

**EPTD WORKSHOP SUMMARY PAPER NO. 7**

**INTERNATIONAL CONFERENCE  
ON STRATEGIES FOR POVERTY ALLEVIATION  
AND SUSTAINABLE RESOURCE MANAGEMENT  
IN THE FRAGILE LANDS OF SUB-SAHARAN AFRICA**

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by Anna Knox McCulloch, Suresh Babu, and Tidiane Ngaido

## **1. BACKGROUND TO THE CONFERENCE**

Land degradation is advancing at an alarming rate in Sub-Saharan Africa, particularly in the form of desertification in dryland areas, soil erosion and deforestation in hillsides, and loss of soil fertility in many cropped areas. The degradation of fragile drylands and hillside areas is particularly worrying because it is often irreversible, or can only be reversed at high cost. While natural forces such as climate change, drought, floods and geological processes contribute to land degradation, the most important contributing factor in Sub-Saharan Africa is human activity. The key driving force is thought to be a nexus of poverty, rapid population growth, and inadequate progress in increasing crop yields. Poor rural people in their quest for food and other livelihood needs are increasingly (i) expanding cultivation into forests, steep hillsides, and other fragile areas that are easily degraded; (ii) reducing fallow periods to the point where soils are inadequately rejuvenated; (iii) pursuing land management and cultivation practices that deplete soils of their nutrient and organic matter content and promote acidification; (iv) overgrazing pasture areas; and (v) cutting but not replanting sufficient trees for fuelwood and other purposes. New or improved technologies that can increase yields and hence reduce the pressure to expand the crop area are either not available, or not economic or appropriate under the subsistence conditions of small-scale farmers.

The dimensions of these resource degradation problems are large and are growing. Land degradation is now thought to affect two-thirds of the total cropland of Africa, and one-third of the pasture land. About three-fourths of these degraded lands lie in dry regions. Moreover, about 3.7 million hectares of closed forest are lost each year, and this rate is accelerating. There is accompanying loss of biodiversity, increased siltation, and flooding of rivers that threaten downstream uses such as dams and irrigated agriculture, and changes in regional and global climate.

This degradation is matched by worsening poverty and food insecurity in rural areas, and by unabated increases in the population. Each year, another 20 million people are added to Africa's population, leading to a doubling every 20 years. About half of all Africans currently live in poverty, and about 160 million poor live in dryland and hillside areas. Africa is the only major region where poverty is expected to increase in the next decade. Food availability is already below the UN recommended minimum, yet food production per capita continues to decline (by 0.8% per year during 1981-92). IFPRI's projections for the year 2020 suggest worsening poverty and food insecurity problems in Africa, unless there is a significant change in strategy, with the total food gap increasing from 8 million tons per year today to about 30 million tons per year by 2020. And these food gaps are based on estimated purchasing power, not on the amounts of food that Africans would need to be properly fed. With poor economic growth and worsening social problems, the pressure on natural resources, particularly in fragile areas, seems destined to worsen. Migration to cities will provide some relief, but even so, population densities in many fragile areas are likely to increase during the next several decades. As governments and aid agencies confront the increasingly urgent need to develop a broad

range of types of fragile lands in Africa, there is a need for a new consensus on how this can best be achieved. An evaluation of past and recent experiences in developing fragile lands, and synthesizing the lessons learned for the future would be a useful input into achieving a new consensus.

The broad goal of the conference was to contribute towards balanced agricultural growth and food security in Sub-Saharan Africa, through formulation of strategies for sustainable resource management and poverty alleviation in the fragile lands. In pursuit of this goal, the conference focused on the following objectives:

- Foster common understanding of the issues and challenges in the development of fragile lands to solve the problem of food security and poverty alleviation;
- Identify constraints to successful management of fragile lands;
- Formulate recommendations for designing appropriate policies and strategies for fragile lands to meet the livelihood needs of people while conserving and sustainably managing the natural resource base; and
- Identify appropriate follow-up activities for implementing the agreed upon policies and strategies (for research, capacity strengthening, policy formulation, NGOs and future investment).

The Entebbe Conference was planned and managed by an advisory committee comprised of:

Dr. Bruno Ndunguru (SACCAR)

Prof. Chris Akello-Oguto (Technoserve)

Dr. Suresh Babu (IFPRI)

Dr. Peter Hazell (IFPRI)

Ms. Anne de Ligne (EC)

Dr. Matthias Magunda (NARO)

Mr. Juergen Richter (DSE)

## **2. THE OPENING CEREMONY**

Professor Joseph Mukibi, the Director General of NARO, and the president of the conference welcomed the participants to Uganda and to the conference, and introduced Professor Bruno Ndunguru, the Director of SACCAR and the conference chairman. Professor Ndunguru introduced the objectives of the conference, its format, and the expected outcome. He emphasized the need for coming up with a future plan of action at the end of the workshop which should be presented to key policy decision makers. Mr. Herbert Beck, representing the Ambassador of Germany to Uganda, stressed that given the increased demand for food and agriculture commodities for subsistence and commercial purposes, sustainable use of natural resources will be vital in the years to come. According to him, developing sustainable agriculture production systems is the key challenge for the fragile lands of Sub-Saharan Africa. Thus, the core question of the conference was how to maximize growth in agricultural production for poverty reduction while minimizing the damage to the natural resource base. Following him, Dr. Peter Hazell of IFPRI welcomed the gathering on behalf of IFPRI. Giving a brief introduction to IFPRI and its research program in less-favored areas, he highlighted the urgent need to increase Africa's per capita food production. Unfortunately, while total food production has increased moderately in recent years, population size has grown faster and food

production per capita has declined. Dr. Hazell emphasized that the increased food production in the high-potential areas will not be sufficient to redress the food needs of many millions of rural poor. Additional food production will have come from vast areas of less-favored areas including the fragile hillsides and low rainfall areas that are the primary focus of this conference.

The conference was officially opened by the Honorable Dr. Israel Kibirige Sebunya, Minister of State for Agriculture on behalf of the Minister of Agriculture and Vice President of Uganda, Honorable Madam Speciosa Kazibwe. He welcomed the participants and emphasized the importance of the timing of the conference given that land degradation is advancing at an alarming rate. In Sub-Saharan Africa, particularly due to desertification in dry areas, soil erosion and deforestation in hillsides and loss of fertility in many cropped areas, the productivity of crops has been going down. Because degradation of fragile dry areas and hillsides is often irreversible, he highlighted the need for developing technological and policy solutions for reversing the trends, thereby increasing food security and reducing rural poverty.

### **3. KEY PROBLEMS AND CHALLENGES FACING SUSTAINABLE DEVELOPMENT OF THE FRAGILE LANDS**

#### **THE BACKGROUND PAPERS**

Six plenary papers were commissioned for the conference. Their titles and authors are listed below in their order of presentation.

1. Growth, Poverty and the Environment in the Fragile Lands of Sub-Saharan Africa. Suresh Babu and Peter Hazell, International Food Policy Research

Institute (IFPRI).

