12 types of agricultural, hunting, and fishing implements are made of bamboo.

The existing management practices indicate that IK extends to the biological relations between crops and other natural resources and that the knowledge is used effectively. **Erosion control practices consist of preparing bunds - maintaining** long fallow periods with vegetative cover following harvest, ploughing along the slope contour, propagation of species that control erosion, and building fences with live species that are multipurpose in nature.

The *Mewahang* also use manuring and management practices to maintain soil fertility. The *khira* leaf is used to

manage pests in crops. Weed control methods such as burning, flooding (by irrigation), and ploughing before planting (to expose weeds to the sun) are followed. The *Rai* also observe genetic resource and microclimatic management practices. General environmental knowledge and oral rituals are two sources of information for researchers. The utility classification of plant resources demonstrates a fairly elaborate process of selection upon which appropriate behaviour is determined. The *Mewahang* make a distinction between trees, bushes, etc, according to the root structure, shade potential, height, density, location, and elevation.

Rai perceptions of the environment are influenced by the creation myth, a distinct part of the *Muddum* or oral tradition. The creation myth is divided into four parts - origin, differentiation, migration, and creative deeds of the ancestors - starting from the beginning of the world, continuing with the establishment of traditional order, leading to the present condition. The ancestral stone *Sakhewahung*, gives meaning to the concept of *Ca:ri*, or clan territory. Among the *Mewahang*, the *Purkha* (clan elder), *Nokchung* (priest), and the *Bijuwa* (shaman) are three types of ritual specialists. They are knowledge holders (the source of cultural continuity) and bridge the spiritual and mundane aspects of the natural environment.

Ubhauri refers to the traditional upward migration of cattle and people to the higher pastures during the Nepali month of *Phalgun*. The *Ca:ri Puja* is performed by the *Nokchung* to commemorate *Ubhauri*. The *Udhauri* (southward movement of people and cattle from highland pastures) coincides with the end of the monsoons and the beginning of winter. The

Nwagi festival is performed in the *Khamang* or ancestral shrines within individual households to thank the ancestors for protection in the past season. The *sili* or ritual dances that retell the origin myth of the *Rai* are a significant component of *Rai* culture.

Mr. Gurung noted that migratory patterns were traditionally based on ecological factors of seasonal change. For instance, the wildlife migratory patterns and the change of voice in the *Orwo* bird due to a hormonal response to change in daylight hours provide the cue for the migration of people and livestock. Concluding, Mr. Gurung said that development strategies which incorporate the cultural explanation of the human-environmental relationship must be examined for their efficacy in empowering groups such as the *Rai* who live on the economic and political margins of the national mainstream.

Mr. Yu Xiaogong presented a paper on Protected Areas, Traditional Natural Resource Management Systems, and Indigenous Women : A Case Study of Xishuangbanna, China. He began by saying that mal-development has three consequences - destruction of biodiversity, extinction of "other cultures," and deterioration of the "other sex."

In the Xishuangbanna protected area of Yunnan Province, resettlement programmes have a considerable impact on the indigenous communities. The traditional natural resource management systems, IK, and indigenous women's role in natural resource management in *Dai* and *Jino* villages in and around the protected area are the subject of investigation. Findings reveal linkages between cultural diversity, women's role, and biodiversity conservation, Mr. Yu said. In the concerned protected area management system,

cultural bias was found to be a major obstacle to the efforts to conserve natural resources. Co-management was thought to be the best possible solution to protecting the area as well as to improving the socioeconomic conditions of the local people. It was a positive sign to find the staff of the protected area willing to co-manage the area with the local people, Mr. Yu said.

Under analysis, the Traditional Natural Resource Management System (TNRMS) was found to be functioning and proved to be economically, socially, and ecologically sound. The TNRMS principles are: sustainable use of renewable resources, biodiversity conservation, respect for natural processes, multiple use of resources, and lower external cost. Social institutions - community organisation, traditional knowledge system, ideology (social value, norms, co-ethics) and belief (religion, rituals) - interacted with and influenced the resource - use pattern of the people. Indigenous women were found to have a closer relationship with nature because they perform social production and reproductive tasks; any changes in the resource base were found to directly affect women.

