

Introduction and Inaugural Session

Introduction

From its establishment in 1983 until 2004, the International Centre for Integrated Mountain Development (ICIMOD) rented offices in Jawalakhel, in Kathmandu's sister city of Lalitpur. Following the generous contribution of 1.5 hectares of land by His Majesty's Government of Nepal in 2000, ICIMOD constructed its own headquarters at Khumaltar (4 km south of Jawalakhel). A state-of-the-art architectural design by renowned architect Tom Crees was selected in 2001 from a number of bids. The foundation-laying ceremony took place in December 2002 in the presence of members of the ICIMOD Board of Governors and the ICIMOD Support Group. Construction started immediately afterwards. Despite many constraints, work progressed largely on schedule and the building was completed by the end of 2004 – and ICIMOD moved into its new headquarters building. This was indeed a milestone, heralding a fresh beginning for the mountain development institute.

The Symposium

ICIMOD celebrated the inauguration of the new building together with its 21st Anniversary by holding a symposium on 5-6 December 2004 on 'Securing Sustainable Livelihoods in the Hindu Kush-Himalayas: Directions for Future Research, Development and Cooperation'. The purpose was to reflect on the Centre's achievements over the past two decades, to look at future challenges in the Hindu Kush-Himalayan (HKH) region, and to contribute towards the improvement of regional cooperation and knowledge sharing. The specific objectives were:

- to draw lessons from the success and failures of the past twenty years;
- to identify contemporary and emerging challenges, posed by global warming and climate change, to the environment of the HKH region; and identify priority research and development needs in relation to long-term environmental security;
- to identify contemporary and emerging socioeconomic challenges and opportunities faced by mountain communities; and
- to strengthen ownership of the Centre by the Regional Member Countries and to strengthen partnerships at various levels between civil society, research and development agencies, government and non-government agencies, the private sector, and the international community in order to improve the sustainability of the Centre and its services

There were nearly 100 participants including high-level government officials, members of ICIMOD's Board of Governors, representatives of donor agencies, representatives of Regional Member Countries, international non-government organisations (INGOs), and non-government organisations (NGOs), and academicians, researchers, and development professionals from the social and natural sciences. Eminent scientists from the development field in the social and natural sciences and members of ICIMOD's Board of Governors were invited as keynote speakers and panellists. The Symposium Sessions were planned according to ICIMOD's new Medium-Term Action Plan strategy on 'Partnerships in Mountain Development, Securing the Future of the Hindu Kush-Himalayas'.

The proceedings of the symposium are presented in the following: the contributions to the Inaugural Session, Sessions I to IV, and the Closing Session are presented in separate sections; the programme and list of participants are provided in the Annexes. The sessions were prepared in the form of a keynote presentation followed by shorter presentations from a group of panellists and a plenary discussion in which the floor was open to the participants who put questions to the speakers. The rapporteurs of each session summed up the main findings and recommendations in a concluding session. In some cases the speakers prepared a full paper for publication, in others the main contents of the presentation was transcribed from recordings, notes, and slides used in the presentations.

Opening Speeches

Welcome Speech

Dr J Gabriel Campbell, Director General, ICIMOD

Your Majesty, your Excellencies, the ICIMOD Board of Governors and Support Group Members, distinguished mountain scholars, development practitioners, and all other mountain lovers and friends. Thank you for joining us on our 21st birthday as we mark our maturity with a new home. Thank you for helping us to celebrate the excitement of continuing our mission to serve mountain people and environments in Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan, as well as the rest of the mountain world.

ICIMOD was founded 21 years ago by some of you sitting here today as a bold idea. It was founded with a deep personal and professional commitment to bettering the lives of millions of poor mountain peoples and to reversing the accelerating deterioration of their environments. It was founded on the idea that mountain peoples had more to learn from each other, than from technical and socioeconomic solutions developed for the plains below. It was founded with the hope that the magnificent natural resources, the glorious diversity and depth of cultures and adaptations developed in the mountains, and the spiritual inspiration and renewal that they have provided to peoples of all beliefs, could be saved, and that these resources could be nurtured, cherished, and safeguarded for the benefit of poor mountain peoples and for the hundreds of millions of people relying on these treasures for their lives downstream. Perhaps most boldly, ICIMOD was founded on the agreement of eight countries in a region better known for tensions and occasional hostilities than for setting up institutions for regional collaboration.

Ladies and gentlemen, ICIMOD's founders were not only far seeing, they were right. Their ideas have stood the test of time. Their vision is now shared by many throughout the world, and the number of mountain regions establishing their own versions of ICIMOD is increasing. The knowledge and insights that have grown out of ICIMOD's work are now enshrined in the world's documents – the Rio Earth Summit¹, the

¹ United Nations Conference on Environment and Development (UNCED), Rio de Janeiro, 3-14 June 1992

Johannesburg World Summit on Sustainable Development² – and more importantly, in the numerous policy and programme decisions made by mountain states and provinces, operational departments and NGOs, farmers and their husbands throughout our region.

Mountains are different. We have to live in them differently, respecting and responding to their dynamic movement of snow, ice, water, and soil – their immense variation of eco-niches, habitats, challenges, and opportunities. It costs more to live in the mountains – more calories to move up and down, more investment to build roads or deliver services. But then mountains give us more; they are the primary source of our water, our hydroelectric potential, our biological diversity, and our spiritual sustenance.

Unfortunately, mountains are also often home to immense hardship and poverty, and social and physical vulnerability. Their residents have often suffered from less access to health, education, infrastructure, markets, and opportunities. Too many of their peoples, especially the socially excluded and women, have suffered from discrimination and, despite the best efforts of governments in the region, become vulnerable to the path of violence. The disproportionate level of violent conflict found in our mountain regions – here and all over the world – is unfortunately one more indicator of how right our founders and supporters were and are in focusing on the need to address more effectively the plight of mountain peoples.

We can point to these terrible and tragic problems in our mountain homes and ask: have we failed? And In one sense, we have to say, yes, we have failed. Failed to deliver the level of livelihood improvement, of hope, of peace and security that all our mountain peoples want and deserve. And that is why we must redouble our efforts, and learn how to make them more effective. We must learn how to redesign them so they empower, and bring self-respect, voice and dignity to the mountain peoples we seek to serve.

For although we have, in part, failed, we have also succeeded to a degree our founders might find hard to believe.

Where poverty levels exceeded 40% in many areas of the Hindu Kush-Himalayas 20 years ago, they have now been reduced to 8-30% throughout the region. Where the overwhelming majority of households did not have access to drinking water, electricity, and schools several decades ago, now they do. Where deforestation rates were so high 25 years ago that vast moonscapes were being predicted, today there are many areas where there is actually more forest cover than at that time, and the rate of loss has been drastically reduced. And today, while there are still pockets of abject poverty, we now have many areas of relative prosperity – even in remote mountain valleys like Solu Khumbu in Nepal, Kulu in India, Swat and Gilgit in Pakistan, Paro in Bhutan, and some minority areas of Western China to name a few.

² World Summit on Sustainable Development (WSSD), Johannesburg, 26 August-4 Sept. 2002

In all of these examples, the initiatives of local communities, combined with supportive government policies and programmes, and often NGO grassroots activity, have been instrumental. These actions have transformed poverty into prosperity and degradation into regeneration. Learning from and supporting the spread of these kinds of initiatives, so that hundreds of thousands of mountain peoples and the millions downstream can lead better, happier lives, has been our mission at ICIMOD.

Your Majesty, ladies and gentlemen, we would not be here today, in this wonderful new headquarters if it were not for the extraordinary dedication, commitment, and generosity of many people, organisations, and countries.

In addition to our founders, my predecessors at the helm of ICIMOD – Peter Gueller, Colin Rosser, E. Frank Tacke, and Egbert Pelinck – have made outstanding contributions to building this institution and, along with our superb Deputies – Ram Yadav, Mahesh Banskota, and Binayak Bhadra – have negotiated our role and relations in the region and worldwide, and provided the intellectual guidance for us to grow from a child to our current maturity.

Our core programme donors, starting with co-founders Switzerland and Germany and now extending to Austria, Denmark, the Netherlands, and Norway, along with our other ICIMOD Support Group Members and programme co-financers, many of whom are here today, have not only provided the sustenance for our work, but also valuable critical and constructive guidance at every step of the way.