2. Spatial Aspects of the Design and Targeting of Development Strategies for Fragile Lands. Stanley Wood, IFPRI; Freddy Nachtergaele, Food and Agriculture Organization; Daniel Nielsen, World Resources Institute; Aiguo Dai, National Center for Atmospheric Research; Kate Sebastian, University of Maryland.
3. The Impact of Policy Reforms and Trade Liberalization on Fragile Lands in Fragile Lands. Awudu Abdulai, Swiss Federal Institute of Technology; Peter Hazell, IFPRI.
4. Strategies for Sustainable Agricultural Development in the East African Highlands. John Pender, IFPRI; Frank Place, International Centre for Research in Agroforestry; Simon Ehui, International Livestock Research Institute.
5. Turning Available Technologies for Improvement of Soil Fertility Management into Real Options for Farmers in Sub-Saharan Africa. André De Jager, Agricultural Economics Research Institute; Mateete Bekunda, Makerere University; Eric Smaling, Wageningen Agricultural University.
6. Property Rights Institutions for the Development of Fragile Lands. Anna Knox McCulloch and Peter Hazell, IFPRI.

In addition to the plenary papers, five poster papers were also displayed.

1. Dambo Irrigation System: Indigenous Water management for Food Security in Zimbabwe. Ruth Meinzen-Dick, IFPRI; Godswill Makombe, Colorado State University.

2. Community Based Financial Institutions and their Potential to Address Poverty: A Case of Tanzania's SACCOs. Andrew Temu, Sokoine University.
3. Soil Conservation and Environment Recovery in Machakos District of Kenya. Francis Gichuki, University of Nairobi.
4. Soil Conservation in the Highlands of Uganda. Julius Zake, Makerere University; Mathias Magunda, Kawanda Agricultural Research Institute.
5. Conservation of Fragile Wetlands in Uganda, Mathias Magunda, Kawanda Agricultural Research Institute; Julius Zake, Makerere University.

A brief summary of the plenary papers follows.

*Growth, Poverty and the Environment in the Fragile Lands of Sub-Saharan Africa*

The fragile lands of Sub-Saharan Africa are facing a worsening social and environmental crisis. Fragile lands include hillsides and mountains prone to soil erosion that can produce good crops under certain conditions; sub-humid savannahs prone to soil acidification; humid lowlands prone to soil nutrient leaching; tropical lowlands that have low and unstable rainfall; semi-arid regions prone to wind and desertification; and those areas that may have pockets of productive soils but are inaccessible to and need rural infrastructure to make them economically worthwhile for farmers to increase production. The worsening problems of stagnant agricultural production, increasing poverty and natural resource degradation in the fragile areas of Sub-Saharan Africa require urgent action by governments and development agencies to provide solutions that integrate the livelihood needs of local people with the sustainable management and conservation of

natural resources. Without such action, governments and donors are likely to have to spend increasing amounts of resources on crisis relief, safety nets and environmental protection and rehabilitation.

The conventional wisdom that governments and donors should continue to focus most investment in high-potential, often irrigated areas for higher agricultural growth is being increasingly challenged, since this focus has failed to redress poverty amongst the vast majority of Africa's smallholders. Reaching the poor through additional investments in the commercial sector is also in doubt, particularly in many countries in Sub-Saharan Africa that have limited land that is suitable for expanding commercial farming and limited non-farm opportunities. However, some of the recent political, social, institutional, and economic transformations, have provided Sub-Saharan Africa with improved opportunities to achieve increased growth, reduced poverty, and the sustainable use of natural resources.

Achieving poverty alleviation and the sustainable use of natural resources does not have to mean slow growth in the agricultural sector. While there often seems to be a tradeoff among these objectives in the short-run, recent experiences in the sustainable development of fragile lands (e.g., in the highlands of Machakos District in Kenya) point to the potential for attaining all three development goals -- growth, poverty alleviation, and the sustainable use of natural resources -- in the long-run. But because fragile lands are very diverse in their social and agroclimatic conditions, the design of policy, technological and institutional solutions to alleviate poverty and promote the sustainable use of natural resources in the fragile lands should be contextual and site specific.

Policies, institutions and technologies are powerful conditioning factors that influence farmers' decisions about the use of natural resources, and they play an important role in determining whether agricultural growth occurs and whether it contributes to poverty and environmental goals. Policy makers do have the means to influence the outcomes, and to help ensure that the right kinds of agricultural growth are achieved. Appropriate policies are necessary to ensure that farmers have the right incentives to conserve natural resources while increasing productivity. Macroeconomic policies should provide a stable environment to promote general economic growth, and should be complemented with sound sectoral policies that do not unfairly tax the agricultural sector. Institutional development, particularly secure property rights and effective local institutions for managing collective action and common property resources, is also a necessary condition for providing appropriate incentives for household and community investments in resource conservation technologies. Technologies and natural resource management practices that are appropriate to farm conditions also need to be developed and disseminated. Given the diversity of conditions in fragile lands and the complexity of the dominant farming systems, this requires multidisciplinary research and farmer participation in its design and testing.

### *Spatial Aspects of the Design and Targeting of Development Strategies for Fragile Lands*

Land fragility is an elusive concept that relates to the potential mismatch between human use of land and its biophysical conditions, leading to resource degradation. Such a mismatch is conditioned by a host of climatic, biophysical, social, economic and technology factors, and even then may change over time. Fragility is a difficult concept

to operationalize for development planning, and it is more useful to think instead in terms of the suitability of different “locations” rather than land for specific economic activities over time. Spatial analysis of patterns and processes related to the environment, demography and infrastructure can provide significant benefits to policy makers by highlighting potential rural development opportunities. Many policy, market, and institutional variables exhibit spatial aspects that are useful for designing programs for the development of the fragile land areas.

Formulating good development strategies is a complex matter for fragile lands. One of the complexities is the dynamic interaction among natural and human-induced factors and the stocks and flows of natural and other resources in the fragile lands. Obtaining an improved vision, literally and metaphorically, of such interactions can bring order and structure to the policy formulation process. Order and structure arise not only from the existence of a geographically referenced universe, but also because geographical information systems (GIS) can integrate both spatial and seemingly non-spatial information in their database systems. Thus, the spatial framework can be catalytic in providing both a common focus for multi-disciplinary inputs to designing and testing development strategies, as well as common formats for the integration of multi-discipline information. This presents opportunities for time and cost savings, as well as for shaping more effective strategy options, particularly if the visual simplicity of this media can serve to increase transparency in the policy formulation process and thereby make it more accessible to a greater range of stakeholders.

Developing capacity to acquire, generate, manage and interpret spatial information, and feed it into the strategy development process would ultimately improve

the likelihood of favorable social and environmental outcomes in the fragile lands. The visual presentation of data in spatial formats allows a fresh interpretation of agricultural and resource-related issues that face fragile areas. An overview of the relative spatial distribution of key variables may offer some insights into causality, as well as point to issues of data resolution and quality for designing policies and programs in the fragile lands. Most importantly, the approach offers a geographic perspective of the feasibility and attractiveness of targeting of specific strategy options for reducing food insecurity and poverty in fragile areas of Sub-Saharan Africa.

*The Impact of Policy Reforms and Trade Liberalization on Fragile Lands in Sub-Saharan Africa*

Many Sub-Saharan African countries have made serious efforts to implement the policy reforms needed to achieve macroeconomic stability. In cases where stabilization measures were accomplished by deregulation and liberalization of prices and markets, significant supply responses over pre-reform levels have been achieved. However, the sustainability of agricultural growth, even in those countries where economic recovery and growth have been impressive, remains questionable. While macroeconomic and sector-specific reforms are necessary for economic recovery, they are not sufficient for sustained long-term agricultural growth. At best, they create an enabling economic environment for increased agricultural production. But in many Sub-Saharan African countries, agriculture's supply responses is constrained by poor rural infrastructure and high marketing costs, and by the absence of improved technologies. Overcoming these constraints will require significant public and private investments in rural areas.