In Mr. Yu's view, it is crucial for project area managers and conserva-

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RESOURCE PERSON *Yu Xiao Gang is currently a researcher in Gender and Development Studies, Asian Institute of Technology, Bangkok. He spent eight years researching Yunnan ethnic groups (Dai, Hani) at the Institute of Ethnology, Yunnan Academy of Social Sciences. His interests include indigenous knowledge, natural resource and environment management by local people, protected area and biodiversity conservation, gender and development issues.*

- Use
- Fuelwood
- Fodder
- Ag. Equipment
- Timber
- Fencing
- Ritual
- Relig.
- Household Equipm.
- Food
- Shade
- Medicine
- Dyes
- Erosion Control
- Fodder
- Animal Feed
- Road
- Manure
- Animal Breeding
- Shading
- Soap

tionists to be clear about conservation, i.e., biodiversity protection depends on empowering local people to make decisions based on their culture and knowledge system. He recommended the following.

—Protected area (PA) authorities should involve indigenous men and women in decision-making and planning.

—The PA authorities should share management power and responsibilities with indigenous representatives.

—Guards should be locally recruited as they are knowledgeable about the local ecosystem and wildlife.

—The traditional natural resources' management system should be evaluated and strengthened.

—A co-management plan should be formulated in terms of goals, objectives, and constraints.

—Traditional techniques for environmental conservation should be recorded and adapted.

—Cultural biases should be removed.

—Resettlement should be a last option after careful study has ruled out other solutions.

—Preservation of the cultural heritage is equally important.

—Social impact studies should be conducted.

—Continuing support is needed for successful resettlement, and the resettlement people should be allowed to maintain certain links with their traditional resource base, e.g., revisiting the sacred forests, etc.

—Further research needs to be un-

dertaken on indigenous cultures having a close relationship with biological conservation. Variables such as social values, beliefs, taboos, myths, rituals, and so forth should be studied. Ethnobotany, ethnobotany, and social science are important fields for research.

—There should be study and monitoring of the changes in the resource use pattern causing changes in the ecosystem and changes in the resource base leading to cultural changes.

—More research is needed on indigenous women's natural resource-use patterns relating to social values, ecoethics, and productive and reproductive functions, etc.

The leader of the panel, Dr. P. S. Ramakrishnan of Jawaharlal Nehru University, provided an ecological perspective of IKS. In his view, the application of the development paradigm to upland, traditional, often tribal, societies, within an extremely fragile though resource-rich mountain system, had either caused disasters or had not been able to penetrate the community.

Dr. Ramakrishnan said that it was important to catalogue traditional technologies and to improve them by understanding the processes involved. Keystone species were crucial in nutrient recycling during secondary forest succession. Many ecologically significant keystone species were selected by communities through social processes over time. He stressed that linkages between ecological and social processes had to be deciphered and used.

For instance, the natural ecosystem faced internal and external distur-

Hill tribes of Thailand

Eleven tribal groups in Thailand are believed to have migrated from Tibet, Burma, and China. A majority - 85 per cent - of them live in the northern region. From 1980 to 1982, they encountered several problems, including political ones. The government and the mainstream culture have largely ignored the indigenous knowledge systems of the tribes. Though new economic and social plans are formulated every five years, most tribes have not benefitted from them.

Mr. Songwit Chaumsakul of MPCDE-HRI blames the top-down - as opposed to grassroots' - development approach adopted. He stressed the importance of giving people the power to plan and decide for themselves. As they understand the local problems better, their solutions are more likely to be sustainable.

Among these tribes are the *Hmong (Miao)*, believed to have migrated from South China 200 years ago. Of an estimated 8,920,000 *Hmong* in Asia, 95,000 are in Thailand spread over 13 northern provinces. The *Hmong* are divided into two sub-groups - blue and white *Hmong*, denoting their clothing colour and their dialect, which is part of the Sino-Tibetan linguistic group. Believers in spirits, they summon their shamans in times of emergency.