Our Regional Member Countries, through their multiple levels of support – financial, administrative, intellectual, and moral – are the reason that we exist at all, and the basis for our legitimacy. Through their representation on our Board of Governors, and even more, through their support for our key partners throughout the region, our mission is anchored in their priorities and needs. With additional expert guidance and generous voluntary support from our Independent Board Members, the Board of Governors has shown remarkable vision, foresight, and responsibility in helping ICIMOD to grow into the young, yet mature, institution that it is today, with bright and dedicated staff from throughout the region and the world. It is they who work with our partners, the backbone of our work, many of whom are also represented here today. Our job is to facilitate your work, to give it synergy, and a regional and global dimension to multiply its impact. I am proud that your presence here today is testimony to the strength of the partnerships upon which we are built.

Your Majesty, I have left until last our most important debt of gratitude. That is to Your Majesty's Government, to its committed officials, and our many Nepalese staff whose consistent professional and generous support, policies, and collaboration have not only made our work go smoothly and effectively, but have also provided us with a source of personal joy and delight. Nepal's innovations in development policy – whether in community forestry, buffer zone management, hydroelectric power, ecotourism, or other areas – continue to provide a source of inspiration and learning for us to share throughout the region. In addition, Nepal's welcoming policies, open visa requirements

for the Regional Member Countries and their participants, and support for ICIMOD as an international organisation continues – despite the current problems – to make Nepal the best location for a regional institution such as ourselves.

Your Majesty's personal commitment to conservation and sustainable development, as amply demonstrated by the hundreds of hours you devoted as chair of the King Mahendra Trust for Nature Conservation, a partner organisation, has also served to inspire policies and commitments that positively frame our work in this field.

Finally, Your Majesty's Government's generous allocation of land, first for our ICIMOD Test and Demonstration Centre at Godavari, and now for the site of our first permanent home, is a true tribute to Nepal's enduring friendship. The splendid generosity of our Regional Member Countries, Bangladesh, Bhutan, China, India, and Pakistan, in providing special contributions to this headquarters is extraordinary, and highly appreciated.

Your Majesty, we thank you for inaugurating our new home and gracing this occasion. We thank the officials of your Government, especially in the Ministries of Agriculture, Population and Environment, and Forestry and Soil Conservation for providing us our homes in Nepal.

I request all of us here to express our appreciation at this time with a round of hearty applause.

Thank you all for joining us today. Dera manana, danyabad, kadinche, xe xe, kyae zu tin bar dae, shukria, thank you.

Inaugural Address

U Soe Win Hlaing, Chairperson, ICIMOD Board of Governors, and Director General, Forest Department, Myanmar

Your Majesty the King of Nepal, distinguished dignitaries, colleagues, and friends, may I join the Director General of ICIMOD in extending a very warm welcome to His Majesty the King and express our sincere gratitude to your Majesty for graciously consenting to grace this occasion and inaugurate the Centre's new headquarters and its 21st Anniversary Symposium.

Coming from the southeastern part of the Hindu Kush-Himalayas, I am indeed delighted and honoured to be here with my fellow Board members to participate in such an important and historic moment for ICIMOD. The presence of so many high level representatives from the Regional Member Countries and eminent scholars and professionals from the region and abroad is a testimony to the significance of ICIMOD's role as a mountain research and development centre. I have no doubt that, with this level of support, ICIMOD will be able to enhance its role and relevance in the coming years. Let me, therefore, thank you all for taking time out to be with us here, to launch this new chapter in the Centre's history.

The establishment of ICIMOD's new headquarters is indeed a milestone, which would not have been possible without the generous offer of land from His Majesty's Government of Nepal. We hope that ICIMOD will be able to honour the trust and confidence placed in it by its host country in the years to come by playing a lead role in supporting development programmes. I understand that the funds for construction came from reserve funds accumulated by strong core and project donors and direct contributions from the Regional Member Countries. On behalf of the Board of Governors, let me express our sincere appreciation to all of the donors, including the Regional Member Countries, for their generous contributions in various forms. Your support has made it possible for ICIMOD to have its own premises here in Khumaltar. This magnificent new facility will enable ICIMOD to better integrate its programmes and improve its services to its member countries.

The holding of this Symposium is the first step towards a rejuvenated ICIMOD and, hence, it is aptly titled 'Securing Sustainable Livelihoods in the Hindu Kush-Himalayas: Directions for Future Research, Development and Cooperation'. Towards this end, the main purpose of the Symposium is to reflect on the Centre's achievements over the past two decades and to look ahead to meeting the challenges and harnessing the opportunities emerging both globally and regionally.

I am confident that this Symposium will be successful in coming up with useful recommendations to serve as a basis for inspiring ICIMOD's future research and development agenda, and in fostering closer cooperation among the countries and peoples of the HKH region.

May I thank your Majesty, the King of Nepal, once again for your august presence and wish your Majesty continued good health. The brave people of Nepal deserve our sincere appreciation for having us here, despite all of the problems Nepal is currently going through, and we join them in praying for a speedy return to peace, stability, and prosperity for this great country.

Thank you.

Inaugural Address

Mr Jochen Kenneweg, Chairperson, ICIMOD Support Group

Your Majesty, distinguished dignitaries, members of the ICIMOD Board of Governors, ladies and gentlemen, colleagues, and friends. On behalf of the ICIMOD Support Group, which comprises representatives of the Regional Member Countries, and international and bilateral donors, I wish to thank His Majesty the King for the great honour of his presence on this occasion and for inaugurating ICIMOD's new headquarters. With sincere and deep gratitude, we acknowledge that the government of the Centre's host country, the Kingdom of Nepal, again made a decisive contribution to the further development of ICIMOD by generously allocating this valuable and

beautiful piece of land. This contribution has allowed ICIMOD to find a well-situated and apparently very appropriate new home. It is yet another indication of the country's endeavours to foster cross-border cooperation in the region. This unperturbed determination is shown at a time when Nepal itself is facing very difficult challenges to its internal stability, its economy, and development.

The headquarters building and pavilions are visible proof that there is a strong and growing ownership of ICIMOD by the Regional Member Countries. Extraordinary contributions, remarkable both in number and size, have gone into this project. It gives rise to hope and expectation, as the material base for the Centre's present and future activities lies in the preparedness of governments, institutions, groups, and people to render support voluntarily and continuously.

To carry out its many activities in applied research, training, project work, networking, and communication ICIMOD received, from 1982 to 2003, in terms of financial resources, a total of 65,785 million dollars. In addition, we have to consider the numerous contributions in kind from the Regional Member Countries and the many co-financing arrangements with partner institutions. The value of these support components should not be underrated, although they are difficult to quantify in monetary terms.

In order to keep or enhance the interest of its supporters, and to gain new ones, the Centre will have to maintain the attractiveness, relevance, and professional standards of its programmes as much as the quality of its relationships with partner institutions in the region and beyond. I would agree with the views expressed recently in an ICIMOD internal assessment, which points out ICIMOD's comparative advantages. They surely comprise ICIMOD's competence in the research and development of natural resources and ecosystems, as well as the Centre's ability to engage people and institutions from the eight quite different countries in the Hindu Kush-Himalayan region in discussing many issues, even sensitive ones such as transboundary biodiversity and water management.

I believe that the exchange of highly qualified staff between the Centre and the Regional Member Countries plays a crucial role here.

The success of ICIMOD has to do with both continuity and readiness to change and adjust to rapidly changing circumstances. While the primary objectives of the Centre – to “help to promote the development of an economically and environmentally sound mountain ecosystem and to improve the living standards of mountain populations” – remain as valid as they were 20 years ago, there are now new challenges such as the necessity to cope with conditions of violent conflict or the requirement to take into account the effects of accelerated globalisation and climate change. Whereas ICIMOD has enjoyed, throughout its history, a remarkable continuity in the financial support received from a few European core donors, the rapid and multifaceted development in some of the regional countries calls for their greater involvement in the funding of the

Centre. Long-standing partnerships between ICIMOD and major institutions in the region have their merits and advantages. On the other hand, development and research activities may have become sustainable without direct ICIMOD involvement. Changed emphasis in programme content, the choice of respective strategic lead partners, and capacity building requirements may lead to shifts in the Centre's priority partnerships.

Because of the professional quality of ICIMOD's staff, the reputation of the Centre, and the experience gained in developing and maintaining partnership relations, I believe that we can be confident that ICIMOD will be in a position to face the challenges ahead successfully. The new premises will surely provide a conducive environment.