However, partly as a result of the financial retrenchments associated with structural adjustment programs, public investments in agriculture and rural areas have declined sharply in many Sub-Saharan African countries in recent years. This downward trend will need to be reversed if the full promise of the policy reforms is to be captured.

Policy reforms also have an impact on natural resource management practices in rural areas. These effects can be complex and difficult to observe, but the available evidence suggests that many of the changes have been favorable and have contributed towards improvements in the condition of natural resources. Investments in land conservation and soil fertility improvements seem more likely to be successful given the poor infrastructure and high transport and marketing costs encountered in rural areas. Market liberalization policies can easily lead to increases in the prices of key inputs like fertilizers in these areas, as well as reduced access to input supplies and market outlets. Additional public investments are needed in many backward regions if they are to successfully compete in liberalized economics and to redress their poverty and environmental problems.

#### *Strategies for Sustainable Agricultural Development in the East African Highlands*

The policy and institutional requirements for sustainable development depend upon the economic strategy of development that is pursued, while appropriate strategies depend upon the factors determining potential comparative advantage, especially agricultural potential, access to markets and population pressure. Despite the considerable diversity of conditions that exist in fragile lands, relatively few types of development strategies (or pathways) are actually observed at the community level.

These include high external input intensification of food production, low external input intensification of food production, livestock intensification, commercial production of perishable (mainly horticultural) crops, commercial production of high value nonperishable (mainly perennial) crops, rural non-farm development, and emigration. Success of the commercial agriculture development strategies is largely conditional upon increased food crop production, particularly in areas with poor market access with potential for high-value perennial crop production. Opportunities for intensified commercial production of crop and livestock products are very good in much of the highlands, where agricultural development in low potential areas is more limited, although there appears to be good potential to increase the overall productivity of land use through better management of grazing lands. In higher population density/low potential areas with good market access, there may be good potential for investments in irrigation or rural non-farm development (though rural non-farm development may need to depend upon linkages to sectors such as manufacturing or mining where agricultural potential is low). In high population density/low potential areas with poor market access, emigration is bound to be a major element of people's livelihood strategies.

Addressing problems of poverty, low agricultural productivity and resource degradation will require strategies that address the needs of the poor as well as the more well-endowed. Nevertheless, identifying broad strategies of development that are feasible can help in the formulation of more targeted strategies for more specific situations. Much research is needed to validate the broad development strategies that have been proposed (or to identify others), to test whether the constraints hypothesized are in fact critical constraints, to identify the most effective policy changes or public investments to relax

the constraints, and to identify more specific strategies to address problems and potentials within the broad categories of situations that have been identified.

*Turning Available Technologies for Improvement of Soil Fertility Management into Real Options for Farmers*

Technology development in the area of soil fertility management needs to be linked closely to policy development in order to ensure large scale impacts. Policy instruments influence the demographic situation, market conditions, institutional factors, information and available technology, public and community investments in land management and ecological conditions. And these factors determine to a large extent the decisions made at the farm household level, including soil fertility management. Policies should aim at creating conditions for economically sound production of food and cash crops by the domestic agricultural sector. Increased opportunities for better economic performance, in combination with sound institutional aspects, are assumed to lead to increased soil and water conservation practices and reduction of soil nutrient mining.

In order to facilitate implementation of technologies at the farm household level:

- Farmers have to become key actors in the technology development process.
- Socio-economic and institutional constraints to adoption of conservation practices and sustainable nutrient management practices need to be addressed by policy makers.
- Society should assist the agricultural sector in implementing required investments with long-term benefits.

The multi-disciplinary natural resource monitoring approach, although still in development, has contributed towards an improved understanding of the current farm

management systems and helped target and prioritize different development options. The observed heterogeneity -- caused by differences in the physical and socioeconomic environment, farm management strategies and objectives and technical knowledge of fragile land areas -- can be used as a starting point for inducing changes towards greater sustainability.

### *Property Rights Institutions for the Development of Fragile Lands*

Given that the vast majority of those residing on fragile lands are poor, solutions need to be found to regenerate the capacity of fragile lands to meet the basic needs of their residents. Technologies, including natural resource management (NRM) practices, and the institutions that govern their implementation are central to the performance of resource systems and their potential for sustainability. In this context, it is important to understand how the viability of local institutions governing property rights and collective action can contribute to the adoption of sustainable natural resource management practices which enhance the prospects of long-term agricultural development and advance human welfare.

The degree of spatial and temporal externalities embodied by certain NRM technologies can provide a means of evaluating the extent to which property rights and collective action institutions shape adoption outcomes. Although property rights and collective action may independently shape the adoption of NRM technologies and practices, often these institutions interact with other factors to indirectly affect uptake. Constraints and opportunities arising from physical, technical, social, economic, political and governance factors shape local institutions, thereby affecting technology choice and outcomes from these choices.

Throughout Africa, indigenous property rights systems continue to prevail in practice and often do so even when national laws and official legal systems do not recognize their legitimacy. Indigenous property rights systems are constantly evolving in response to the pressures of population growth, expansion of markets and commercial opportunities, and technology innovation which heighten land and natural resource scarcity and intensify competition. Beyond the realm of agricultural cropland and trees planted on it, indigenous tenure regimes have designated most other natural resources as common property, whereby community members hold joint use rights to benefits such as water, forest resources, rangeland resource, and marine resources.

The fragility and variability of the environment in Sub-Saharan Africa further intensifies the validity of common property, particularly where credit and insurance markets are absent or imperfect. In the case of rangelands in semi-arid regions, extensive techniques are necessary to safeguard fragile soils and prevent erosion which results from overgrazing. Likewise, where variability in benefits produced by a resource are high, common property can act as insurance against losses by enabling users to exploit the most productive portions of the undivided resource. Tenure reforms attempting to replace indigenous tenure systems have not only affected farm land. African rangelands have also been the target of seditarization and privatization schemes imposed from above generally to the detriment of the detriment of their pastoral and agropastoral users.

Where it is established that tenure security is needed to facilitates more effective resource management, serious consideration needs to be accorded to what type(s) of property institutions are most appropriate for achieving that objective. It is important that policy become more directed toward facilitating institutional resilience and adaption,

rather than replacing local institutions. Attempts at strengthening the evolutionary capacity of indigenous tenure systems may include extending legal legitimacy to local rules and management, instituting a legal framework which accommodates a variety of property rights and collective action institutions, providing back up channels of support (e.g., legal, enforcement) to local institutions, removing constraints to technological progress designed to alleviate pressures on fragile land resources, and developing structures which make states more accountable to local communities and their needs. Consistency in tenure institutions and authority is also important for fostering tenure security.

When introducing technologies where robust institutions are in place, it is preferable to adapt technologies to be compatible with institutions rather than the reverse. Policy frameworks are needed to strengthen common property institutions which encourage the evolution of local collective action by devolving partial or complete authority for resource management to local communities and which actively facilitate the conditions for collective action. Institutions which can organize and balance competing claims, mediate conflicts, and promote stable and sustainable use patterns will tend to be the most resilient.

#### **4. PROBLEM ANALYSIS: KEY PROBLEMS AND THEIR CAUSES -- WORKING GROUP SESSION I**

In order to identify the key problems facing fragile lands, the workshop participants were organized into two working groups. The terms of reference for the working group discussions were as follows:

1. What are the major problems of fragile lands?
2. What are the reasons for these problems, and how are they interlinked?
3. What are the consequences of these problems?
4. What has (not) been done in the past to solve the problems?