The *Hmong* used to practise shifting cultivation and grew opium as a cash crop until stopped by a United Nations' directive. They cultivate field rice for themselves and maize for their livestock. Since their switch to settled agriculture, they grow a large number of marketable crops. But these changes have been accompanied by problems such as pesticide use, heroin use, the adjustment to a new way of life and culture, and the erosion of traditional beliefs. The *Hmong* have also had to put up with constant military conflict in the area. According to reports, the many who migrated to western countries have experienced problems adjusting.

bances, but *Quercus* species could be used to conserve moisture within the soil sub-system. Biological invaders, e.g., exotic weeds (endemic to Latin American countries) posed a threat. Dr. Ramakrishnan said it was important to reconcile the adverse effects and the useful role of these biological invaders. In terms of human resource development, PAR and PRA were useful, but mere cataloguing of IK was not enough and process-level studies were necessary. Ecologists should consider the linkages between sustainable development, rehabilitation, and other driving forces.

Concluding, Dr. Ramakrishnan said that process-level studies should form the basis of development strategies. He suggested (i) transfer of agricultural technology for *jhum*, valley cropping, or home gardens between tribes to improve ecological/economic efficiencies; (ii) maintenance of a minimal 10-year *jhum* cycle; (iii) strengthening the

agroforestry component of the *jhum* system; (iv) considering animal husbandry and domestic sub-systems as integral parts of the agricultural sub-system; (v) altering crop cultivars based on soil nutrient status and incorporating pisciculture for high economic/ecological efficiency levels in agriculture (*Apatanis* of Arunachal Pradesh follow this practice); (vi) biological lessons and traditional practices should be integrated; (vii) use of keystone species; (viii) soil fertility maintenance based on the recycling of organic residue waste, selection of appropriate crop cultivars, maximising nutrient use efficiency by crop placement patterns, tree architecture, and agroforestry inputs; (ix) 'sacred groves' as a storage of ecological knowledge useful for restoration ecology; and (x) development packages tailor-made to a given ecological situation though based on socioeconomic and cultural understanding.

■ Panel C

Local Organisational Strengthening

The leader of Panel C was Dr. N. Ishwaran of UNESCO's Man and the Biosphere Programme; Mr. Long Chun-lin (KIB) and Mr. Buddhi Tamang of SAGUN presented project findings; and Mr. Pralad Yonzon of Resources' Nepal was the resource person. The theme: Local Organisational Strengthening.

Nepal

Mr. Buddhi Tamang said that, in the past, local youth were organised in the youth organisation (class organisation) of the *Panchayat* era. From 1983 to '89, these organisations became dysfunctional, and most youth members had left the organisation to join the communist party. In the '80s and '90s, some organisations (*Silichong* Club, a sports club) had formed a sheep-rearing group, *Nitkosh* (a grassroots' group concentrating on agriculture), and *Golkhandi* Forest Users' Group.

Mr. Tamang identified the causes of organisational failure during the 15 years as: 1. interference of political organisations; 2. lack of leadership at the community level; 3. inappropriate use of funds for government-sponsored drinking water projects; 4. lack of transparency regarding financial accounts;

and, 5. faulty government approach to institutional development.

The impact of failure was the lack of unity and group feeling, the underdevelopment of organisational mechanisms, the distrust of outsiders, lack of leaders to initiate community development, improper utilisation of natural resources, and improper tapping of available resources and services of GOs and NGOs.

Mr. Tamang said that SAGUN had identified the formal and informal leaders of the local organisations and initiated contacts. According to an informal agreement with *Silichong* Club, SAGUN would undertake activities such as 1. consolidation of the Club through drafting of a new constitution with community development objectives; 2. development of a programme strategy; and 3. formation of sub-branch committees at the VDC level. Grassroots' groups, women's groups, forest users' groups, drinking water users' groups, Arun Cooperative, and *Sagarmatha Janasanskrit Paribas* (SJP) were other groups with whom SAGUN maintained contacts.