I wish to congratulate ICIMOD, and all who feel a sense of ownership of this valuable organisation, and for having a new and beautiful home.

Thank you.

Inaugural Address

Mr Bachaspati Devkota, the Honourable Minister for Population and Environment

Your Gracious Majesty, the Right Honourable Prime Minister, your Excellencies, Professor Messerli, Chairs of the ICIMOD Board of Governors and ICIMOD Support Group, participants, ladies, and gentleman. Firstly, let me offer my sincere gratitude to Your Majesty for gracing this occasion and inaugurating the ICIMOD building today. It is indeed a great honour to receive Your Gracious Majesty.

The history of the International Centre for Integrated Mountain Development (ICIMOD) began with the seed of an idea, sown in Munich in 1974. Inspired by the concept, His Majesty's Government of Nepal offered to host the proposed Centre and the offer was accepted in 1979 at a United Nations Educational, Scientific and Cultural Organization's Man and the Biosphere programme (UNESCO-MAB) meeting in Kathmandu. This led to the establishment of ICIMOD on this very day, December 5th in 1983, with the assistance of its founding sponsors UNESCO, the Government of Switzerland, the Federal Republic of Germany, and His Majesty's Government of Nepal.

At the time that ICIMOD was established, there was a dire need to address the deterioration of mountain habitats and the rapid depletion of valuable species. At the inaugural symposium in Kathmandu, the call was for integrated and sustainable mountain development in the vast Hindu Kush-Himalayan region. We have come a long way from that time, but there are still, as the poet says: "miles to go before we sleep". This is why we need ICIMOD more than ever today, to carry us along that hardest of journeys, the last mile, and to ensure a better future for the 120 million people living in the world's highest and most rugged mountains.

Throughout, I believe that Nepal has not only been the host country, but also a good friend. Good friends enjoy their friendship, and friendship means practical help,

sharing, giving, and receiving. On the side of His Majesty's Government of Nepal, the early request by ICIMOD for land for a headquarters building led to an area being apportioned in Kirtipur; and subsequent infrastructural changes led to this land in Khumaltar being made available.

ICIMOD, today, has opened its own headquarters' building, and it is a very impressive building indeed. In addition, as Minister for Population and Environment, I would like to draw your attention to another piece of land not far away from here – the ICIMOD Demonstration and Training Centre at Godavari, made available by His Majesty's Government in November 1992. Today, the hillside flourishes with best farming practices, improved livestock, water harvesting, bees, and alternative energy. It is a demonstration of land well used and skilled husbandry that conserves the riches of the environment.

However, more important than buildings and sites is the work that ICIMOD has successfully carried out over the last twenty-one years. That work has been in direct collaboration with Nepal, regional countries, and the core donors of Austria, Denmark, Germany, the Netherlands, Norway, and Switzerland. In addition to these are other donors, too numerous to mention here, but to whom we are extremely grateful. ICIMOD has assisted the Ministry of Population and Environment in establishing the first Mercury Station in Nepal, assisted with the State of the Environment assessment, the Male Agreement on air quality monitoring, and the formulation of an IT policy for Nepal. ICIMOD also provided initial training in mountain risk engineering and then together with Tribhuvan University, landslide and hazard control, beekeeping, GIS training, and, more recently, brought Nepal and other regional countries together for flood hazard management and control.

The last 21 years have been productive and fruitful. As a good friend, on behalf of His Majesty's Government of Nepal, I would like, with the Government, to congratulate ICIMOD on this magnificent achievement and thank the Regional Member Countries for their generous contributions to this headquarters. We wish ICIMOD the best for a productive and flourishing future and assure the Board and staff of ICIMOD of His Majesty's Government's continuing, full support in the future.

Thank you.

Keynote Address – Securing Sustainable Livelihoods in the Hindu Kush-Himalayas: Directions for Future Research, Development and Cooperation

Professor Bruno Messerli, Professor Emeritus, Institute of Geography, University of Berne, Switzerland

The political setting: ICIMOD – 21 years in a rapidly changing mountain world

The inauguration of ICIMOD in 1983 took place between the Stockholm Conference on the Environment in 1972, and the Rio Earth Summit on Environment and Development in 1992 with its Agenda 21 and the mountain chapter 'Managing Fragile Ecosystems – Mountain Sustainable Development'. In these 20 years from 1972 to 1992, the awareness for the mountains and their natural and human resources reached such a level that the mountain chapter was accepted unanimously for the Agenda of the 21st century.

Looking more precisely at these 20 years between 1972 and 1992, UNESCO's Man and the Biosphere Programme (MAB), in particular MAB-6 'Man's Impact on Mountain Ecosystems' in 1973, had a profound effect on mountain research and development in general, and on the foundation of ICIMOD in particular. The first ideas for a regional centre were discussed in the UNESCO-MAB meeting on 'Integrated Ecological Research and Training in the South Asian Mountain Systems, especially in the Hindu Kush-Himalayas', held in Kathmandu in 1975. UNESCO's General Conference of 1976 supported such a centre and the General Conference of 1978 approved paragraph 2410, which authorised UNESCO to provide its support to the creation of at least six regional centres on integrated ecological research, training, and documentation. In 1980 the name 'Regional Centre' was changed in a quadripartite meeting of the four founding sponsors (UNESCO, Nepal, Germany, and Switzerland) to 'International Centre for Integrated Mountain Development' (personal information from Dr. Gisbert Glaser, former Assistant Director General of UNESCO, who played a leading role in the foundation of ICIMOD).

The inauguration of ICIMOD took place in 1983, eight years after the first discussions. During this apparently long preparatory process, the main aims and topics of the future ICIMOD were elaborated; they were presented at the inauguration symposium in 1983 (Glaser 1984, p.61). Twenty-one years later, here in a new inauguration symposium, these objectives and responsibilities are well summarised in the title 'Securing Livelihoods in the Hindu Kush-Himalayas: Directions for Future Research, Development and Cooperation'.

For this short retrospective, we could not find any information on the aforementioned UNESCO decision to create at least six regional centres on integrated ecological research, training, and documentation. For the mountains of Africa and South America very different types of organisations, compared to ICIMOD, were established. In Africa,

the mountains are scattered all over the continent and isolated from each other. With this in mind, and supported by UNESCO, the United Nations University (UNU), Switzerland, and other sponsors, the first international mountain workshop was held in Ethiopia in 1986 to discuss the formation of the African Mountain Association. Following this, meetings were held in Morocco in 1990, Kenya in 1993, Madagascar in 1996, Lesotho in 2000, and Tanzania in 2002 to enlarge the knowledge base, support the growing scientific community, and to increase the awareness of mountains and their resources in Africa. A similar process was observed in the Andes. The first international workshop held in Santiago de Chile in 1991 led to the foundation of the Andean Mountain Association. This was followed by meetings in Bolivia in 1995, Ecuador in 1998, Venezuela in 2001, and Argentina in 2005. Even though these two organisations were quite new and vulnerable, together with the much stronger partner ICIMOD, they represented the main mountain systems of the developing world, and they became, together with UNU and UNESCO, the driving force for a successful intervention in the preparatory meetings for the Rio conference in 1992 and for the successful formulation of a mountain chapter in Agenda 21 (Mountain Agenda 1992).

However, listening to the discussions in the corridors at the Rio conference, we could tell that the importance of mountains was not properly understood by many of the political delegations. Rather, it was assumed that mountain agriculture and forestry, natural hazards, nature conservation, and mountain development were part of national policies and competences, which could hardly be classified as having international or even global importance. This perception changed for the better five years after the Rio Earth Summit, at the United Nations (UN) Special General Assembly in New York in 1997. It was at this point that the political delegates began to understand that mountains are not only important water towers for an increasingly thirsty planet, vast resources of cultural and biological diversity, sensitive indicators of climate and environmental change, vital recreation areas for an ever more urbanised world population, sacred places for various cultures and religions, and uniquely privileged regions of protected areas, but also sites of erosion, risk, and disaster with damaging effects on the surrounding lowlands (Mountain Agenda 1997; Messerli and Ives 1997). Altogether, over 50% of humanity may depend, in one way or another, directly or indirectly, on mountain resources. The mountains of the world with their natural and human resources were no longer merely of local and national concern, they had become globally significant in and for the 21st century.

