



# **Towards Sustainable Land Use**

**Furthering Cooperation between People and Institutions**

**9<sup>th</sup> Conference of the  
International Soil Conservation Organisation  
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## **Conclusions and Recommendations**

# TAKING ACTION THAT MATTERS

Under the topic „Toward Sustainable Land Use - Furthering Cooperation Between People and Institutions“ the Conference brought together 900 scientists, government representatives, representatives of national and international organisations as well as NGO's and networks from 120 countries, discussing the topics of soil protection and soil conservation.

It was stated that the limited availability of soil resources for the production of food and renewable biotic resources caused by a steady growth in population and accelerated soil degradation can have a bigger negative impact on living conditions on earth than the human-induced greenhouse effect caused by mankind. Anthropogenic soil management and land use processes should be considered to be more destructive than climate change consequences - at least during the next decades. A comprehensive analysis of the driving variables for climate change and their effects on soil properties can hardly reveal the required short term indicators for the assumed long term changes in soil quality.

Land needs to be considered as a finite resource. Its allocation must aim to satisfy the needs of the various land users in the most equitable and sustainable way. Combating soil degradation and investing in the conservation of soil resources for future generations will be a major political task promoting sustainable development and nature protection. A global partnership is required to protect and restore the health of the Earth's terrestrial ecosystems.

What is required is a holistic approach for planning, development and management of land resources which methodically identifies human and environmental needs. The process needs to address cross sectoral issues such as responses to pressures on the land caused by poverty, unsustainable consumption and production systems, clarification and security of land rights and land tenure and land ownership reforms. Furthermore, this approach requires the integration of issues of water resources and biodiversity as they relate to land use. A mismanagement of land and water often leads to land degradation through erosion, flooding, waterlogging and salinity and the depletion of groundwater resources. Moreover, soil and water degradation through contamination by agricultural, urban and industrial effluents is of increasing importance in developed and developing countries.

For formulating and implementing policies it is essential to collect and process and disseminate timely and reliable information and to utilise modern land assessment and evaluation technologies to create sound scientific knowledge for proper decision support.

## **1 Managing a planning process for the use of land resources with all stakeholders**

Improvements in sustainable land use and development need the consideration of the interests of all involved individuals and groups. Therefore, a multi-level stakeholder approach for the planning process is essential to obtain socially balanced results in which the economic and ecological objectives have been weighed up.

All stakeholders such as farmers/conservationists, owners/tenants, individuals/communities as well as administrators, planners and governments etc. in a problem setting must be identified and invited to take part in a broad participatory process to analyse problems, and express and evaluate their needs, interests and aims. Stakeholders must then negotiate options and priorities

for action. This is a way of ensuring that action at the local level can be co-ordinated, and that alternative scenarios can be compared with a view to their potential for long-term improvement.

The multi-level stakeholder approach shall imply democratic - and to a certain extent - formalised procedures. They shall be based on a sound information basis which includes all data about the properties of the land, the land uses and their functions for the resilience of ecosystems.

Land use planning that considers all the functions of the land and that contains full participation of all stakeholders in the planning process is an important tool to implement the recommendations of UNCED's Agenda 21 in particular the section dealing with the concentration and management of resources for development.

## **2 Creating an enabling environment**

A positive, "enabling" institutional environment at the national and the international level offers the potential for substantial support of sustainable land use by creating favourable conditions in which land users and communities can benefit by improving existing shortcomings. We have to think about the perceptions and decisions of stakeholders at the various communication levels such as households, communities, national societies and the interrelationships between them as interactive units.

National policies directly affect land users. Many national governments are increasingly attempting to integrate environmental, economic and social concerns into national planning processes. Declaration of a national policy on sustainable land use is an important measure that can help bring about necessary political, institutional and economic changes.

The emergence of enabling incentives marks a shift away from command and control approaches - which force land users to adopt or abandon a particular course of action - towards the creation of an environment which allows them to choose their own course of action.

Policy-enabling incentives acknowledge the need for a coherent natural resource policy in all policy aspects, co-ordinate economic and financial policies with environmental policy, co-ordinate strategies of agrarian and development policies with natural resource policy, create an institutional framework which supports natural resource policy, co-ordinate between different government institutions, guarantee regional autonomy and delegation of responsibility for natural resources to the communal and local levels, and enforce sustainable use of natural resources in local communities.