The *Silichong* Club formed a culture committee (15 members) for cultural revival, especially of the *Mewachang Rai*. Along with SAGUN the club organised training programmes for a forest nursery, winter crops, record keeping/management, kitchen gardens, village project planning, bamboo crafts, wool knitting, and agricul-

RESOURCE PERSON *As the founder director of the G. B. Pant Institute of Himalayan Environment and Development, Professor Ramakrishnan initiated research projects in Kumaon, Garhwal, the north-eastern hills, and Sikkim, based on a project formulation phase in an initial workshop involving scientists, planners, administrators, and NGO groups from the region. He is currently involved in networking with ecologists on a variety of local, national, regional, and international programmes based upon ecology-socioeconomic, interactions, and his own continuing research efforts on ecological processes/sustainable development related to areas in the north-eastern hills, the Himalayas, and the Western Ghat region in India.*

People and Parks in Nepal

When the Protected Area system was introduced in Nepal with the establishment of the Royal Chitwan National Park (RCNP), the rhino population was nearly decimated. Over time the rhino count reached 400. In 1993, 57,000 tourists visited the park, yielding a revenue of 30 million rupees, out of which 10 million rupees was ploughed back into buffer zone communities. The park had 78 elephants, which needed green fodder each day. The RCNP supported the daily needs of 70,000 people. Although the national park system is not a water-tight compartment, people appear to be able to fulfill their needs from it, if illegally at times.

Problems are inevitable when the household subsistence economy encounters the market economy. In the Langtang National Park, the establishment of the cheese factory prompted villagers to keep more cows. Increasing cattle grazing resulted in decreasing forest cover at the cost of catering to the local cheese market for tourists in Kathmandu. It is evident that economic incentives play an important role in resource management.

tural extension. Mr. Tamang believes a linkage building (with GOs and NGOs) programme is significant in institution building. The task of local institution building is crucial and is accomplished by conducting various types of training, meetings, talk programmes, contacts with individuals, and networking.

Organisational capabilities, however, are built up only through tremendous efforts. The *Silichong* Club and grassroots'/users' groups had enhanced their knowledge and skills and developed self-confidence through mobilisation and management of locally available resources. But existing activities are not sufficient to sustain the groups under the changing circumstances. Therefore, *Silichong* Club and SAGUN have agreed to develop additional training programmes and activities at the micro-level.

Mr. Tamang outlined the following activities for possible implementation in the future - (i) excursion tours (farmer-to-farmer exchanges); (ii) training on development concepts and prevailing practices; (iii) leadership development training; (iv) encouraging women's participation in development; and (vii) further assistance to cultural revival of the *Mewahang Rai*.

Some positive developments are the conversion of Golkand, Mulpani, and Legigurans forests from government to community forests, and the introduction of beneficial agroforestry practices (management of fruit trees) intercropping, cash crop plantation, pest control, livestock improvement, forest management activities, and local craft production.

China

Mr. Long Chun-lin, of KIB, told participants that the Zijin and Yunqing communities had a committee of five to seven representatives, including the village head, co-head, accountant, secretary, women, and youth members, all of whom were elected by the villagers. He said a community committee was the basic unit of village management and was also a bridge connecting local government and the village. The women's association united the women of a village for specific programmes such as health, child care, and birth control. Embroidery and culture were also included in the programmes. Zijin and Yunqing had also formed horticultural associations to introduce and manage fruit production and home gardens. Each association consisted of seven to eight farm-

ers who could read and had mastered some skills. Mr. Long stressed that rural organisations had to be strengthened to achieve rural development. He suggested that farmers' organisations could play the role of instructors, organisers, executive bodies, and management boards. In several respects, local organisations had been strengthened. For example, the training in cultivation and management of fruit trees had improved the ability of horticultural associations. The farmer-to-farmer exchanges in and outside Chuxiong had sharpened the perception of committee members and farmers toward village-level planning and rural development since the project's initiation in 1992.

In the view of Dr. N. Ishwaran, local organisations revolved around 'development' as people could not help being affected by outside influences. There was no alternative for the traditional systems but to bear the impact of the market economy. However, their responses to outside influences depended on the strength and status of the systems. Research on development activities did not reflect on conservation. He reiterated that conservation, research, and development should be linked for local development and biodiversity conservation. He noted that strengthening local organisations also involved strengthening other forms of organisation, e.g., administrative levels.

■ Panel D

Biodiversity Management

The leader of the Panel was Dr. Gary Martin (UNESCO); resource persons were Dr. T.B. Shrestha (IUCN) and Dr. Alton Byers (Project Co-Manager, Makalu Barun CP); Mr. Long Chunlin (KIB) spoke about biodiversity at the project site.