Based on discussions and lessons learned from the paper presentations, it became apparent that fragile lands could not be restricted to a uniform set of characteristics. Some may be more susceptible to degradation than others. Rather, fragile lands encompass both those lands which are highly susceptible to degradation (yet may have so far been exposed to relatively little exploitation) as well as those lands which initially may have had favorable characteristics in terms of resource endowments, climate and fertile soils, but have come under heavy exploitation such that now their status can be considered fragile in that they are unable to serve the long-term needs of the populations which depend on the land and its resources.

Thus, natural resources are susceptible to degradation as a result of different combinations of poor natural conditions and environmentally detrimental human intervention. In an effort to characterize fragile lands, the working groups identified several forms of resource degradation. The mining of soil nutrients were attributed to agricultural intensification, increasing shifting cultivation, and inappropriate agricultural

practices, leading to erosion and loss of soil fertility. Poorly managed water resources and irrigation practices can also contribute to soil acidity and salinity. Other forms of degradation arising from poor land husbandry include deforestation and overgrazing, resulting in a loss of biodiversity, desertification, flooding, water logging, and susceptibility of forests to fires.

The discussion characterizing fragile lands quickly evolved into a process of examining the associated causes of resource degradation and its manifestations. While some of the problems can be attributed to poor natural conditions, much of resource degradation arises from a series of endogenous processes which can lead to a vicious cycle of deterioration unless the dynamics are somehow shifted to a more sustainable track. The following constitutes the causes identified along with an explanation of the interlinkages with other processes, beginning with those related to states of nature conducive to fragile lands.

- a) *Climate* plays an obvious role in shaping land fragility. Dry conditions brought on by low or highly variable rainfall and accompanied by arid or sandy soils are generally synonymous with high risks of desertification. Topography can be important as well. Steep slopes may be prone to isolated erosion as well as susceptible to floods and water logging, whereas flat, dry regions which support poor vegetation coverage are more conducive to widespread erosion.
- b) Areas characterized by *high population densities* or population growth frequently experience increasing competition for land and other natural resources. When this occurs, those resources which are in high demand are more likely to be mined at

- an unsustainable rate, particularly if property rights institutions are not in place to restrict access to resources and their rate of usage.
- c) *Uncertainty and risk*, whether environment-related or having to do with markets and prices, may create incentives to exploit resources unsustainably. This is especially true for the poor, whose emphasis on meeting immediate consumption needs may lead to practices which produce the highest return in the short run, but accelerate levels of degradation in the long run. Concerns over risk may also diminish adoption of technologies and natural resource management practices which have beneficial implications for the environment, if they are more sensitive to variable conditions or if payoffs are realized in the long term. Despite high risks, it is rare for rural communities in developing countries to have access to formal safety nets to protect them from risk. This can be attributed to policies which ignore the importance of insurance as well as a lack of public investment in infrastructure and other means of encouraging insurance market development. Although informal mechanisms of risk-coping may be in place, they are frequently insufficient to cope with large-scale or covariate risks or they may be absent or weak due to inadequate local institutions to support them.
- d) *Local institutions and organizations* have been shown to be crucial not only for managing risk, but also managing natural resources in general. The collective action necessary to ensure efficient, equitable, and sustainable resource management may not be sufficient if policies are lacking for encouraging local organizational development (or which may even go so far as deterring

- organization), participation costs are high, human capacity is weak, and populations are either too low to support collective action or too high to assure a reasonably low level of resource conflicts.
- e) Institutions for defining *property rights* to resources are also very important. Insecure property rights can contribute to decreased incentives for investment in long-term, environmentally sound technologies. Conflicts over land use may also arise from insecure tenure and lead to worsening degradation. Inheritance practices which involve subdividing smaller and smaller parcels of land have a tendency to induce higher levels of agricultural intensification in order to meet subsistence needs, thereby putting added pressure on fragile lands. They may also result in less secure forms of tenure for women, implying negative implications for resource management.
- f) Governments may be responsible for formulating and implementing *policies* which have harmful implications for the resilience of fragile lands. Public spending plays a large role in shaping how natural resources are managed. Fragile lands are often characterized by low investments in infrastructure and market development, increasing the cost of technologies and the transaction costs associated with operating rural industries and formal insurance and credit markets. This, in turn, hinders both investment in natural resource management technologies and the creation of non-farm income alternatives which have the potential of alleviating pressure on fragile land resources. Services, such as health and education, are key to improvement in human capacity, but are frequently

lacking in remote fragile land areas. Similarly, investment in information dissemination, including extension services which convey best-practice natural resource management, can be inadequate and therefore limit human capacity. Not only are there high costs to be met in targeting the poor in remote rural areas, but the impact of the investment may be limited if it does not reach those actually responsible for much of natural resource management, namely women.

Policies aimed at strengthening local institutions and developing local organizational capacity remain a rarity on many developing country agendas. In fragile land areas, this compounds the risk of unsustainable natural resource management if local institutions and organizations for these purposes are weak or absent. Similarly, if policies are not geared toward participatory methods of technology development which tap indigenous know-how, scarce government resources may be lost to developing inappropriate technologies which are either incompatible with environmental objectives or are not adopted due to their failure to positively contribute to people's livelihood needs. Credit and savings institutions are also likely to be key to technology adoption geared to more sustainable practices, but their development curtailed by inadequate infrastructure and markets as well as limited income-generating opportunities outside of agriculture.

- g) Whereas failure to incorporate indigenous knowledge and insufficient research may lead to the development of inappropriate *technologies* for fragile lands, poor adoption levels relate not only to the technology's appropriateness, but also the

transaction costs of disseminating technologies to rural areas. This will depend on the extent of infrastructure and market development and investment in information dissemination and extension on resource management technologies and practices.

The result of many of these negative endogenous processes is not only worsening resource degradation, but also increasing poverty for those who reside in fragile land areas. As a result, the gap between those living in high potential areas and those occupying low potential areas widens and equity implications become more pressing. Unfortunately, this is not the end of the road since poverty itself can contribute to the perpetual cycle of resource degradation by eliciting higher discount rates on net returns to resource investments and through higher adversity to risk. High cost technologies and technologies involving higher risks may also be resisted in favor of more affordable and reliable methods that may not carry the environmental benefits of improved practices and technologies.

The next part of the session focused on specifying what has been done by various African countries in the past to solve the problems identified. It was noted that actions have been undertaken in response to these problems at the technology, institutional and policy levels and have had varying degrees of success. However, limited time precluded much discussion among the groups of the performance of various measures.

Several policies and development programs were highlighted as addressing resource degradation in Africa. Policies have aimed at livestock development, controlling deforestation, and environmental regulation while programs have included fodder

promotion, group ranches, soil conservation programs, afforestation and agroforestry programs, water provision, and agricultural extension and research. Attempts to reform inappropriate agricultural practices which contribute to degradation have centered on research on developing appropriate technology such as drought-resistant crops and livestock, promotion of farm mechanization and technical inputs, and agricultural extension addressing such issues as optimal input use.

Whereas unfavorable natural conditions cannot be altered, actions have been undertaken to try to overcome their deleterious impact, such as non-traditional crops which are adapted to fragile landscapes, small-scale irrigation schemes to overcome limited water supplies, and crop insurance initiatives to enable people to cope with severe weather uncertainties.

