Environmental Change and Ecosystem Services

The Environmental Change and Ecosystem Services (ECES) programme links the stability of ecosystems with the livelihoods of mountain people by monitoring ecological and socioeconomic changes, analysing the consequences for the livelihoods of mountain people and of downstream inhabitants, and developing, assessing and disseminating potential adaptation approaches and technologies. It facilitates the development of appropriate policies, and innovative and equitable compensation mechanisms for ecosystem services, including freshwater and carbon sequestration.

The Centre works with the people of the region to conserve and manage biodiversity as a natural heritage, and a resource for livelihoods and ecological resilience and works to ensure that coping and adaptive strategies will be scaled up while building the capacity of communities, professionals, and national institutions.

ECES works in four action areas:

- Integrated Watershed Management (IWM)
- Biodiversity Conservation and Management (BCM)
- Rangeland Resource Management (RRM)
- Community and Livelihood Forestry (CLF)

In 2008, the main achievements in the ECES programme included the following.

- An ICIMOD study showed how local communities in the Himalayas are able to measure the carbon sink in forests – an important contribution to the expansion of the Kyoto Protocol.
- The Centre prepared a plan for landscape biodiversity corridors for the Kanchenjunga landscape in India, Nepal, and Bhutan. Regional partners have agreed on the plan and approach as a working basis to expand it to other places in the region.
- The rangeland programme carried out a pilot project on energy-related technologies for mobile herders and range people. It managed to show that alternatives can contribute to the energy resources of mobile people and enhance their livelihoods in the long term.
- An international conference accompanied by a series of workshops (see page 13) was organised to discuss various aspects of mountain biodiversity and climate change. The participants stressed the need for reliable data and regional cooperation in order to develop the information base needed to address the problems. The transect approach proposed by ICIMOD was agreed to be a valuable approach to help fill the data gaps and ensure consistency.

Partners' voices: "we are learning from the community.."

ICIMOD's Regional Rangeland Programme works with partners in six countries. Several of its partners previously did research on ecological processes; ICIMOD has introduced the idea of working with local people.

Dr Luo Peng of the Chengdu Institute of Biology (CIB), Chengdu, China has worked in partnership with ICIMOD for ten years. He commented on the impact of the collaboration.

"CIB is an academic institution so we generally used different research approaches which focused on natural aspects of the system in the past and had not recognised the importance of local communities' participation.

Through our collaboration with ICIMOD, we improved the project design and implementation to involve both the government and the nomadic community. ICIMOD encouraged us to invite the community to participate in research on water, climate, and grass resources of the area.

We are learning from the local community. Now we know how and why people use certain grasslands and rely on water sources. With this knowledge, we can improve the grassland enclosure management and promote community management of rangeland resources."

Partners' voices: "Good lessons for the future.."

For eight years, ICIMOD has worked with the Aga Khan Rural Support Program in the remote Chitral district of the North West Frontier Province of Pakistan. It has collaborated on projects for honeybees, rangeland management, and most recently, alternative energy technologies.

In this arid environment, only 3 % of the land in Chitral is cultivated and 60 % is potential rangeland. Most of the population depends on livestock for their livelihoods, but the land is being damaged by overgrazing and shrub collection.

Mr. Sardar Ayuab, the Regional Program Manager, described the programme's partnership with ICIMOD and its impact.

"In Chitral, we are experiencing problems from climate change because 60% of the land is already so dry. With ICIMOD's ongoing partnership, we are able to work on three inter-related aspects regarding climate change.

First, we have built the capacity of the staff through exposure visits and training by ICIMOD in Nepal. We have also been able to provide training for local people on rangeland management and as a result, they have formed Rangeland Committees. ICIMOD has also provided technology and new seed for plantations and training for locals to grow and market medicinal herbs. This work has created a model and lessons learnt, which we are now preparing to replicate in another watershed through funding from the Poverty Alleviation Fund.

Climate change affects the mountains, but we have realised that there are no studies on glaciers and disasters. With ICIMOD, we are documenting indigenous knowledge so we can replicate the knowledge and share it with communities. We also have a study in progress that will give baseline to negotiate with government to take action to mitigate disasters.

Through ICIMOD, we are able to work on climate change, glaciers and water and rangeland management. The partnership gives us good lessons for our work in the future."

Kyoto: Think Global Act Local

– Building capacity to prepare for carbon trading

Famers in the Himalayan region have been successfully managing their forests for a long time to meet their sustenance needs and sustain their mountain livelihoods. The success of community forestry in the region is globally recognised.

From 2003 to 2008, ICIMOD in collaboration with the University of Twente, the Netherlands, started to analyse the relationship between community forest management and the biological sequestration of carbon. The project was a pioneer for research globally and analysed the Kyoto global climate treaty at local levels through community forest user groups.

With the help of local partners, the project set up permanent plots at six sites in India and Nepal to monitor the changes in biomass in community managed forests. It worked with NGOs to train local people to conduct forest inventory work and monitor the carbon pool in their forest on an annual basis, thus reducing the transaction costs in assessing carbon.

The ICIMOD research project generated the scientific data needed to measure biological carbon sequestration in community managed forests in the Himalayan region. Several interesting results have emerged from this research namely:

- Forests managed in a sustainable manner provide an opportunity to mitigate greenhouse gas emissions relative cheaply;
- Community forest management contributes to climate stabilisation as it avoids deforestation and forest degradation and enhances forest biomass.
- Forests managed in a sustainable manner by local people sequester more carbon annually than unmanaged forests.