China

Mr. Long spoke of the beliefs of the Yi people and how these dictated their conservation behaviour. The tiger is a totem of the Yi people who are also known as the nationality of the tiger. In Zixishan, the tiger survived until the 1960s; it was protected by the traditional Yi religion. The Yi also worshipped holy trees such as Chinese ilex, oak, *Keteleeria evelyniana*, and other species on special religious festivals. The holy forest behind Longwangmiao village was a burial hill which was conserved by village laws. Such forests provided birds and small mammals with a suitable habitat. The rhododendron was a symbol of the Chuxiong Yi Autonomous Prefecture besides being a Yi totem.

According to Yi legend, the *Mayinghua* flower saved the Yi people from extinction. Forests in which the dragon was believed to live were preserved by cultural and folk tradition.

RESOURCE PERSON *Dr. Natarajan Ishwaran is with the Environmental Sciences' Regional Office for Science and Technology, UNESCO, in Jakarta. His special area is terrestrial ecology, natural resources' management, conservation of biodiversity-with emphasis on management of protected areas-and human resources' development in environmental sciences. He is currently coordinating UNESCO's Jakarta operations on a UNESCO-WWF Joint Project on "Traditional Plant Resource Use by Indigenous People in the Kayan-Mentarang National Park, Kalimantan, Indonesia." He is also coordinating the UNESCO inputs in traditional forest resource ownership and use and their impacts on biodiversity conservation in PNG.*

People and Plants' Initiative

Begun in July 1992 as part of the Man and the Biosphere Programme (MAB), the People and Plants Initiative is a joint effort of the WWF, UNESCO, and the Royal Botanical Gardens, Kew. It focuses on field activities in biosphere reserves, World Heritage sites, and other natural areas in which partner organisations have been active. The key objective of the People and Plants' Initiative is to support the work of ethnobotanists in developing countries on the use and sustainable harvesting of plant resources as well as on the application of the results of research in conservation and community development. Training workshops are held for participants on ethnobotanical methods drawn from various academic disciplines. At the sites of field projects, People and Plants' coordinators, with local people, park personnel, and researchers, prepare inventories of useful plants and appraise the effects of harvesting specific plant resources in and around the protected areas. Scientific and popular literature, as well as practical method manuals on ethnobotany, resources' harvesting, and other related topics, were also distributed.

People and Plants are carrying out projects in Kinabalu Park (a protected area in Sabah, Malaysia), Beni Biosphere Reserve (northern Bolivia), northern Sierra (Oaxacastate) in Mexico, and Mixe (indigenous town of Totontepec). Though all have diverse cultural and natural areas, they share a common approach to ethnobotanical exploration in protected areas. The emphasis is on reinforcing subsistence use and small-scale commercialisation of plants that contribute to the well-being of rural communities, enhancing their capacity to participate in conservation efforts.

All work is carried out by teams of local people, park personnel, researchers, and university students to build up local expertise in ethnobotany and to reinforce interaction between communities, national scientific institutions, non-government organisations, and conservation agencies.

Four stone tablets from 200 years back relate the relationship between the dragon and forests. Gods and holy beings are believed to live in ancient trees, which were left alone to let the deities to die naturally. Thus forests surrounding temples and nunneries in Zixishan were preserved out of religious piety.

Dr. T.B. Shrestha of IUCN noted that indigenous knowledge is based on nature. Nepali villagers believe the cuckoo bird sings 'kaphal pakyo' - "the Kaphal fruit is ripe" - and the 'biu biu' cry of another bird is a warning that seeds are rotting. The rural lifestyle follows the rhythm of nature, and hu-

man beings are seen to be part of nature, i.e., in their perception of a microcosm in a macrocosm. In Jumla, if a son who left the village in search of employment or on another purpose does not arrive for rice plantation by a certain date, he is presumed dead. This is because the plantation period in Jumla is extremely short and delay is critical.