Efforts to curtail growing population pressures typically center on the promotion of family planning methods and education on 'family life' issues although programs which support women's employment, entrepreneurship, and self-reliance may also have an effect on lowering birth rates.

More recently, research and NGO activities have called attention to improving the performance of local organizations through efforts to empower them and encourage self-reliance, use of participatory approaches such as Participatory Rural Appraisal methods, and decentralization of natural resource management authority and responsibilities. In a few cases, this has included policies aimed at devolving property rights to resources to local populations. In Kenya, this went so far as privatization via land adjudication and consolidation, although its intended impact on improving tenure security is questionable.

Many African countries have initiated reviews of their land policies in the interest of addressing insecure tenure issues, in some cases raising awareness of gender issues. In addition to the above measures, resettlement schemes and land use reform measures have also been undertaken.

To different degrees, country-level efforts have been put in place that create a more favorable policy environment to effectively deal with issues affecting fragile lands. Several African nations have undertaken economic reforms in the form of market liberalization and structural adjustment programs which have included reduced taxes on export products. In addition to the policies mentioned earlier in this section, other new or reform measures have included integrated rural development projects, small-holder development projects, decentralization of government authority, increased regional integration, formal recognition of NGOs, and greater consideration of gender including the creation of ministries to address women's issues. Public investments have been made in infrastructure improvements such as rural roads, irrigation, construction of water reserves, increased regional integration, and the coordination of input, production and marketing chains, with higher levels of investment often enabled by increased government borrowing. Subsidies continue to play a large role in supporting policy initiatives.

In the realm of technology development and adoption, it was noted that greater efforts were being made in some policy environments to incorporate indigenous know-how into technology development and to promote a combined science and indigenous knowledge approach. Strengthening human capacity has been addressed through human

resource development programs and extension services, as well as through initiatives aimed at increasing awareness. Many forms of micro finance schemes, both government-sponsored and private have been launched in the interest of promoting technology adoption and reducing poverty.

In addition to what had been done, the groups examined what had not been done or done inadequately with respect to the problems faced by fragile land areas. Weak policy environments were discussed and attributed to insufficient political will, isolated actions, poor conceptualization of problems, lack of a sustainability orientation and an appreciation of the uniqueness of local circumstances, implementation time-frames which are too short, corruption, and natural disasters and civil disruptions which reverse positive policy effects. Most felt that policy-making had not been sufficiently decentralized, if at all, and that community participation, particularly in terms of resource management and technology development, remained quite limited. Rather, more consideration needs to be given to how community institutions and local organizations could be developed and strengthened. Other areas warranting significantly more rigorous attention include service provision (e.g., health, education), tenure security, land use and conflicts, infrastructure, research, facilitating the adoption of improved technologies, lack of appropriate technologies, access to credit, the creation of safety nets, promotion of non-agricultural income opportunities, input/output price policies, macroeconomic policies, and market liberalization. In selecting what was most needed, the groups identified a greater emphasis on addressing fragile land issues, farmer-centered research, research funding, combined (win-win) cost-effective technologies, appropriate crop and livestock

breeding, rural roads, rural credit programs, and more effective monitoring of the natural resource base.

## **5. POTENTIAL INTERVENTIONS FOR SUSTAINABLE DEVELOPMENT OF FRAGILE LANDS -- WORKING GROUP SESSION II**

### **POLICY INTERVENTIONS - WORKING GROUPS A AND B**

In order to develop potential interventions for sustainable development of fragile lands, four working groups were formed. The first two groups (A and B) dealt with policy interventions. The other two working groups (C and D) dealt with institutional interventions.

The terms of reference for the policy intervention group were as follows:

1. Which policies have been in place to specifically address the problems of fragile lands?
2. Which of these policies have worked? Why have they worked or not? How can one make them work?
3. What has been the impact of macro and sectoral policies, e.g., impact of market liberalization on fragile lands (past and future)?

In an effort to foster more sustainable resource use and management and to improve the natural status of fragile environments, African countries have put in place many policies directly addressing resource degradation and poor resource conditions. They range from general programs, such as the National Environmental Management Policy in Uganda and the National Environmental Policy in Ethiopia, to those aiming at

specific resources, including forestry (National Afforestation Programme in Lesotho and National Forestry Action Plan in Tanzania), soil (Food for Soil Conservation in Malawi), water (Soil and Water Conservation Project in Lesotho), rangelands (group ranches in Kenya), river basins (River Basin Development Projects in Nigeria) and land (Land Conservation Programme in Tanzania). Policies have also been directed toward arid and semi-arid lands, including drought management and irrigation development.

Resettlement programs and policies aimed at promoting non-agricultural activities have also sought to relieve pressure on over- stressed resources.

Other policies have addressed resource degradation more indirectly by confronting other issues characterizing fragile lands, such as low investment and yields, tenure security, deficient infrastructure and services, poverty, and weak human capacity.

Examples of these include the Modernization of Agriculture in Uganda; Regional Land Policy in Ethiopia; Health, Sanitation and Water policy in Tanzania; Community-based Nutrition Program in Malawi; Better Life for Rural Women in Nigeria; and rural credit policies in Malawi.

In selecting which policies have worked well and why, there was consensus on the positive impact of local participation in policy implementation (including women), reliable and sustained funding, strong government commitment, problem and policy awareness building, and decentralized policy making structures. Policies which have been weakly implemented and unsuccessful have experienced problems in being excessively broad in their objectives, under-funded, poorly coordinated or mismanaged, top-down and lacking participation, inadequately planned, insufficiently enforced, overly

labor intensive, fraught with conflict, or a combination of these. Therefore, if policies are to be effective, the groups felt certain criteria needed to be met, including:

- political commitment,
- informed stakeholder participation in planning and implementation,
- reliable, sustained funding,
- decentralized decision-making and implementation,
- accountability by governments,
- policy analysis capacity,
- local resource mobilization, and
- available and accessible technologies, which are appropriate and profitable.

In addition to the above policy options, the group went on to discuss the impact of macro and sectoral policies on fragile lands. These policies included: exchange rate and market liberalization, financial deregulation, trade liberalization, investment policy, and other monetary and fiscal policies related to stabilization and structural adjustment. The impacts were assessed to be improved prices for tradeable goods, higher costs for imported inputs, more stable prices and increased availability of goods and services, improved incentives to invest, and market creation. However, such policies can lead to exploitation and food insecurity if they are not monitored and tailored to soften negative impacts on the poor.

## INSTITUTIONAL INTERVENTIONS - WORKING GROUPS C AND D

The terms of reference for the groups that worked on institutional intervention for the fragile lands included:

1. Which institutions have been put in place to address problems of fragile lands?
2. Which of these institutions have worked? Why have they worked or not? How can one make them work?
3. What has been the impact of national institutional issues on fragile lands (past and future)?

In addressing the terms of reference focused on institutions, Group C defined ‘institutions’ in the sense of organizations, whereas Group D defined ‘institutions’ as sets of rules and norms guiding human interaction. The discussions arising from each are therefore separated.

*Group C* organized its discussion by listing various organizations according to their international, regional, national and local status and describing their particular functions. They then distinguished features of these organizations which worked well versus those which were less effective or did not work.