## **3 Creating a positive learning environment for sustainable land use**

A common ground should be created to enable people to learn from others and by direct experience, through „participant observation“, accepting non-standard sources of information, data and observations such as oral history, folk wisdom, intuition, emotions and feelings. Second, science would be seen as a set of provisional hypotheses, to be constructed, re-constructed and reformulated as additional knowledge becomes available. Third, in place of separate disciplines, multi- and inter-disciplinary institutions would be created under one roof to provide an institutional setting in which different forms of knowledge are equally acceptable.

Fourth, the reward structures in education for both student and teacher would be changed, affecting exams, career development, prestige and pay.

We must consider how to foster openness to knowledge characterised by respect and understanding for different views rather than conflict and rejection of what is not part of one's own knowledge system. Let us start with the assumption that people must have good reasons why they should share their know-how, their understanding of the physical world, and their concepts of a sustainable society. That means to put local knowledge into the fore-front.

Local knowledge reflects natural and societal factors, and is embedded in social organisations as well as in cultural traditions and preferences. Land users' knowledge systems are dynamic; land users themselves continuously interact with the environment and make changes as they encounter new problems. Among the characteristics of local technical knowledge are low external input in materials, the low risk usually associated with the technologies at hand, and the fact that it is based on the preferences and skills of local society.

#### **4 Enhancing action-oriented research**

- **Introducing economic and ecological thinking and instruments in land use management**

Comprehensive economic analyses can increase the chances of success in promoting new technologies, if they clearly identify constraints which have been neglected in the past and which can be overcome by appropriate policy interventions.

Special attention shall be drawn to analysis of economic viability that means:

- Cost-benefit analyses by the stakeholders will provide insights into the profitability of land use types.
- Analysis of the economic environment will reveal impediments to changes in agricultural practices and land use patterns.
- Analysis of institutional constraints and imperfections will provide insights into other variables which influence stakeholders' decisions on land uses and investments.
- A policy analysis must be carried out based on the results of the previous three analytical steps. Appropriate policy instruments ranging from the macro-economic to the micro-economic level can then be selected.

Equally important is the awareness for ecological sustainability which is composed of the analyses of the

- soil functions showing whether these functions (production, regulation, cultural heritage, living space) are being maintained;
- functionality of ecosystems helping determine whether such ecosystem components as the water cycle, soil nutrient balance and microclimate will remain intact after the introduction of new land management technologies;
- biodiversity showing whether new land management technologies have negative impacts on fauna and flora;
- ecological resilience indicating the extent to which an ecosystem can tolerate depletion and/or accumulation of material without exceeding the capacity for natural regeneration and/or human activities which reverse damaging processes.

There is an increasing need for indicators for soil and land quality. At least three important indicators can be of value in indicating the health of soils and of landscapes in which they are found:

- One such indicator is the stability of plant production, in the form of crop and pasture yields, assessed from year to year.
- Visible signs of land degradation, as evidenced by e.g. the symptoms of excessive erosion and runoff, and/or declining biodiversity in natural and agricultural ecosystems, are another indicator.
- A third indicator is what farm families themselves perceive as changes.
- **Furthering the development of integrated technologies**

The basic principle of sustainable land management is to increase biomass production with technologies which make maximum use of solar energy, water and soil nutrients, and which do not have negative impacts on the environment.

When assessing techniques suitable for the local context, five broad issues should be considered:

- Analysis of productivity will show whether a given measure meets land user/household needs, does not take up too much space, and is adapted to available inputs.
- Analysis of security will show whether the measure minimises risks, leaves sufficient management flexibility, uses local resources, and reduces dependency.
- Analysis of continuity will give indication of soil quality, recycling of nutrients, prevention of soil degradation, maintenance of biomass and biodiversity, efficient use of water, and neutral off-site effects.
- Analysis of identity will be shown by integration into the land use systems and infrastructure, by strengthening of cultural systems, by consistency with policies, and by benefiting underprivileged groups.
- Analysis of adaptability will be demonstrated by spontaneous adoption, rapid success, flexibility in adaptation, and easy communication to other land users.