Based on this new understanding, the debate on an 'International Year of Mountains' had a well-established foundation. As a consequence, it is interesting that all political delegates were prepared to discuss mountain policies, even policies concerning national level procedures, which would never have been possible 10 years before at the Rio Earth Summit. This progress was clearly documented in the title of the glossy brochure distributed at the 'World Summit for Sustainable Development' in Johannesburg in 2002: 'Sustainable Mountain Development – The Need for Adequate Policies and Instruments' (Mountain Agenda 2002). The cycle from the national level, with the defence of national competence and sovereignty, to the global level, with all aspects of solidarity and cooperation, and back again to the national level, with

measures and policies, has played and will play a fundamental role with all its aspects of research, development, and cooperation.

This discussion on the political setting for ICIMOD and the mountains of the world would not be complete without mentioning the rapidly growing interest in mountains shown by various UN bodies; the Global Conventions on Climate Change, Biodiversity, and Desertification; scientific programmes like Global Environmental Change, with its human and natural dimensions; the Food and Agriculture Organization's (FAO) Global Terrestrial Observing System, with its special Mountain Module; and the Millennium Ecosystem Assessment (Figure 1). All of these have led to much stronger cooperation between political and scientific communities and institutions. It is no longer possible for local and national scientific projects to provide the necessary data to understand

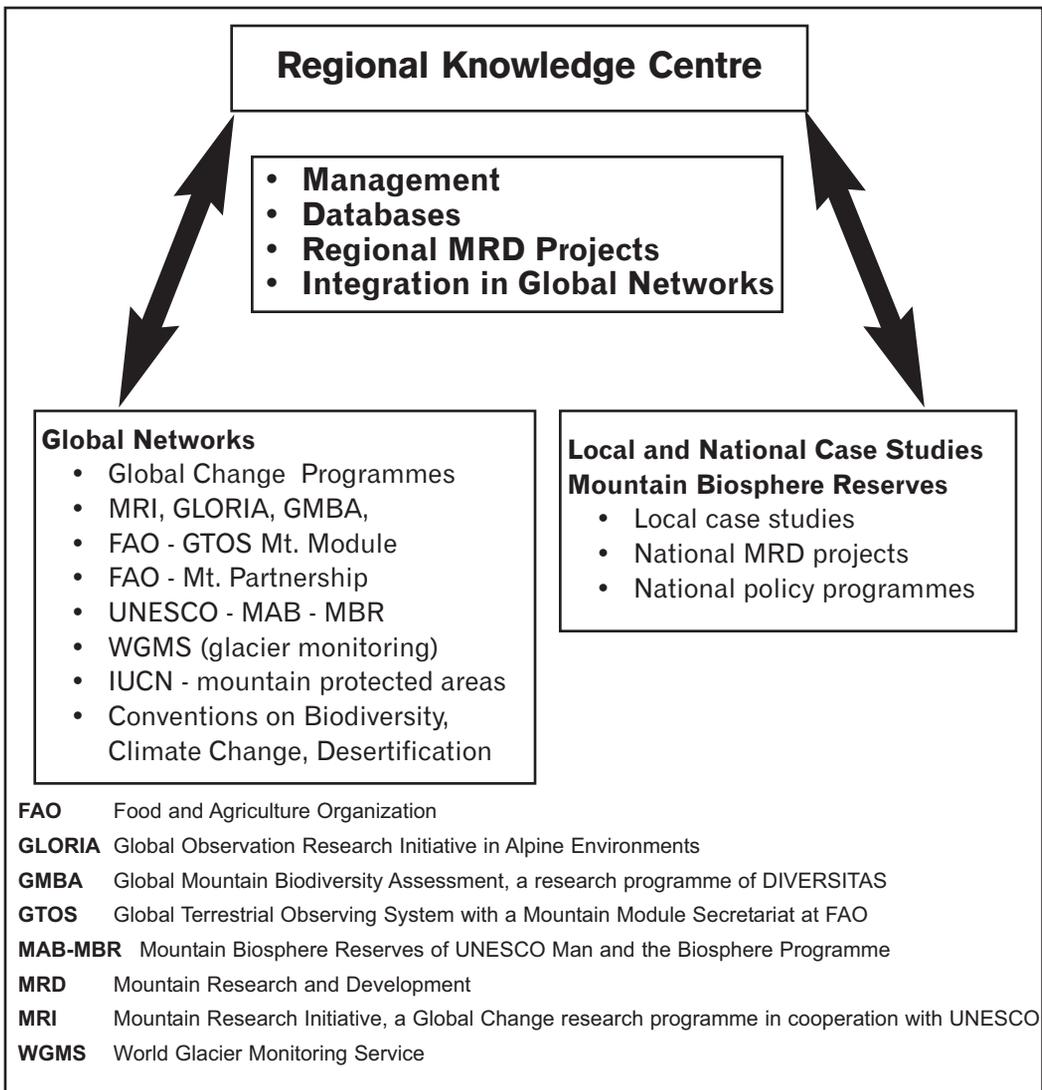


Figure 1: Schematic view of a regional knowledge centre

the driving forces in a globalised world. On the other hand, to verify global processes it is absolutely necessary to have the 'ground truth' from local and national projects. We need regional knowledge centres with the necessary infrastructure and competence to evaluate, or even participate in, global programmes, and to transfer important information from the national and local level to the regional and global level, and vice versa, for a true verification of ongoing processes.

Figure 1 is a schematic presentation of a regional knowledge centre. The mountain regions of the western United States of America are beginning to establish such centres. ICIMOD has had a much longer history and experience and could even be used as a model for these institutes. It is most important to establish, not only local–regional–global interactions, and vice versa, but also to initiate cooperation between the scientific and political communities in order to discuss strategies for sustainable mountain development with continuous adaptation to the changing natural and human environmental conditions in the mountain world.

Directions for future research, development, and cooperation

Is it possible that a strong connection between research, development, and cooperation can produce results with a higher value for a future oriented strategic planning and sustainable development? Two examples will be discussed, one more dominated by the natural sciences, and the other more dominated by the social and economic sciences. Each one is illustrated with a case study on a large and on a small scale.

The water problems in the Himalayas

The satellite image in Figure 2 shows the late monsoon flood situation in the Ganga–Brahmaputra–Meghna Basin on 8 October 1988, one of the worst flood years in the 20th Century. The first floods occurred as early as mid-April to mid-May in some parts of Bangladesh. The Meghna and Brahmaputra experienced a severe flood in July. A nationwide flood occurred roughly between August 20 and September 5 along with the peaking of all three major rivers. Until October, a significantly above average flow continued to be recorded on the Brahmaputra and Meghna rivers. Accordingly, the satellite image, not only shows the receding waterfronts at the end of an extreme flood year, but also highlights some features of the three rivers that are typical of many flood situations of the 20th century.

The Meghna and Meghalaya Hills: The most striking element of this image is the vast flooded area adjacent to the Meghalaya Hills (maximum altitude approximately 2000m) produced in part by flash floods in the hills. Cherapunjee is situated on the southern ridges of these hills and hosts a world famous climatological station. Cherapunjee has an average annual precipitation of more than 10 metres and an extreme annual precipitation of more than 20 metres. These extreme values illustrate the effect of this first orographic barrier on the monsoon coming in from the Bay of Bengal.

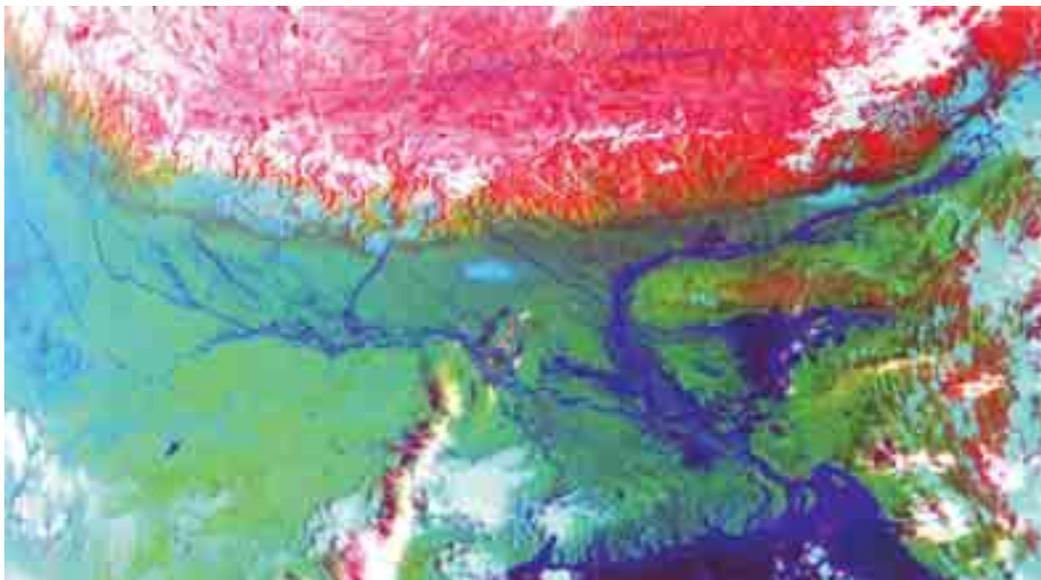


Figure 2: Satellite image showing flooding in Bangladesh on 8 October 1988

(Source: NOAA data acquired by the Bangladesh Space Research and Remote Sensing Organisation, SPARRSO; image obtained through ITC)