Those identified under international institutions included FAO, IFAD, World Bank, International Agricultural Research Centres (IARCs), the Desertification Convention Secretariat, other donors, and other NGOs. FAO and IFAD undertake primarily information exchange and database collection, technical assistance, funding, and designing policy frameworks whereas IFAD is also involved in the preparation, implementation, monitoring and evaluation of development projects. The World Bank is

engaged in similar activities, although direct funding is more limited whereas more traditional donors take on mainly funding, policy framing, and project administration. As a research body, IARC concerns itself primarily with information exchange, maintaining databases, and providing technical assistance based on its research. Information exchange and funding are the main activities of NGOs, such as Global 2000, although others are frequently involved in managing projects and shaping policies. The Desertification Convention Secretariat is engaged in framing both legal and policy guidelines.

When it comes to information collection and exchange, organizations tend to have good databases, yet information on fragile lands tends to be inadequate. Similarly, technical assistance aimed at fragile lands is limited and recommendations are often not situation-specific. Funding directed to fragile lands is largely inadequate and flows tend to be uneven. Likewise, research on fragile lands is frequently neglected. More recent shifts toward increased community participation in projects has been a positive step in their effectiveness although projects are limited in number and scope and preparation can be quite weak, leading to a limited understanding of the issues. Work which addresses policy and legal issues has been fairly effective in enabling policy reforms and the implementation of conventions by raising awareness of policy and legal issues. Nevertheless, priorities remain overly focused on technical solutions and fail to address means of creating enabling environments. Limited policy and legal frameworks have addressed desertification. Inadequate communication between institutions involved in policy issues has also hindered their effectiveness.

At the regional level, organizational funding provides a mechanism for cooperation, but is seldom targeted to fragile lands given their limited capacity to address fragile land issues both technically and financially. Low priority is typically accorded to structuring policy and legal frameworks. Regional activities for fragile lands also tend to be poorly coordinated, partly because there are so many regional integration entities around. On the positive side, these organizations bring researchers, policymakers and farmers together and provide a panel for discussion among them, thereby giving voice to local interests. They further provide a forum for discussion of African issues and enable consensus building.

The effectiveness of national organizations, such as ministries, environmental institutions, NGOs, universities, extension services, and farmer cooperatives were seen to vary depending on their functions. Ministries rated high on policy formulation, but had a mixed reputation for policy implementation and decentralizing authority. They maintained a poor record of establishing an enabling policy and institutional environment while mechanisms for monitoring the effect of policies were seen to be virtually non-existent. Mixed reviews were also assigned to universities in their research capacity and to extension services with respect to the education and training they provide. Their performance in the realm of technology development and information and technology transfer was seen as particularly poor. More sector-specific programs such as resource management projects, refugee programs and farmer organizations were judged to be doing a good or adequate job implementing development programs, providing assistance to vulnerable groups, representing local interests, and facilitating input supply. However,

such programs and organizations are generally weak in terms of defending local interests, empowering people, improving access to credit, and marketing output.

A host of explanatory factors were given for what is not working well in national organizations:

- no systems in place for undertaking monitoring and evaluation,
- insufficient funding,
- limited technologies, which are often not adapted to local circumstances,
- internal institutional weaknesses,
- lack of incentives, e.g., low salaries,
- continuous ‘brain drain’ of capacity to private sector,
- lack of coordination between research and government activities,
- inadequate infrastructure,
- low purchasing power (farmer organizations and cooperatives),
- absence of a good legal framework,
- corruption,
- lack of enforcement of policies and rules, and
- psychological frustration.

At the local level, community organizations such as resource user organizations and farmers’ groups provide effective forums for information exchange, advisory functions, facilitating access to resources, developing indigenous technologies, supplying inputs, organizing for collective action, and empowering local people. Yet, they tend to be less effective when it comes to protecting the environment and linking people with

markets. Poverty is a factor since people's limited choices to ensure survival may have negative environmental implications. Such groups can also be undermined by donor priorities which may not be compatible with local interests.

Customary institutions tend to be effective mechanisms for local conflict resolution, resource management, and community development, thereby lending support to more intensive devolution and decentralization efforts. However, the degree to which these local bodies are capable of adequately enforcing rules and regulations is debatable.

Local NGOs and extension bodies have a sound record of providing assistance and training to farmers' organizations, but have fallen short when it comes to technology transfer and implementing credit schemes.

*Group D's* discussion began by agreeing on a working definition for institutions as 'rules, norms and traditions designed to shape human actions', as opposed to organizations. Since formal rules encompassed mainly policies and laws, the group chose to focus on informal institutions. After identifying several institutions which operated in fragile land areas, the group highlighted the problems such institutions were designed to address, the country or region where they were practiced, their operational level, the degree of success they had in addressing the problem(s), and the reasons for success or failure.

Common property institutions, which operate throughout Africa, are a means for communities to manage natural resources while maximizing resource benefits in a risky environment. Their degree of success is mixed. Whereas they can be a means of protecting vulnerable populations during shocks, such as drought, they may break down

as a result of population growth and increased competition for land. Under these circumstances, intense resource pressures can create incentives to 'cheat'. In other cases, government policies, such as nationalizing resources, can undermine common property institutions.

Many village- and community-level institutions operate around the management of particular resources, such as water, rangelands, trees, and soils. In some instances, they may evolve into specific organizations, such as water user associations and catchment area committees. The general assessment was that where these institutions had evolved locally and authority and management rested at the community level, they were largely successful although some experienced problems with long-term maintenance and strong pressures on resources. However, where there existed a high degree of government intervention and imposed rules, such as communal grazing and livestock watering schemes in East Africa, the tendency was for resources to be degraded. This was also the case with government programs in Tanzania and Uganda for mandatory terrace-making, group farming, river basins, and some afforestation schemes. Another problem relates to property rights being shifted from local users to the state, thereby removing incentives for communities to manage resources sustainably.

The success of informal savings and credit groups operating in many African countries is attributed to factors such as the trust built among group members, mutual accountability, the locus of ownership and control being the group, small group size, voluntary membership, low transaction costs, and the production of individual benefits. Traditional labor pooling institutions designed to address manpower shortages are

similarly based on cooperation and trust-building that arises from social pressures to participate. Likewise, livestock sharing which takes place in Ethiopia among small groups enables communities to cope with scarce land, labor and feed resources.

Youth groups and migration institutions were also discussed. Youth groups in Burkina Faso and Mali are instrumental in slowing rural-urban exodus, addressing unemployment and providing development assistance to villages. In many cases, they have performed well as a result of the motivation derived from members being in the same age bracket. However, incentives to migrate to find employment have sometimes undermined their resilience. Migration, whether to urban areas in search of employment or other rural areas in search of better land, is a response to population and resource pressures, declining land productivity and a lack of alternative income sources. Migration institutions have had mixed success depending on the extent to which new areas can absorb incoming populations and their impact on resource productivity. In the short-term, they can relieve pressure on over exploited resources as well as channel money into rural areas via remittances.

The group then turned its attention to what we have learned from observing institutional dynamics over time and what appear to be the criteria for their success in addressing environmental and poverty issues. In the case of increasingly scarce resources, two distinct trends emerge: either 1) institutional arrangements evolve to address an widening array of complex issues, or 2) traditional institutions break down, often leading to open access. Institutional success depends in large part on the degree to which they are conceived and controlled at the local level and on the extent to which they

are based on trust, local ownership, and social control; externally imposed institutions are generally weak and unsustainable in practice. It is also important that individual benefits accompany social benefits given that participatory approaches involve high transaction costs for individuals. Mutual interdependency and homogeneity among individuals also increases the probability of local institutions succeeding by expanding the need for cooperation and lowering the likelihood of conflict. However, more attention needs to be directed to how to scale-up community institutions and how to create networks of farmers in order to enhance institutional impact.