Citing other practices of indigenous knowledge, Dr Shrestha said that some villagers observe body temperature to initiate rice germination; others use the head of the shrike bird in the first rice-feeding ceremony. In the *bel* marriage ceremony, the wild *bel* fruit

RESOURCE PERSON *Dr. Tirtha Bahadur Shrestha is a plant ecologist who has spent 25 years in plant collection and botanical research in the Nepal Himalayas. Presently he is the programme coordinator for the Heritage and Biodiversity Conservation Programme of the IUCN. Prior to this, Dr. Shrestha was the task force coordinator for the Woodlands Mountain Institute's Mahalu-Barun Conservation Project. His Senior Research Fellowship at ICIMOD resulted in a study of the Development Ecology of the Arun River Basin in Nepal. He was affiliated with Nepal's Department of Forestry and Plant Research for 31 years.*

RESOURCE PERSON *Dr. Alton C. Byers is a representative of the Woodlands Mountain Institute, U. S. A. The Makalu-Barun National Park and Conservation Area, the eighth established in Nepal (in 1991), is designed to protect 1,500 sq. km. of virtually uninhabited wilderness and includes Nepal's first Strict Nature Reserve in the pristine Barun valley. The 830 sq. km. Conservation Area south and southeast of the Park is designed to encourage its 32,000 residents to become actively involved in biodiversity protection, cultural conservation, and joint parks/people management systems.*

is used. The *Newari* ceremony for a person who has reached 77 years, 7 months, and 7 days' old calls for 80 plant species. The linkage between cultural and natural survival is evident from the numerous natural items required in cultural ceremonies. There are religious forests all over Nepal; sometimes, they are the only source of indigenous plant seeds. Buddhists speak of hidden valleys where monks and priests hide during times of upheaval and where sacred texts are hidden and preserved. About 18 such valleys have been identified. Unregulated collection of medicinal plants for commercial purposes, however, threatens the survival of many indigenous plants.

In the Makalu-Barun area, slash-and-burn cultivation is practised. Bears are killed for their gall bladders (which are believed to have curative properties and have commercial value) and meat (for protein). It is said tourism is Nepal's third religion, after Hinduism and Buddhism. Given these vast changes, there is more reason to pre-

serve indigenous knowledge.

Referring to the Makalu-Barun Conservation Project (MBCP), Dr. A. Byers, Woodlands Mountain Institute (WMI), said that management-oriented research programmes were designed to promote biodiversity conservation within the National Park and in the Conservation Area. To minimise conflicts between people and the park (resource use versus wildlife), innovative buffer zone models have been developed which need to be field-tested, for which core funding is essential.

Wildlife crop depredation, threats to human safety, effect on local income from crop loss caused by animals, and compensation are issues that are not yet well documented. Each park requires on-site specific investigation. Fencing, increased production of natural food sources within the park (*Chital* deer in Chitwan National Park), the planting of crops that do not attract wildlife, keeping larger dogs to discourage wolves and wild dogs, and controlled harvesting are some options. Dr. Byers said substantially increased international funding is required to actually implement the already sound park/people models available.

Dr. Byers believes traditional land use and innovative habitat manipulation are the key to biodiversity conservation. According to an ecologist doing research in the Makalu-Barun Park, certain ground warblers are good indicator species as they nest on or near the floor of the oak/chestnut forests

Use has to be made of local experts, hunters (Shikari), and it is crucial that the younger generation do not lose IK skills.

of Chitre. According to studies, the provision of adequate nesting habitats can be made possible without disrupting traditional grazing patterns and/or imposition of other restrictions. Hands-on training should be provided to local people in biodiversity conservation techniques; these are useful in user group management planning. Approximately nine months' training is required for a local person working with a researcher. Motivation and flexible management are essential; education enhances villagers' receptivity to change. Cultural conservation is an important dimension of nature conservation.

Use has to be made of local experts, including hunters (*shikari*), and it is crucial that the younger generation do not lose IK skills. Given the difficulty of conveying the purpose of the project to the local people, it would be ideal to combine traditional land-use systems, with which villagers are familiar, with innovative research models.

In concluding, Dr. Byers identified the following as important considerations: park-and-people conflicts; the funding roles and requirements; the application of IK and the involvement of the local people and, where traditional land-use systems and innovative habitat manipulation/restoration techniques were concerned, the role of innovative research models and project management strategies; use of traditional plant and wildlife knowledge and skills as educational tools; motivated and trained staff; and sufficient funding.

Discussion

Panel leader Dr. Gary Martin observed that keystone species and the species identified as important by the local people are often similar. In his

view, IK is more holistic than the scientific framework of reductionism, and he congratulated ICIMOD on its interdisciplinary approach. The gender, age, and level of education should be taken into account. It is necessary to close the gap between knowledge and the use of knowledge in development.