## **5 Developing suitable implementation approaches and establishing networks of observation systems**

Any research on implementation approaches will have to consider the specific land use systems in place (pastoralist, agrarian, forestry, integrated), as well as the relationship between land use and settlement, infrastructure, industry, and mining. It must also include the impacts of agricultural mechanisation, industrialisation (pollution, construction) and climate change on soils and land, because these processes are likely to modify local conditions and land use systems. The objective of these approaches is to further social acceptability of which the following components shall be analysed

- social heterogeneity which will provide insights into different social groups as well as social conditions, e.g. poverty, equality, access to resources, including information, etc.
- demographic conditions which will examine such phenomena as migration, population growth, and ratios between people and resources (land, capital, etc.).
- social infrastructure which will shed light on the availability and the quality of various types of infrastructure such as schools, health care facilities, etc.
- norms and values which will indicate possible reasons for acceptance or rejection of new approaches in soil conservation and soil protection oriented land management.

Present-day problems arising from rapid change call for new methods which provide better reference points for assessing change. Environmental monitoring can only be carried out if suitable indicators are developed. Different types of indicators will be needed at the scientific, political and community levels. The objective will be to compare and appraise

- different technologies in different areas, and
- temporal change in socio-economic and biophysical conditions within an area.

From the institutional point of view, such reference points will require different monitoring networks. International networks should have observation systems in all major ecoregions of the world and focus on biophysical parameters as indicators of global change. National networks will have more refined systems which also take account of socio-cultural, economic and political parameters.

## **6 Furthering co-operation between people and institutions**

### **• Furthering co-operation between people and institutions in the local context**

There have been some revolutionary shifts in methods of communicating knowledge, such as participatory learning. If sustainability is to be more than a concept to which we merely pay lip-service, professional education must incorporate all sectors of society that interact with land use.

The ultimate goal is to make education and training a shared experience among equals. Training is needed in facilitation techniques, management and leadership skills, literacy and numeracy, public speaking and listening, and other skills related to learning and communication.

### **• Harmonising international strategies and action plans for sustainable land use and development with national policies and land users' priorities**

The disparities that exist among countries in terms of economic status, natural resources, educational level, etc., should be reflected in the design of action plans.

Policy issues in sustainable land management include co-ordination of land titling, economic policy, nature conservation policy, and population policy. Therefore, national strategies for sustainable use of natural resources need to thoroughly harmonise, adapt, and integrate the different strategies and policies of governments and their ministries which are directly or indirectly linked to the use of natural resources by stakeholders.

Informal and formal institutions and organisations - from farmer groups, local NGO's and communities to ministries, government policies, and legislation - can only be sustained, if they are accepted and supported by their respective populations. This means that local knowledge systems, norms and values, must be respected. Negotiation processes among all stakeholders, which must be a part of good governance and administrative management, can be enhanced by better information and knowledge about land users' visions, options, and needs with respect to sustainable land management.

### **• Co-ordinating global agreements and conventions**

Global conventions dealing with sustainable land management include the Convention to Combat Desertification, the Convention on Biological Diversity, and the Framework Convention on Climate Change. All three emphasise global solidarity in their ratification

procedures, and they all initiate action programmes through a variety of means. In addition, Agenda 21, the Tropical Forestry Action Plan, and other international action programmes or regional frameworks for action are also concerned with promoting sustainable land management.

However, all these global initiatives and programmes display three chronic deficiencies:

- they are very far from the world of local land users;
- they have been poorly financed to date; and
- there is little co-ordination between their action plans at the local level.

Policy-makers continue to discuss the creation of a convention/code-of-conduct on sustainable land management. Justification for such a convention can be found in accelerating degradation of the world's land resources, and slow progress in promoting better management. Specific points such as nature reserves, natural world heritage sites, and wildlife preservation in natural habitats could also be included. Ecoregional approaches and basin-wide watershed development could be better co-ordinated under the auspices of such a convention. New and existing programmes could emphasise soil and water management and combine this with land use planning towards sustainable land management.

## 7 Rethinking UNCED '92

For enhancing sustainable land use in the framework of creating a sound economic and social development in all countries the assembly of ISCO recalls the demands noted in the UNCED's Agenda 21

- to review and develop policies to support the best possible use of land for the sustainable management of land resources
- to strengthen institutions and co-ordinating mechanisms for land resources
- to improve and strengthen planning, management and evaluation systems for land and land resources and
- to create mechanisms to facilitate the active involvement and participation of all concerned, particularly communities and people at the local level, in decision making on land use and land management

When the General Assembly of the United Nations will gather in a *Special Meeting* on Environment and Development in June 1997, the topics ***Combating Soil Degradation*** and ***Promoting Sustainable Land Management*** should be addressed in a widened sense for further international negotiations. The International Convention to Combat Desertification (CCD) will be enforced on 27 December 1996 which will enable the international community to tackle one important part of these problems.