## **6. INTERACTIONS WITH FARMERS ON THE CRITICAL ISSUES FACING FRAGILE LANDS -- WORKING GROUP SESSION III**

### **FOREST FIELD TRIP - WORKING GROUPS A AND C**

The terms of reference for the field trip to the Mabira forest reserve were as follows:

1. What problems of fragile lands were observed in the field?
2. What were the underlying causes?
3. Which solutions have been found, in terms of technology, institutions, policy?
4. What impact has been observed?

The groups identified numerous problems observed in the field. Surprisingly few actually concerned resource degradation. Those that did mentioned poor soil fertility, degradation of roads and pest problems emanating from the forest. Rather, most

problems centered on the conflict between state foresters and local villagers on who should manage the forest.

It was observed that encroachment into the protected Mabira Forest by villagers for purposes of firewood collection and clearing for crop cultivation was problematic. When the forest was designated by the state as an ecotourism project, rights of neighboring villages to forest resources were appropriated, leaving them only with the right to collect fallen branches and kindling. Given the shortage of farmland and population growth in the area, this has become a source of tension between locals and the state. The project is administered in a very 'top-down' fashion by state foresters, with limited cooperation and interaction between villagers/farmers and forestry management. In fact, the community's role in forest management remains very unclear while policies for management of ecotourism are not transparent. As a result, the project fails to address farmers' needs and problems while providing them with few benefits, either economically or environmentally. Since its inception, ecotourism in the forest area has provided very few economic opportunities for the villagers in an environment that offers virtually no non-farm income alternatives to begin with. The benefits for forest protection are questionable as well in that there are not many forest guards and enforcement of forest policy is weak. There seemed also to be a lack of awareness on the part of farmers of the importance of forest conservation. Likewise, the project is deficient of any monitoring or impact assessment.

Other problems noted were the lack of knowledge of existing agricultural technologies by farmers as a result of poor extension and technical assistance delivery.

Yield-enhancing technologies are especially needed given the constraints farmers face in applying land extensification strategies as a result of the forest project. The high input prices and low producer prices farmers face exacerbate the productivity problem.

Other observations revealed that the groups were not clear whether the lands they saw were actually fragile or high-potential. For the most part, the group felt the soils and land cover were good with seemingly high production potential. Similarly, it was not apparent that farmers were actually poor, although there did appear to be signs of poverty in the periphery of the Mabira Forest. Farmers appeared to be knowledgeable while the presence of few children may have indicated reduced population growth.

Despite the extent of the problems, several measures had been undertaken to address them. The Mabira Forest Committee was established to deal with issues related to the management of the project and involved some of the influential members from the surrounding local communities. Opportunities for generating income from the forest and revenue sharing strategies with the community are being explored. On the protection side, awareness creation campaigns were organized which stressed conservation education and the importance of protecting the forest. Enhanced enforcement of forest policy involved evicting encroaching farmers, boundary demarcation and zoning of the forest. Planting and replanting activities aimed to improve tree densities and rejuvenate encroached areas.

Forest rejuvenation efforts proved successful in tree regeneration, stimulating healthy forest growth, and reinitiating ecological diversity. However, organized campaigns instilled only a limited degree of awareness among villagers while efforts to

incorporate local interests into management of the forest still had a way to go. Interests of villagers and foresters remained polarized and could potentially lead to social conflict, particularly since farmers felt resentful over the loss of land. Benefits generated by the forest included a certain degree of ecotourism and money to build some schools. Yet, it seemed that those who were poor remained poor and did not benefit much from the project.

While the working groups recognized the importance of forest protection, they emphasized that more needed to be done to address poverty and growth. They recommended that awareness creation on the importance of forest/environment conservation be community-based and imparted from the primary school level upwards with the involvement of influential members from local communities. More education on family planning was also needed. With respect to forest management, they suggested administrative responsibilities be shared and that joint ownership and management of the forest be promoted. More proactive management of the forest by villagers was viewed as a means of increasing incomes. Improving yields necessitated more adaptive research and extension efforts aimed at increasing soil fertility so that farmers were less inclined to encroach on the forest areas. Extension services also need to be more active in making new technologies available to farmers. Fencing crop boundaries was suggested as a way to keep forest animals from invading crops. In terms of improving income, farmers' share of benefits need to be increased and marketing channels improved. Another possibility was to diversify into new activities, including raising livestock, pigs and poultry. Finally, it was noted that institutions to protect the water flow systems outside the forest needed to be developed.

## WETLAND FIELD TRIP - WORKING GROUPS B AND D

The groups who visited the wetlands focused primarily on three problems:

- lack of appropriate technology,
- perceived labor shortages and weak labor organization, and
- land tenure insecurity.

Technology deficiencies led to such problems as water logging, cutting fuelwood for firing bricks, and scooping land to gather material for brick-making. Causes stemmed from the high investment cost of developing wetlands for agriculture, insufficient diffusion of information on technologies, limited access to capital, inexperience in intensive land use, and lack of alternatives for construction materials, drainage, and sources of fuel. In the case of rice farming, lack of fertilizer technology means there is no nutrient replacement in the soil. Obtaining organic matter is costly to obtain due to the distance from town. It was recommended that an extension package be developed for the wetlands which is people centered, economically viable, and environmentally sound. Efforts to make people aware of the package and widespread dissemination should also be undertaken.

Although at the outset there appeared to be a labor shortage given the widespread use of prison labor by farmers, the group thought this perception might arise from labor allocations in these newly developed areas still being unstable. Also, farmers may prefer prison labor to hired labor if the cost is comparable since the fact that the former were accompanied by guards kept supervision costs down. It was decided that no intervention was needed in this area, but rather the labor market would likely develop on its own.

Whereas there did not appear to be a labor shortage in the wetlands, there were issues of land tenure security. The “Environmental Act” instituted by the government prohibits ‘unsustainable’ use of wetlands while there is substantial ambiguity regarding who owns these lands, if anyone. The farmers occupying the land now do not have title and it appears that they do not have the legal right to acquire one. The complexity and uncertainty emanating from the legal system on land rights have implications for tenure security and whether sufficient incentives exist to make sustainable investments in the wetland areas. Action was recommended to clarify and harmonize land policies so that legislation on property rights and environment were compatible. Once established, effective mechanisms for implementing and enforcing property rights need to be put in place.

## **7. PRIORITY RECOMMENDATIONS FOR SUSTAINABLE DEVELOPMENT OF FRAGILE LANDS -- WORKING GROUP SESSION IV**

The final session of the workshop sought to build on the discussions and ideas generated from previous working group session in order to formulate a series of recommendations directed at policymakers, researchers, and donor organizations. Rather than dividing into the original four groups, conference participants opted whether to join either the group developing recommendations on highlands or the one addressing drylands.

## HIGHLANDS GROUP

### PRELIMINARY DISCUSSION

Before articulating recommendations, the group began its task by identifying a series of key issues for fragile lands based on what had been highlighted in previous sessions, consolidating what had been discussed and prioritizing those issues. The main problems cited by the working groups were:

- resource degradation
- poor infrastructure
- food insecurity
- lack of research
- inappropriate agricultural practices
- unfavorable policy environment
- population pressure
- poor starting conditions

The argument was made that lack of research is not a problem; there is ample information. Rather, there is a problem of insufficient information dissemination and extension. Also, there is a lack of appropriate knowledge on how to manage resources.