The Brahmaputra in Assam and Bangladesh: It is interesting to note the connection between high discharge and flooded areas along the Brahmaputra from the most eastern corner of Assam to central Bangladesh, but not in southern Bangladesh. Obviously, there is an export of surplus water from Assam to Bangladesh through the Brahmaputra. However, locally produced rain floods within Bangladesh are very important as can be seen in the flooded area north of the lower Ganga, which does not have any connection to the mountains or big rivers. In contrast to the flooded area along the Brahmaputra and Meghna, there is no flooding along the Teesta River, which originates in the Darjeeling Himalayas.

The Ganga and the Western Himalayas: While there is no flooding of the Ganga just before its confluence with the Brahmaputra within Bangladesh, several patches of flooding can be seen further upstream between Patna, Allahabad, and Delhi. Many of these floods have no direct link to the Ganga. According to an article published in a Kathmandu newspaper on 5 December 2004 (Shandip 2004), an expert from Bangladesh stated in a scientific meeting that: “immediate real time information of rainfall and flood events in Nepal can save life and property in Bangladesh”. The interpretation of this satellite image clearly calls for a revision of such statements. Assuming a flow velocity of about 130 km/day, a flood wave from Nepal will require several days to reach the Bangladesh border and, more importantly, the discharge peaks from Nepal will almost certainly be levelled out once they reach the plains.

The interpretation of this satellite image clearly calls for abolishment of the myth that deforestation in the Himalayas is responsible for floods in Bangladesh. This issue is explained and discussed in much greater detail in other publications (Ives and Messerli

1989; Hofer and Messerli 2005). A recent statement by the Director General of the Centre for International Forestry Research in Bogor, Indonesia, clearly supports our findings: "The claim that deforestation leads to big floods is bad science, and it is ruining the lives of poor farmers" (Kaimowitz 2004).

Good science can be highly significant for development in the lowlands of Bangladesh and India – helping people to find the right approaches within the lowlands themselves, rather than from outside, with well-balanced non-technical and technical solutions – as well as for the highlands of Nepal, Bhutan, and India – supporting good sloping land agriculture and forest management. However, development is only possible with cooperation. As shown by the satellite image, water crosses international borders. Water management can create conflict, not only about water control in relation to floods and droughts, but also about water use for energy, irrigation, industrialisation, and urbanisation. Without cooperation, there can be no peaceful development of the Hindu Kush-Himalayan region.

In July 1987 we sent an application in the name of the United Nations University to the Government of India's Central Water Commission, River Data Directorate, for access to discharge data from selected Himalayan rivers. In August, we received the following answer: "We regret our inability to supply such data for research as a matter of policy". We had hoped for a different answer as it should be policy to cooperate with science and with neighbouring countries. This important issue was taken up in an ICIMOD database group workshop (UNESCO, FRIEND, and ICIMOD 1999), but without any great success. All institutions in the Himalayan countries should be reminded that the International Council for Science (ICSU) has published a statement which applies to all member countries, called the 'Statement on Freedom in the Conduct of Science' as follows.

"Scientists must have free access to each other and to scientific data and information. On the basis of its firm and unwavering commitment to the principle of the universality of science, ICSU reaffirms its opposition to any actions which weaken or undermine this principle." (ICSU 2004)

India, Nepal, and China are national scientific members of ICSU, and Bangladesh and Pakistan are national scientific associate members. This means for ICIMOD that the majority of Himalayan countries should follow these guidelines. If they do not, ICSU can intervene in order to establish the necessary cooperation.

Having discussed the large scale, it is interesting to look at a small-scale example of the water problem. The results from a water quality analysis conducted in the Jhikhu Khola watershed, not far from Kathmandu, are of interest. In relation to public water sources, 24 of the total 27 sites tested had a high level of microbiological contamination (chloroforms) based on World Health Organization (WHO) guidelines. Wells within village areas showed the same microbiological contamination, plus high levels of nitrate. Of 10 samples taken from rainwater harvesting sites, only two were clean (Schaffner 2002). This example shows that scientific data can contribute to

better and healthier development, but again cooperation is need to protect sources and wells and to ensure the regular checking of groundwater and the whole water supply system.

Looking at these two examples, we should not forget that both small and large scale water problems are strongly related. Any input in the highlands has an effect on the lowlands. This is well known from sediments or from excessive nutrient and pollutant input from land use intensification. The long-distant transportation of organic and metal pollutants can have serious consequences for aquatic biota and human health in lower catchments and adjacent plains, particularly where there is a cumulative impact from many sources (Schreier 2002).

The food insecurity problem in the Himalayas

FAO estimates that the total number of mountain people in the year 2000 was about 718 million (Figure 3). Of these, 625 million lived in developing countries and the Commonwealth of Independent States (CIS) of the former Soviet Union. There were about 280 million people in the mountains of East and Southeast Asia, and 80 million in South Asia and CIS (FAO 2002; FAO 2003). It is a pity that there are no separate figures available for the Hindu Kush-Himalayas, but, in cooperation with FAO, these figures could certainly be produced for the Hindu Kush-Himalayan region. Most interesting is FAO's estimate that about 40% of mountain areas in developing countries produce less than 100 kg of cereals per person per year. Rural people living in such locations have difficulty in obtaining an adequate livelihood from agriculture. FAO used population estimates together with other qualitative information to arrive at a preliminary estimate of the number of mountain people who are vulnerable to food insecurity. Based on current information, more than half of the mountain population in developing and CIS countries (250-370 million people) are vulnerable to food insecurity (see Figure 3). This estimate of vulnerability should not be confused with FAO's estimate of undernourished people. Typically, about half of those identified as vulnerable are also undernourished (FAO 2002). Without taking into consideration all of the factors and constraints which may contribute directly or indirectly to food insecurity – like climatic conditions and extreme events, water availability, soil quality, social and cultural aspects, lack of education and health services, and nonexistent integration in local markets and the national economy – we must accept that food insecurity is an important and integrating factor in the vulnerability of a society.

Downscaling from the worldwide FAO survey to Nepal, we see the reality of food vulnerability reflected in the following data. In 1981, out of 75 districts, only eight were food deficient, by the year 2000 the number had probably risen to 33. Scaling down to the village and household level, a field study by Bohle and Adhikari (1998) in the districts of Nawalparasi and Kaski showed that only a small minority had food self-sufficiency for the whole year, and between 41 and 68% had food self-sufficiency for less than six months. This small-scale data is like a 'ground truth' for the large-scale FAO survey. It reveals a dramatic food insecurity in the 1990s, several years before the FAO study was published. However, we should keep in mind a comment made by the authors of this study about the struggle for survival in rural Nepal: "Nepalese mountain