# ISCO '96 TOPICS

## TOPIC 1

### **Soil conservation and sustainable land use - erosion, desertification and land use planning**

- Management based on the natural watershed unit may be the most effective bases for natural resource conservation in general and water erosion control in particular.
- Consideration of on long-term at-site and off-site costs, benefits and environmental externalities of soil erosion must be a part of management strategies. Soil conservation programmes should be given greater priority in the larger context of environmental protection.
- There can be significant interactions between wind and water erosion at the same place. Nutrient loss and enrichment effects in wind erosion require better recognition.
- An understanding of processes involved in water and wind erosion through modelling can assist in matching these processes with appropriate and effective soil conservation measures. The purpose or objective of these models should be clearly defined. Such purposes can range from attempting to describe current knowledge of erosion processes, to the ranking of alternative management systems in level of capacity to reduce soil loss, or be a guide in soil conservation planning or erosion assessment. Modelling of wind erosion is possible, if adequate information on factors is available.
- There is an urgent need to develop georeferenced information on natural resources and socio-economic conditions, in order to monitor the change of land qualities over the time. It is therefore recommended to implement international methodologies such as Soils and Terrain Digital Databases (SOTER) and to link these databases with information on soil degradation and soil conservation following the expert system approach of GLASOD/WOCAT.
- There are no sound and easily measured indicators for soil organic matter (=SOM) quality and SOM-mediated fertility that could be used as a land quality indicator for sustainable land use, although there is general consensus that SOM is an important component of land quality. Further research is needed on a) the optimum level of SOM, b) the implications for nutrient balance of a climate change and a doubling of CO<sub>2</sub>, c) the relationship between biomass production, organic matter production and long-term carbon storage.
- The building up of soil organic matter content can be considered to be a capital investment in soil as a national and community level resource. It also constitutes a substantial sequestering of human-induced atmospheric CO<sub>2</sub>, and therefore would diminish the hazards of global climate change. National governments that are signatories to the Framework Convention on Climate Change and that are considering the concept of "joint implementation" as a means to fulfil their requirements under the convention, may recognise carbon sequestration in degraded or natural low-activity soils as an attractive "win-win" proposition.
- The role of a land use planner in the promotion of sustainable land use is not one of decision-making but one of facilitating the process of stakeholders' agreement on wise use or non-use of the land of their interest, through a) the identification of likely future trends and needs, in consultation with the stakeholders, b) the provision of all necessary technical information on the basis of integration of data gathered by various disciplines, in an easily understood form, c) the itemising of the various viable land use options or alternatives, per



identified agro-ecology and socio-economic land unit, d) the developing of procedures for a fully participatory approach in negotiated decision-making, at local and at national level, and at in-between levels (district planning offices and platforms), e) the disposition, through socio-psychologic training, to act as neutral mediator in platforms for conflict solving and decision-making on future land use, f) the monitoring and evaluation, together with the stakeholders, of land use practises that are the result of the planning process, and to suggest modification of these practises where and when required. Participatory management based on socio-economic and gender issues of equitable sharing of benefits and responsibilities should be promoted.

- Recognising that land use planning is a dynamic process, the formal national and international land use planning institutions should be flexibly organised, with clearly defined mandates and lines of co-operation with each other, both vertically (from national to village level, and back) and horizontally (between disciplines).
- The integrated approach to land resources planning and management, as advocated in UNCED's Agenda 21 (Chapter 10), and elaborated in relevant FAO reports requires full-scale inter-institutional co-operation (government institutions and NGO's) instead of competition, development of goodwill of all stakeholders concerned through the functioning of platforms for conflict resolution and participatory decision-making, at all levels, and the sustained provision of basic financial resources, credit and marketing facilities, and technical support services for data gathering and processing, for rural extension services etc.
- Recognising that soils, or lands, are the exclusive patrimony of a country's inhabitants and a sovereignty-linked national resource, any international initiative to promote good and sustainable land husbandry world-wide may have to be restricted to the formulation of a "statement-of-principles". Individual countries may then be willing to adhere to such principles, on a non-legally binding basis, through the adoption of national land policies or charters that are modelled on such a statement-of-principles.