Questions and Discussion

Dr. A. Byers noted that agricultural lands and forests often border one another and this interface results in conflicts.

Dr. Sukumar suggested that park-people conflicts can be resolved only through consensus between the local people and the authorities,

Dr. Ishwaran said solutions had to be site-specific.

Dr. Gary Martin pointed out that there is no statistical difference between what the adults and children know in Mexico; he said the body of IK is growing in some places. The documentation of oral knowledge in text books sometimes endangers the body of IK because an 'outside' view can inadvertently include certain classifications and systems. Oral systems are vulnerable and it is possible for IK to disappear in a generation or two. In his view, this is a critical issue and efforts are necessary to ensure that IK is not lost from the community or region.

IK catalogued can be subject to outside commercial exploitation. Of the two, cultural diversity is far more vulnerable than biological diversity to outside influences.

Species that are socially significant to local people often have ecological significance too. Keystone species are often protected by indigenous communities.

Dr. Ishwaran warned that IK catalogued can be subject to outside commercial exploitation. It is crucial to formulate and enforce a biodiversity policy, Dr. Gary Martin said. Noting the linkage between cultural diversity and biological diversity, Dr. Campbell said, of the two, cultural diversity is far more vulnerable to outside influences. He said that other than documentation, techniques to preserve cultural diversity had not been developed.

But it is necessary for the community itself to recognise the value of IK, stressed Dr. Mathias-Mundy. She said IK had been documented in Bolivia, but from the point of view of the local communities, a tropical rainforest once lost cannot be recreated.

Language is a powerful means of recapturing IK, Dr. Campbell said. With the loss of language, the local categories too are lost. Dr. G. Martin believed emphasis should be laid on ensuring the survival of a tradition that is alive rather than recreating something already lost.

Mr. Francis Childe (UNESCO) said no culture can exist in isolation; its own population pressure would de-

mand that old rules and teachings change. New responses are needed for fast-changing conditions. He said scientific methods and traditions should be brought together and local people themselves should be engaged in the process of action-oriented research. Consideration should be given to the linkage between cultural and biological diversity, he added, and cited the example of Laos, Burma, Thailand, Vietnam, China, and the Cambodian border areas, all of which shared a similar culture and ecology.

Dr. Ramakrishnan observed that species that are socially significant to local people often have ecological significance too. In sacred groves, the important species are preserved. Keystone species are often protected by the indigenous communities. Therefore, scientists could benefit from looking into traditional practices as they had evolved over time and as their suitability had won acceptance.

In concluding, Mr Pelinck said cultural and IK systems are dynamic in nature. Reiterating ICIMOD's commitment to IK and biodiversity conservation, he said ICIMOD is interested in continuity, development of alternative concepts and paradigms, and partnerships with like-minded institutions. It is necessary to use indigenous knowledge for development, Mr Pelinck said. A range of options can be developed for the best use of both IK and external (scientific) knowledge. Therefore, future contacts and follow-up programmes are necessary. He said he hoped the exchange of views from different parts of the Hindu Kush-Himalayan Region and from those outside had been beneficial.

Cultural Context of the Natural Resource Management Project-under the UNESCO World Decade for Cultural Development Programme

In the last three to four years, social scientists, NGO workers, and village leaders in Southeast Asia have rethought the idea of development and turned again to traditional knowledge systems in order to understand natural resource management. Consider the successful projects that integrate traditional knowledge into natural resource management projects such as the community forestry projects in India and Thailand and the coastal resource management projects in the Philippines and Thailand. Other development projects integrating traditional knowledge have focussed on Participatory Action Research (PAR) and people - centred development projects.

The purpose of the project activities is, ultimately, to promote better understanding of the cultural context of resource management among academics and NGO workers in six mainland Southeast Asian countries: China, Thailand, Laos, Vietnam, Cambodia, and Myanmar. Participants will learn from each other by exchanging experiences, attending study tours, and conducting case studies. In the long term, the proposed activities would encourage the formation of a network of like-minded researchers actively involved in the development process and interested in the cultural context of resource management.



J. GURUNG

Preserving cultural traditions in Bhutan