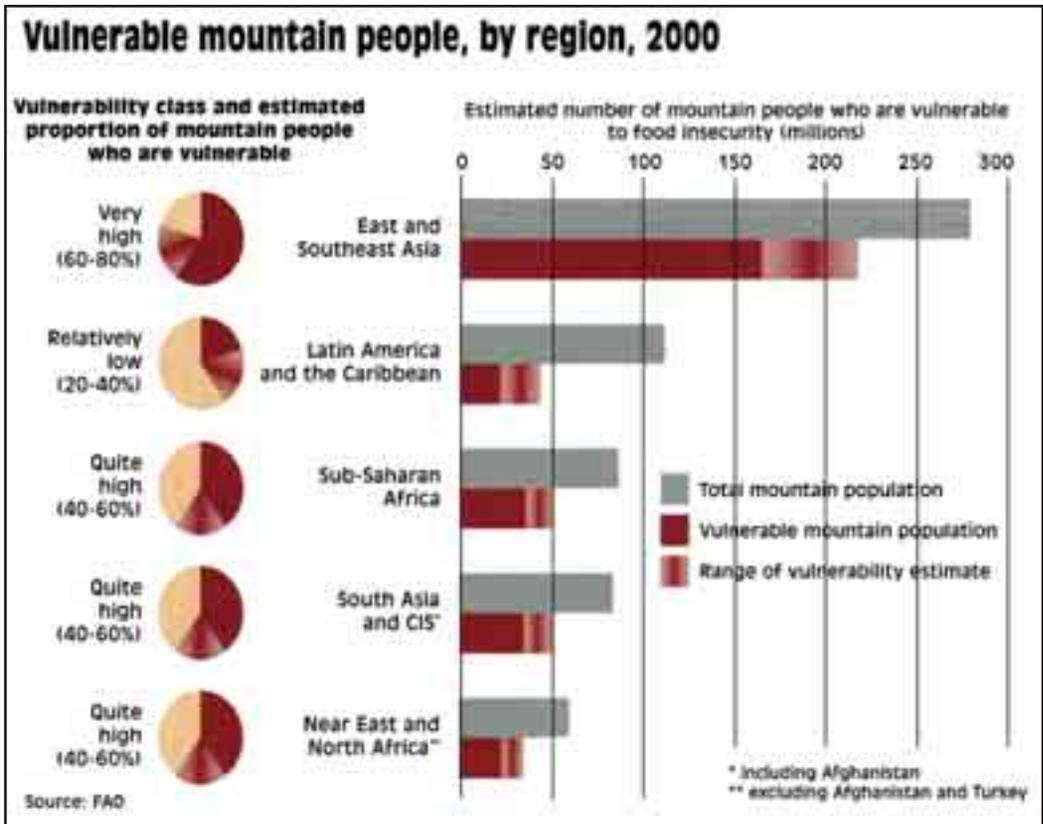


Figure 3: Food insecurity in the mountains of the world (Source: FAO 2002)

farmers are by no means passive, inflexible, ignorant victims of unsustainable development; they are highly active, adaptive and dynamic actors” (Bohle and Adhikari 1998). This fight for survival is very impressive, but it is no long-term solution for securing sustainable livelihoods, as the beginning of the Maoist insurgency has shown.

The situation may be very different for an area relatively close to an important market place, such as the Jhikhu Khola watershed located about 40 km from Kathmandu. In Jhikhu Khola, the average annual crop rotation changed from 1.6 in 1982 to 2.8 in 2001. This was a most welcome improvement to farmers’ incomes, but it raises new questions. One of these questions is how to maintain soil fertility under such intense use? A large phosphorous deficit was identified and corrected with phosphorous fertiliser from Japan, however, other deficits can be observed. How much more intensification is possible, and what are the problems with maintaining other macro and micronutrients for sustainable soil fertility and agricultural production (Schreier, H., UBC, Vancouver, 2004, personal communication)?

All of these examples, from large-scale statistical analysis to small-scale field-based studies, again illustrate the significance of integrating research, development, and cooperation for adequate and sustainable solutions. This is especially important in a time of global environmental change with its natural and human induced driving forces

(Jodha 2000). These processes also create uncertainties, as can be seen in the prediction of potential changes in future water availability. Figure 4 shows two versions of a general circulation model and their consequences in relation to the change in annual water discharge. The modelling process was based on an annual increase of 1% CO₂ in the atmosphere. It is astonishing and alarming to see the fundamental differences between the two models for the Himalayas and the plains of India and Bangladesh (IPCC 2001). One version shows a trend towards more runoff and perhaps more extreme events. The other version predicts more droughts. What would be the consequences for food production and for all aspects of sustainable development? All that we can do is to observe carefully the progress of scientific methods and models;

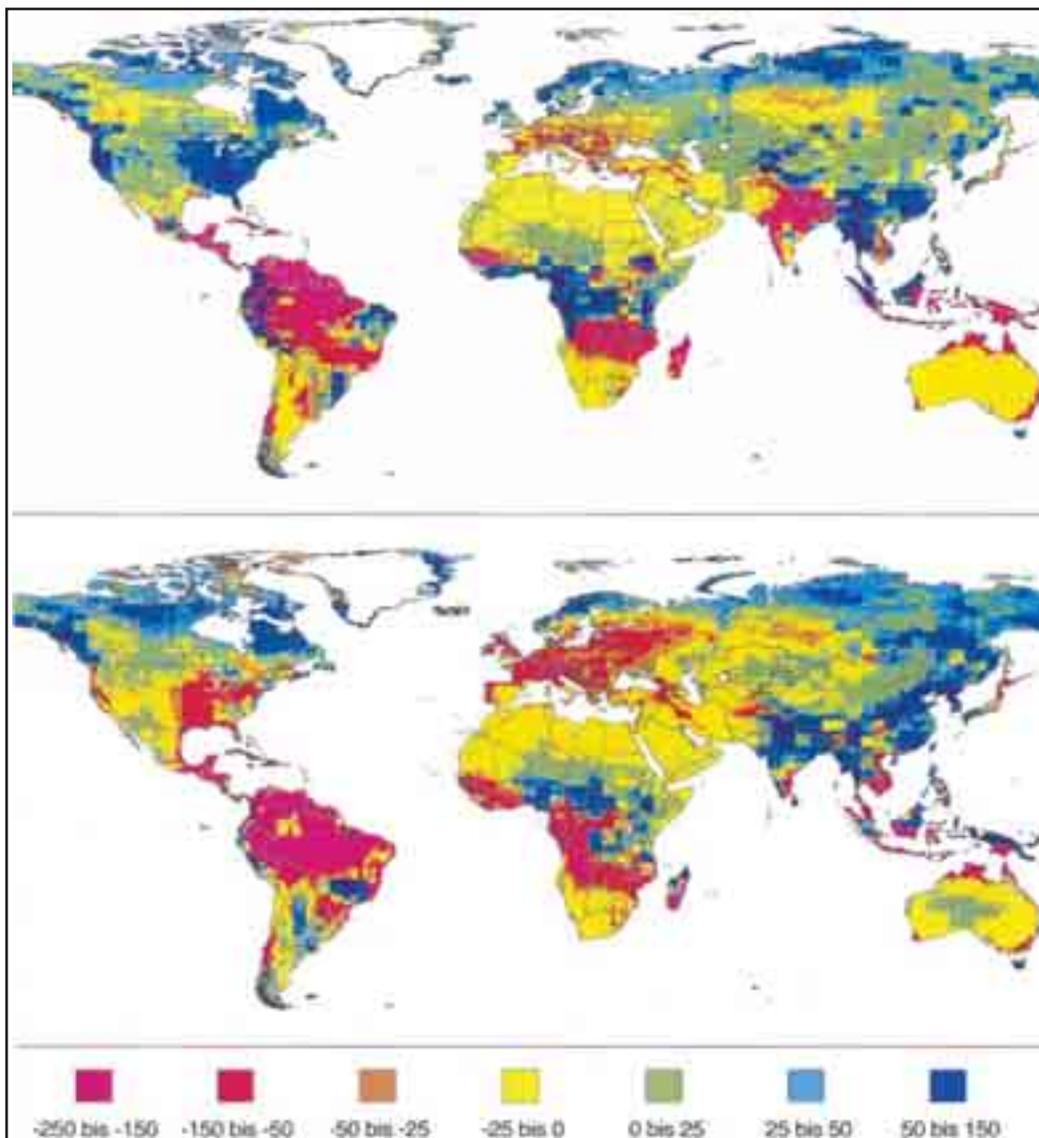


Figure 4: Projected changes in the annual average discharge for the year 2050 in mm/annum compared to data from 1961-1990 (Source: IPCC 2001)

to measure the changes in climate and hydrological cycles; to adapt development programmes according to new knowledge; and to reflect the consequences continuously on the natural-human life support system. All of this is only possible with strong interaction between research, development, and cooperation.

Securing sustainable livelihoods in the Hindu Kush-Himalayas

Figure 5 maps armed conflicts in the world in 2001 – maybe surprisingly the highest density of armed conflicts were in the Hindu Kush-Himalayan region from Afghanistan to Myanmar. These conflicts may have very different historical, political, cultural, social, or economic causes, but they raise the same the question: why do these conflicts fall so clearly along mountain ranges or occur in mountain countries? Are there some common reasons that make mountain populations vulnerable to conflict?