## TOPIC 2

### New forms of soil degradation

With growing populations and increasing industrialisation new forms of soil degradation have become increasingly important. Particularly soil degradation caused by air and water pollution with organic and inorganic pollutants is a matter of prime concern in industrialised as well as in developing countries. The following principles should guide soil protection and soil conservation measures:

- Diffuse and direct substance input into the ecosystem may in long term not exceed the possibilities to produce biomass and to filter and transform substances. Therefore unwelcome inputs of substances have to be minimised by all polluters such as industry, traffic and transport, agriculture and households at their source. Since the substance flows in many industrialised countries have already been put out of balance to a considerable degree, the measures to minimise substance inputs require planning with regard to areas and time.
- The consumption of soils for uses linked with a loss of the natural soil functions certainly has to be kept as low as possible. This also means that changes in further developments of the forms of land use have to be adapted to the natural site conditions. They trigger interlinking effects on ecosystems as to time and area which can be explained only to a very limited extent.

Threshold values for the assessment of soil strains and soil contamination have to be elaborated. It is necessary to agree internationally on simple, comparable and common soil investigation and evaluation methods. In many areas of the world agriculture and activities of the mining industry and hazardous waste sites and closed down industrial sites as relicts of modern life have affected the environment and often require soil and land rehabilitation measures. Although agrochemicals are essentials of modern agriculture and necessary for sufficient yields, improper handling of fertilisers and pesticides as well as of sewage sludge and composted municipal wastes may lead to contamination of the soil and water. Pesticide adsorption processes in soils and the concomitant formation of bound residues stress the necessity for an integrated pest management and of minimising pesticide use in agriculture.

There is no principal question about the beneficial effect of mineral fertilisers in supplementing the nutrient supply of agricultural soils and optimising crop yields and quality. However, since the buffering capacity of the soil system for soluble fertiliser salts is limited, a most careful matching of plant nutrient inputs to the outputs by crops is required. On less fertile and resilient soils, especially those in the tropics, the predominant use of NPK fertilisers tends to aggravate other deficiencies, particularly of micro-nutrients. Therefore, organic and mineral fertilisers should supplement each other, and the quantities supplied should always take into consideration the loading capacity of the whole environment.

In many developed countries livestock manure has to be used with more care for the ecosystems and especially for the water resources. Soils have a finite capacity for buffering and retaining excessive additions of plant nutrients from animal waste, and even the loading capacity for phosphorus eventually comes to an end. The resulting pollution of ground and surface waters with nitrate and phosphate, and of the air with ammonia, indicate that many existing animal husbandry systems cannot be sustained. Economical facts and constraints are no excuse for delaying the necessary adaptations. Policy makers should be made aware of the rising and eventually unaffordable external effects and costs.

The limitations for the use of sludge and composted organic municipal wastes are principally the same as for mineral fertilisers and for manure. Unfortunately, sewage sludge is a very effective sink for all kinds of environmental questionable contaminants, organic as well as inorganic, particularly of heavy metals. Only at very low rates of sludge and compost contamination, it is possible to maintain a long-term equilibrium between inputs and outputs of potential soil pollutants at the lowest possible level. On the other hand, recycling of suitable wastes from society into soils is the only possible way to reduce the unidirectional fluxes of plant nutrients from rural into the urban environment. Therefore, an essential prerequisite for future sludge and compost utilisation is that urban societies reduce the load of persistent contaminants in their waste waters by all possible means. This quality problem becomes even more relevant when the consequent recycling of appropriate organic wastes will result in compost quantities which have never been experienced before. Hence the principal desirability of closing plant nutrient circuits as much as we can, justifies all possible efforts to minimise the load of contaminants in municipal composts. Here again, however, there cannot be any compromise as far as the maintenance of soil multifunctionality is concerned. Solving this problem requires both government action and public education.

The sustainability of all measures considered to be beneficial for soil productivity have to be judged against the background of their long-term environmental effects. Existing soil quality standards are not always sufficiently based on the concept of sustainability, so that many soil "amendments" need to be reconsidered in the light of long term soil protection. "Prevention"

should be the leading principle in soil protection, since "rehabilitation" is extremely difficult and often not possible at all, once symptoms of soil degradation can be observed.