In addition, at the global level, the results gave ICIMOD (and many other institutions) the data to highlight the needs of local forest users. Consequently, the 2007 Bali Action Plan explicitly states that local people's rights must be respected when action is taken to mitigate emissions.

The results have also enabled ICIMOD to substantially contribute to the debate on Reduced Emissions from Deforestation and Forest Degradation (REDD) policy. They highlight the need to include rural populations that manage and conserve forests in the REDD policy, which is an expected global policy outcome at the forthcoming Copenhagen climate conference in December 2009.

Given these results, ICIMOD has made several submissions to the Subsidiary Body for Scientific and Technological Advice (SBSTA), provided inputs for the Government of Nepal in developing a proposal for the World Bank's Forest Carbon Partnership Facility (FCPF), and assisted civil societies in submitting the UNREDD proposal (through NORAD).

Transboundary landscape conservation

- Promoting landscape connectivity as a strategy to adapt to climate change and sustain ecosystem services

For over a decade, transboundary biodiversity conservation has been one of ICIMOD's main initiatives because protected areas in mountainous landscapes are often separated by international boundaries.

The Convention on Biological Diversity (CBD) has been encouraging an 'Ecosystem approach' in biodiversity conservation through development of 'conservation corridors' to form large-scale landscape systems of interconnected protected areas across boundaries. Countries are encouraged to develop effective landscape management, including across boundaries, to help reduce biodiversity loss. ICIMOD is facilitating the approach in critical transboundary landscapes in the Hindu Kush-Himalayan region.

Since 2003, ICIMOD has worked intensively in the Kangchenjunga landscape which spreads across eastern Nepal, Darjeeling and Sikkim of India, and western Bhutan. It has facilitated consensus among various stakeholders and is now advocating for the national planning processes to include transboundary landscapes and development of conservation corridors. One focus of the initiative was to enhance the capacity of communities, NGOs, and government organisations to address conservation and ecosystem management challenges through technology transfer and promotion of conservation-linked livelihood options. The initiative provided training programmes on the formation of self-help groups, and tested, demonstrated, and provided training in good practices such as ecotourism, medicinal and aromatic plant cultivation, off-season vegetable farming, floriculture, sericulture, beekeeping, production of cash-crops using an agroforestry model, non timber forest products, silviculture, and forest resources management, to farmers in the corridor areas. The good practices were promoted by forty households, which prompted 26 additional villages in the six corridors to scale up their agricultural practices. Nearly 600 farmers from the corridor villages in the Darjeeling area were also given training in organic farming, which helped them to understand various aspects of biodynamic agriculture, greenhouse technology, composting, and pest management.

The household income of these beneficiaries increased by 20% (preliminary analysis). ICIMOD has continued facilitating the partners' initiatives in the corridor areas through technical support and advisory inputs, while many co-financing projects from the Critical Ecosystem Partnership Fund (CEPF) have helped partner organisations to further scale up activities in the project area.

The Kanchenjunga Landscape now provides an integrated model for effective conservation. The experience gained has been instrumental in starting new initiatives in the Namdhapha-Hkakaboraji-Gaoligongshan landscape shared by China, India, and Myanmar; the Kailash Sacred Landscape shared by Tibetan Autonomous Region of China, Nepal, and India; and the Karakoram complex shared by China and Pakistan.

Promoting sustainable energy for nomadic herders

After one year of a trial project, daily fuel saving by nomadic households during the winter months now averages between 25 and 55% in all the project sites except China (12-17%), where people were already using some form of improved stoves.

In 2007, with financial support from the Austrian Development Agency (ADA), ICIMOD started a pilot demonstration project – Development of Sustainable Energy for Rangelands (DESER) – in Bhutan, China, Pakistan, and Nepal to find sustainable solutions to energy problems that effect the overall sustainability of the ongoing Regional Rangeland Programme.

The project developed a knowledge base on the household livelihoods and energy situation. It conducted site testing of energy technologies using a participatory action research approach including field investigations, a baseline survey, and technology identification, modification, fabrication, and testing before piloting. DESER also supported regional training of trainers, monitoring the performance of the technologies, and finally documenting and sharing the results and experiences during national stakeholder workshops conducted in all four countries.

Three types of stoves were provided that show a good degree of efficiency and were in most cases socially acceptable. The stoves save fuel, reduce indoor air pollution and GHG emissions, and reduce the drudgery of herders, especially women. Portable solar lamps were also provided and have become very popular because they replace kerosene and dry cell batteries.

Tangible impacts have already been generated at the government level. The Royal Government of Bhutan has incorporated a renewable energy programme for rangelands in its Tenth Five Year Plan. In Pakistan, the district government of Chitral provided seed capital to promote the pilot activities and NWFP has made budgetary provision for the promotion of renewable energy. After participating in the training of farmers, a private entrepreneur has invested in an enterprise to fabricate these technologies. Individuals are also making the stoves themselves.

In China, a new portable solar biodigestor has been designed is currently being tested in the private sector. The government of Hongyuan County has decided to scale up all proven technologies. In Nepal, the Alternative Energy Promotion Centre has included scaling up of the piloted technologies in their annual plan for the rangeland areas.