Poverty, despite all the differences, could be a common problem linked to conflict. In these mountainous areas, poverty can also mean food insecurity, missing resources, and a fragile environment. A poor society is a vulnerable society. As Mahatma Gandhi said: “To the millions who have to go without two meals a day... God can only appear as bread”. Instead of ‘God’, you could say a ‘political ideology’ or ‘religious fundamentalism’, as we see in these mountain countries. In this context we have to remember again the results of Bohle and Adhikari’s study (1998), which was based on field data from 1996 and 1997, and earlier information showing the same poverty and

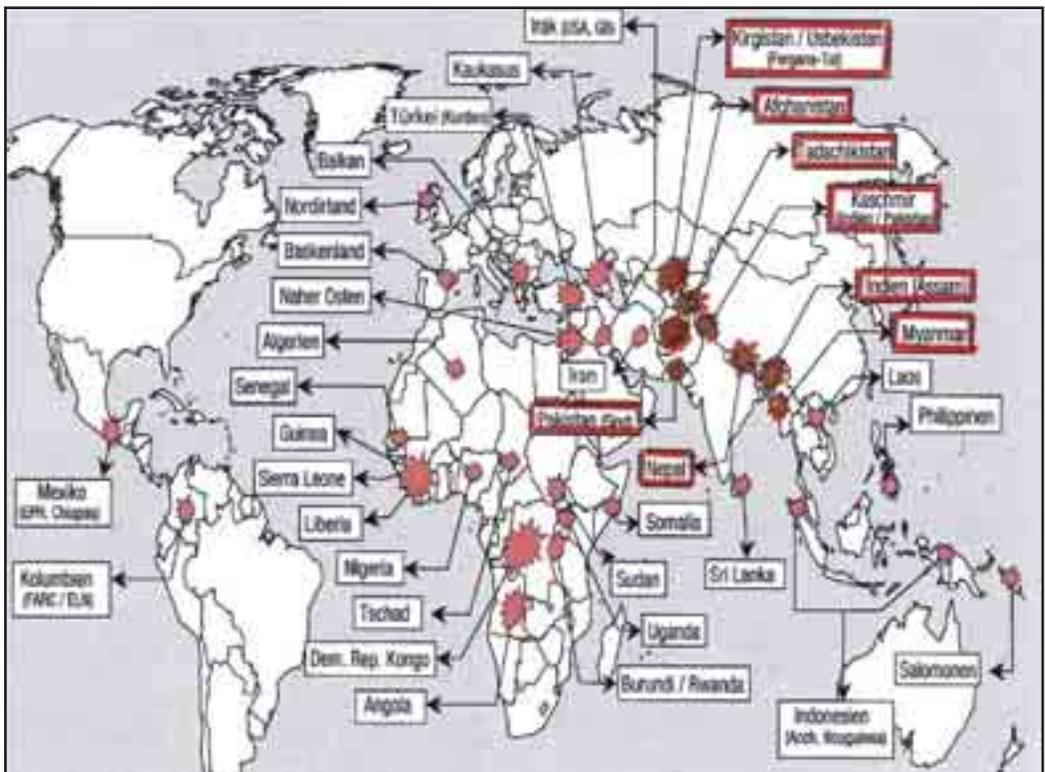


Figure 5: Armed conflicts in the world in 2001 (Source: courtesy of Professor A Wenger, Director of the Centre for Security Studies, Swiss Federal Institute of Technology, Zürich, Switzerland)

food insecurity from 1992, several years before the beginning of the Maoist movement in Nepal (Metz 2003; Upreti 2004). Would it not be possible to develop a set of significant indicators for assessing the vulnerability of a mountain population as an early warning system for political leaders and decision makers, who are too often too far away from the reality of life in a harsh mountain environment?

In this context it was fascinating indeed to see that five days after the end of the 21st Anniversary Symposium of ICIMOD, the UN International Mountain Day on 11 December 2004 was dedicated to the theme 'Peace, Key to Sustainable Mountain Development'. In addition, an FAO (2004) leaflet, dedicated to this International Mountain Day, read:

“Peace on High – the importance of reducing conflict for mountain development. Many of the more than 800 million chronically undernourished people in the world today live in mountain areas. In some cases, their food insecurity is a consequence of population growth, which often has a harder impact on poverty in mountainous regions because of the fragility of the natural resources. But one of the greatest causes of poverty and hunger in mountain regions is the chaos created by armed conflicts. In 1999, 23 of the 27 major armed conflicts in the world were being fought in mountain regions.”

Conclusion

Looking back over the last 21 years, it is interesting to see the development of ICIMOD from its inauguration in December 1983 to the first quinquennial review panel report in August 1990. Figure 6 shows the state of the discussion in this report, about 15 years ago (Messerli 1990; Muhammed et al. 1990). On the research side, the UN and other international scientific organisations are mentioned, but only in the last decade did their global or regional programmes become highly significant as important sources of knowledge. The development side shows the different levels of planning,

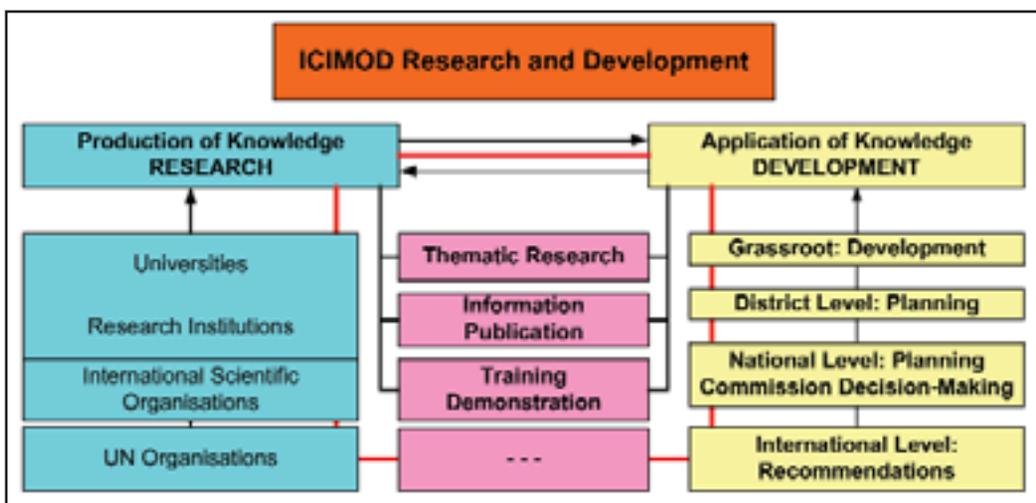


Figure 6: Report of the first quinquennial review panel of ICIMOD, presented in August 1990 (Source: Messerli 1990; Muhammed et al. 1990)

decision-making, and implementation. In the central frame, the main aims and topics of ICIMOD are mentioned, but of course in a very generalised way. All the same, this figure represents, at least in a first and very preliminary way, the title of the 21st Anniversary Symposium 2004: Directions for Future Research, Development and Cooperation.

Looking forward we must take into consideration the new position of the mountain world and its resources in the international political arena since the Rio Earth Summit 1992, and especially since the International Year of Mountains and its final conference in Bishkek in 2002 (Messerli and Bernbaum 2004). Moreover, fragile mountain ecosystems have begun to play a more and more important role, as most sensitive indicators, in global environmental change programmes. This trend and its significance are represented in Figure 7, which also shows the increasing complexity of the processes and again the need for regional knowledge centres (see Figure 1). In relation to this, it is of interest to quote the United Nations Environment Programme (UNEP) Evaluation Report about barriers and best practices in the integrated management of mountain ecosystems (UNEP 2003):

“The activities undertaken by ICIMOD with the ongoing MENRIS programme have made a substantial contribution both in terms of advancing technology and improving the way in which geographical information is managed, enhanced, accessed and leveraged for sustainable development in the Hindu Kush-Himalayan region.”