Other issues which need much more attention are soil compaction and soil sealing. Soil compaction both in agriculture and in forestry is a world wide problem, which gets more important because of increasing use of machines, higher frequency of wheeling and increasing dynamic forces applied to the soil. Also surface sealing either by natural processes or by human activities, especially in densely populated areas, leads to a loss of soil functions in landscapes.

### TOPIC 3

#### **Influence of demographic, socio-economic and cultural factors on sustainable land use**

- Rapid demographic change is a major threat to the environment. While projected future populations can be fed in aggregate, there remains many areas where severe stress will occur and where the demands of local people cannot possibly be met by the soil resources. Typically, such areas include conflict zones as in the Horn of Africa, sites where there has been rapid migration as in Montane Mainland South East Asia. Elsewhere, many communities are learning to cope with demographic pressures and adapting their own technologies and responses to a changing environment. Society can adapt its land management to cope with demographic change. These are the people and situations from which we can learn ways in which sustainable land management may be practised.
- Policy and research responses to the influence of demographic change on land use must include: addressing inequitable and inappropriate land tenure systems; providing infra-structural, marketing and institutional support to projects, programmes and communities; targeting rehabilitation programmes to areas where special factors have made it impossible for communities to cope and adapt to demographic change.
- The engine for moving towards sustainable land management is the provision for people's social and economic needs. All examples of successful conservation projects have a primary focus on local society and livelihood security. Without these ingredients, no intervention or innovation will succeed. For land management practitioners, it therefore means they first have to listen and learn; secondly, they must match what they have to offer - technologies, education, professional advice, physical resources, money or whatever - with the socio-economic needs of the people, and finally, they must monitor and evaluate what happens.
- Policy and research responses to the influence of socio-economic factors must include: greater decentralisation and empowerment of local communities; promotion of a more participatory and incremental approach to interventions; support for analytical tools to understand the social and economic conditions; an understanding of the diverse societal and economic perspectives of people - such as gender differentiation and economic rationality at the household level. National governments should support financial and economic baseline studies of the implications of continued degradation, and use these to design appropriate policy responses in, for example, support to extension, research, marketing facilities and related programmes in healthcare, education and support services.
- Pollution brings special social and economic problems which need specific actions. Rural communities cannot shoulder the burden for all society of off-site impacts of land degradation. The careful design of incentive structures such as cost sharing of pollution control and of legal frameworks is called for in order to target action responses in the

appropriate sections of societies - local people, farmers, men and women, young and old, poor and elite, rural and urban, landless and owners.

- Cultural factors such as respect for traditions, indigenous knowledge, religious and ceremonial needs condition many people's approach to the land. Enduring cultural traditions can be the motivating force for protecting the environment. They can be the catalyst for an integration of indigenous and formal scientific knowledge.
- Land tenure is fundamental to land management. A tenure regime should be clear, flexible and secure.
- Governments should be the facilitators of change, not the controllers. Soil, land and water resources are both public goods entrusted to society and private goods entrusted to the individual. Administrative, institutional and legal provisions must enable, not generalise.
- **TRIGGERS.** We must identify the triggering mechanisms for rapid and large-scale adoption of improved and managed practices. Triggers will undoubtedly live in social, cultural and economic factors. **SECURITY.** Long-term security of land use is a vital precondition to conservation, land husbandry and sustainable land management. **INTERVENTIONS.** They must be long-term and be monitored and evaluated.
- Our own assumptions, perceptions, biases and interests must be questioned continuously, and we should be receptive to new ideas.

## TOPIC 4

### From soil and water conservation to sustainable land management

- The diversity of potentially conflicting land management objectives, the multi-level decision making associated with various sectors of society and the proliferation of environmental regulations require that decision aids be designed to take these factors into account. Many tools, data bases, simulation models and quantitative understanding of indicators of sustainability which lend themselves to rational multi-criteria decision making are necessary for multiple objective decision making. High quality information, data bases and applicable models are crucial for decision making on productive and sustainable land use systems. Decision aids for informative land use planning must be user friendly and must provide choices not single solutions to sustainability problems.
- Multi-level stakeholder approach to sustainable land management appears to have been increasingly accepted as a tool not only for supporting local land uses and communities but also for research and extension. There is an urgent need to involve the farmers in technology development and adjustment so that their local experiences and knowledge can be fused into the research.
- Handling of information relevant to sustainable land use systems should be based on both conventional data processing and pre-processed data with subject oriented models. These should fit the integrated model where socio-economic data are also incorporated. The important phase will be the validation of the integrated models by means of expert evaluation and real values observations.
- It is recognised that there is a clear gap of data and sound soil and water conservation guidelines to assist poor farmers with options of technologies.
- In those situations where watershed is selected as entry point for resource management, there are clear problems of adoption of introduced conservation technologies due among other things to lack of people's participation, inconsistency and insufficiency of commitment on the part of the involved agencies, lack of co-operation among the stakeholders etc.