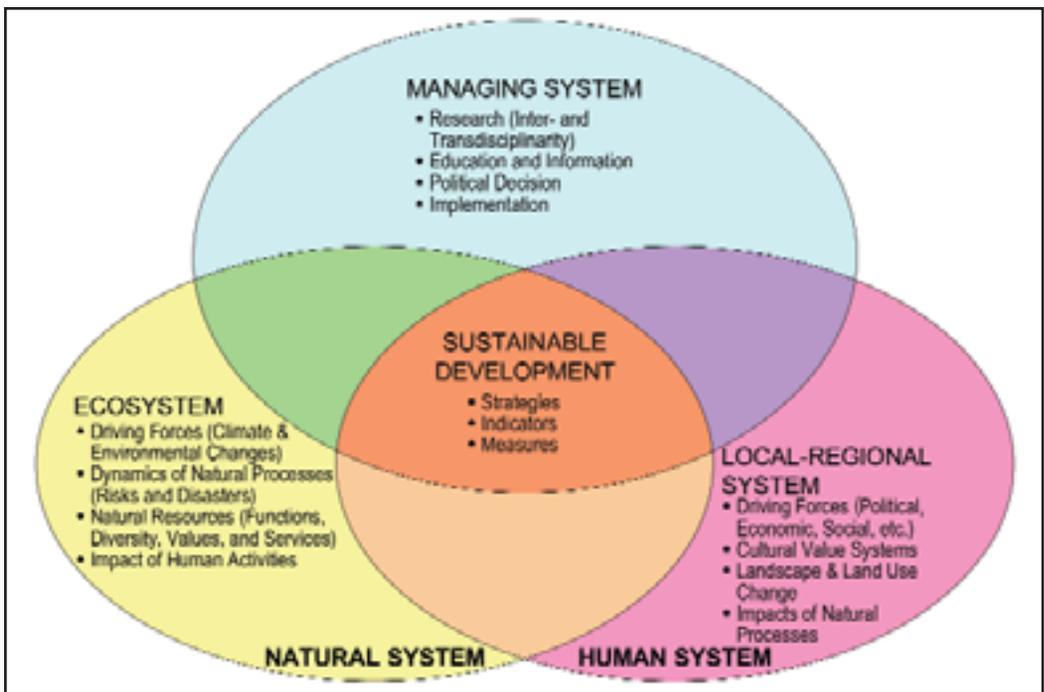


Figure 7: Elements of an integrated approach to help understanding of the driving forces in natural and human systems from the local to the global level in a time of rapidly growing processes of 'globalisation' and 'global change'
(Source: Messerli 2004)

Looking back, and forward, the three main types of knowledge remain the same (Figure 8). ‘Systems knowledge’ refers to the current state of knowledge with its structures and processes, variability, and interactions. It should include natural and social factors and processes and their connections. ‘Target knowledge’ is the knowledge concerning what may be, or what should be. It requires an evaluation of the current situation, prognoses, and scenarios, providing critical levels or thresholds, guiding ideas, ethical boundaries, conditions, visions, and so on. Science must stimulate discussions on the values and targets of future development. ‘Transformation knowledge’ is knowledge on how to shape and implement the transition from the existing to the target situation (CASS and ProClim 1997). All together, future environmental and sustainability research needs to place greater emphasis on ‘target’ and ‘transformation knowledge’. For ICIMOD, this again means a mobilisation of the best talents in the region, as well as internationally, either by engagement, an exchange of staff, or through visiting fellowships.

Finally, to help us to rethink the past for the future, Figure 9 shows a wonderful painting by a 16 year-old girl who was the prize winner in a school competition held for the inauguration of ICIMOD in 1983. It is an exciting child’s-eye view of her dream of how the natural and human mountain environment should look in future in the 21st century, or perhaps even on the 21st anniversary of ICIMOD. This girl was 16 years old in 1983. Now she is a 37 year old woman. Where is she today and was her dream realised? If not, why not? She should make a new painting of her current situation. It would be like a mirror for us to see what she wanted 21 years ago and what her reality is now. Perhaps she could even explain to us, why her dreams could not be realised. Her story could be a unique stimulus for Research, Development and Cooperation to Secure Sustainable Livelihoods in the Hindu Kush-Himalayas!

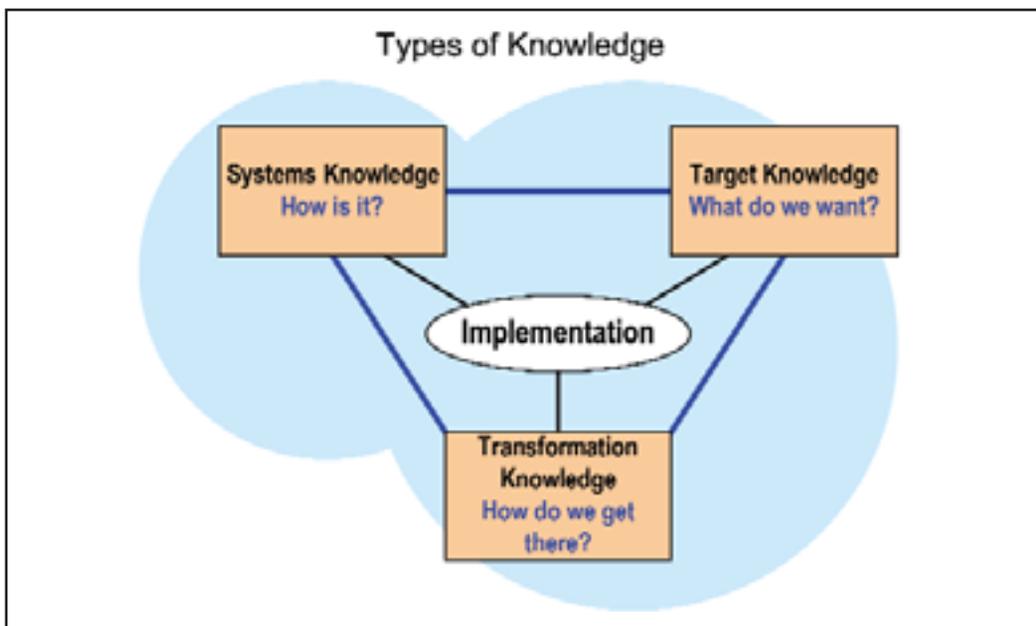


Figure 8: From the past to the future: the contribution of science to sustainability is based upon three types of knowledge (Source; CASS and ProClim 1997)

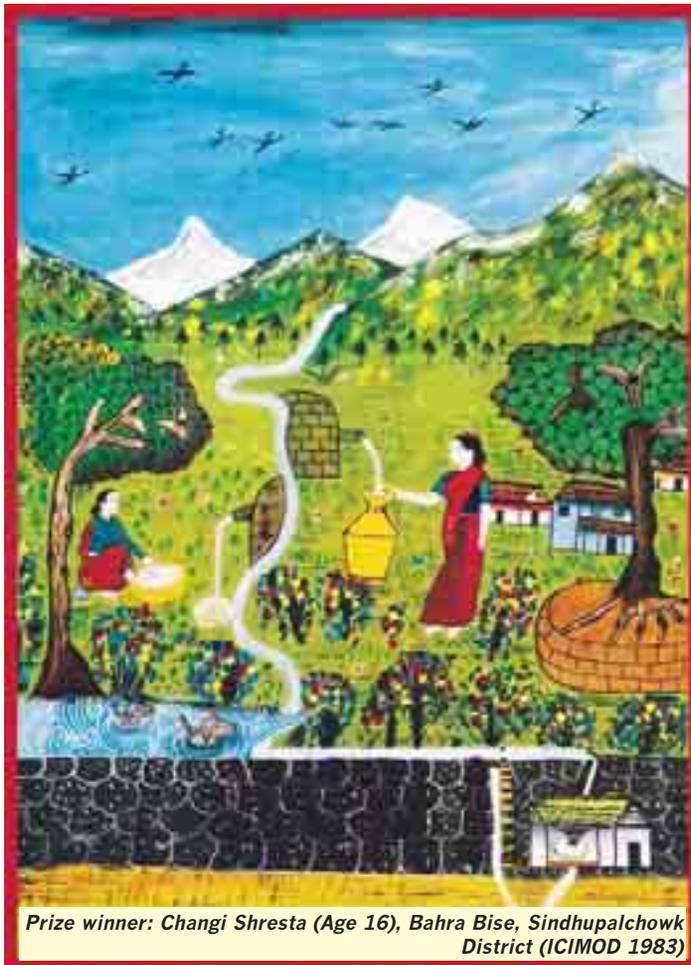


Figure 9: Prize winning entry in a painting competition for schoolchildren from all over Nepal held by ICIMOD for its Inauguration Ceremony in 1983

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