- Preventing degradation of productive land shall be given more priority than restoring already degraded land.
- There is need to make more use of information already on hand than to initiate more data collection in new projects.
- There is a need to adjust and adopt already known technologies for different bio-physical and socio-economic conditions.
- Institutions which finance research take account of the global need of sustainable land management and give guidance to their decision making bodies towards supporting more integrated approaches. The share between basic, disciplinary research on the one hand and integrated, multidisciplinary or transdisciplinary research on the other hand be half-half.
- Monitoring by means of sustainable development analysis of local conditions should guide any institutional approaches and activities supporting land users and their communities.
- There is need to bring together/to establish multi-disciplinary teams of natural and social sciences, decision/policy makers and the land users to jointly formulate scientifically based investigations, select indicators and principles for M&E (=monitoring and evaluation) and be responsible for the M&E, define basic and meaningful concepts of sustainable land use systems, serve as conceptual groups to advise sectoral departments and give guidance to institutions' policies.
- Researchers should not only develop sophisticated methods but also rough and quick methods that can be applied by non-researchers. Researchers should not conclude their tasks with scientific reports but be more actively involved in implementing the results.
- Long-term objective setting and commitment must be recognised by donors and governments, if sustainable land management should be productive.
- Promotion of a suitable mix of technologies rather than any single technology be preferred.
- In semi-arid environments it is recognised that there is evident competition for crop residue as mulch, animal feed and fuel. In the short run therefore, trade-offs in the utilisation is recommended.
- It is recognised that keeping the environment and ecosystems intact is not always the first priority of the land users and at times the government as well. Rather, they expect tangible results from investments in land management. Therefore, considerations/preferences shall be given to technologies that show results in a short time.

## **TOPIC 5**

### **Furthering co-operation between people and institutions**

Monitoring refers to an information system, not just data collection. Data without an audience, an objective and analysis is a waste of time and effort. Monitoring in the context of sustainable land use has a wide range of audiences, all of whom are stakeholders in the development of more sustainable forms of land use.

1. How to deal with a situation of incompatibility of project length (short time frame) and the time it takes for impact to show itself (often much longer when it comes to some biophysical/socio-economic trends)?
2. How to deal with a dominant interest in quantitative data when often qualitative data is more relevant and revealing?

Investments in human capital is today recognised as the most cost-effective strategy in human-kind's endeavour to banish poverty. Successful human resource development programmes aim

to enhance the ability of individuals so that they can have more options which will ultimately give them more control over their lives. A diversity of institutions at policy, research, implementation and local levels form a key focus for this strategy. Considerable gains have been made by analysing past and current human resources development practices revealing that there are institutional barriers which need to be examined with a sense of urgency.

The focus has to change from strengthening institutions to transforming institutions. In addition a considerable commitment has to be made to the establishment of innovative institutional mechanisms especially at the community level. The strategy for the future must focus first on institutional transformation and locate human resource development in this context of change. Organisation and human resource development needs to be encouraged in two broad areas, i.e. **COMMUNITY BASED ORGANISATIONS** in local level institutions. These consist of existing and traditional community organisations which are both formal and informal (e.g. user groups) and indigenous or introduced (e.g. co-operatives); **EXTERNAL INSTITUTIONS** which consist of those institutions which are not community based but all the same work with local communities such as youth extension department, research institutions, doctors, etc.

Knowledge creation becomes efficient through monitoring and adaptive management in a participatory approach. This needs mechanisms to capture this knowledge.

There is urgent need to research mechanisms of participatory approaches (in different socio-economic settings), specifically how to cut across boundaries between institutions and disciplines, how to ensure that the participatory process is on-going, and how to capture and disseminate useful knowledge.