It was suggested that another means be used for categorizing issues, which distinguished between ends (e.g., poverty) and means (e.g., infrastructure and investment). Of the issues identified, food insecurity and resource degradation are 'ends'. Everything else could be considered a 'means'. Caution was expressed with respect to having too narrow an approach and focusing only on agriculture. Growth is

also an end, but is not achieved only by addressing agricultural problems.

Poverty alleviation and food security were cited as the overarching goals, conditioned on sustainable natural resource management, whereas the priority problems (related to the 'means' for attaining the primary goals) selected by the group included:

- poor infrastructure
- lack of resources
- unfavorable policy environment
- low investments
- population pressure

The group then split into subgroups of 3-4 individuals to formulate recommendations in each of the identified areas. The criteria for specification is that they help solve:

- resource degradation
- poverty and food insecurity
- growth

Once the group reconvened, a rapporteur from each small group presented the recommendations they formulated. Others from the larger group were charged with assessing: 1) are the recommendations concrete enough? 2) is there specificity with regard to countries? 3) to whom are we recommending?

#### *Unfavorable Policy Environment*

The group assessed the pros and cons of different alternatives, addressing the government as the client.

- Land registration (with and without a cadastral survey) targeting areas of higher population density. Where there is no cadastral survey, local institutions need to be codified.
- Resettlement programs to address land fragmentation. Negative effects are likely where resettlement is forced. Instead, voluntary incentives are needed, although there may be high costs associated with this.
- Government marketing of inputs. The private sector is not likely to fill in when subsidies are removed. May need to phase out subsidies gradually.
- Government provision of output and price information. The cost to government is low, but institutional capacity needs to be developed.
- Formulation of investment policy which provides incentives (e.g., tax breaks) and provides 'one-stop-shop' investment information.
- Institution of credit policy for deregulating rural financial institutions and encouraging the development of rural financial institutions (e.g., initial assistance, seed money).
- Institution of forest policy that advocates benefit/income-sharing between governments and local communities for forest management. Also, policy should allow for private use of degraded land for woodlots and agroforestry.

### *Low Investment*

The highland group identified three investment sources: 1) farmers, 2) private sector, and 3) government.

1) Farmer investment in agriculture.

Problem: lack of appropriate rural financial institutions in rural areas due to 1) high transaction costs of rural lending and lending to poor; 2) incompatibility of conventional banking practices with small farmer realities (e.g., using land as collateral).

Recommendations:

- Development of suitable rural financial institutions (RFIs) and banking practices which lower the transaction costs of banking and incorporate alternative collateral mechanisms so as to match the socio-economic realities of local people (e.g., savings mobilization).
- Institute rural finance policy which is supportive of:
  - alternative rural financial institutions, including informal institutions,
  - financial intermediation (as opposed to purely credit) approach
  - savings mobilization, including for non-formal RFIs, especially where it has traditionally been restricted,
  - institutionalizing non-traditional forms of collateral,
  - restructuring the formal financial sector based on best-practices demonstrated by the informal sector (so as to lower transaction costs),
  - liberalizing interest rates on savings and loans,
  - liaisons between larger, formal financial institutions and local informal institutions.
- Undertake research on non-formal rural financial practices.
- Establish training programs designed to enhance the capacity of formal

financial institutions to adapt to more appropriate practices for rural clients.

- Direct funding to best-practice rural financial institutions (including NGOs), particularly for purposes of building loan portfolios and capital funds.

## 2) Private sector investment in agriculture.

Problem: How to get the private sector to invest in rural areas to generate alternative income sources and foster other means of addressing poverty alleviation.

### Recommendations:

- Increase government investment in infrastructure improvement,
- Promote policies which give preferential treatment to small scale industries (e.g., milling, food-processing, tailoring),
- Create investment incentives
- Formulate policies which enhance the purchasing power of the poor, so that businesses have a reason to set up in rural areas,
- Undertake research on
  - appropriate rural enterprises,
  - why there is a lack of investment in rural enterprises,
  - what are the constraints to investment; what are the costs versus benefits?

- Promote agroprocessing and forestry related industries.

### 3) Government investment in agriculture.

Problem: Although public investment is necessary to promote private investment by farmers and private sector industries, governments often lack the financial resources and are immersed in political conflicts and constraints. Also poor returns to infrastructure investment can act as a disincentive (chicken and egg problem), although smaller projects are likely to be more viable.

Recommendation: Increased public investment in smaller, higher return infrastructure projects.

### *Technology Development and Transfer*

#### Recommendations:

- Revive technologies that are ‘on the shelf’ (not implemented) and establish why they were not disseminated or adopted,
- Strengthen the capacity to do research in the highlands (e.g., research on technology adoption in these environments which takes into account local realities and is multi-disciplinary in its approach),
- Create an enabling environment for researcher/extension/farmer linkages: information dissemination.

### *Population Pressure*

#### Recommendations:

- Initiate resettlement programs (for temporary relief) by reserving land for resettlement purposes and designating areas for reclamation (e.g., insect-infested or disease-ridden areas).
- Establish a land tax to encourage land to be released in the highlands - however, this requires land markets and titles.
- Initiate education programs and incentives geared toward slowing population growth.
- Intensify production via targeted subsidies, irrigation, infrastructure development and maintenance, facilitating access to markets.
- Promote off-farm employment, such as agroprocessing, and provide support services for management.

### *Infrastructure*

#### Recommendations:

- Improve market integration via constructing roads, reducing transportation costs, improving access to inputs and marketing of outputs.
- Improve access to public services
- Increase investment in rural roads and communication, electrification, healthcare provision, and schools — depending on an assessment of the returns, investing the greatest shares of resources so as to reap the highest returns.

The group then reacted to the recommendations presented and offered suggestions as outlined below.

### *Unfavorable Policy Environment*

Emphasis was put on the need to harmonize environmental and agricultural policies and integrate across sectoral policies, i.e., cross-sectoral policy linkages.

The point was made that land registration is needed only where population pressures are high, and that cadastral surveys may be appropriate only where they are economically feasible. Generally, they tend to be needed in areas where there is disputed ownership. In this case, adjudication is also needed. Adjudication is not needed, however, if there are minimal disputes and widespread recognition of rights.

The importance of implementing good macroeconomic policies was noted although debate ensued as to whether structural adjustment policies are appropriate for fragile areas. Rather, one needs to account for the uniqueness of specific areas. There was some disagreement on whether government marketing of inputs to remote areas was a good policy. However, it was agreed that this depended on the state of infrastructure and road access and that the policy was meant to be only short-term until infrastructure caught up.

*Low Investment*

Concern was expressed that limited government budgets may preclude the adoption of recommendations on public investment. However, recommendations for private-sector investment needed to be pushed further.

More clarity was needed to know to whom the recommendations should be targeted. It was suggested that the recommendation for private sector research should be moved under the specific research area.

*Technology Development and Transfer*

The group suggested that more meat be added to the recommendations. Phrases like ‘strengthening research capacity’ have no bite. Also, research simply on technology development is not enough; more emphasis is needed on:

- technology implementation,
- policy and institutional research,
- adaptive research,
- research on integrated nutrient management,
- research on yield caps.

Specific areas of research priorities need to be identified; it is not enough just state a need for more research. Outcomes expected from research also need to be specified in terms of what, if any, tangible difference will be made as a result of the research? This can also be a guide for where there is a need to divest from research.

### *Population*

It was mentioned that there is much sensitivity to the issue of reduced population growth. Often countries and communities perceive a need to increase their populations. Greater specification was needed as to when diminishing returns are realized as well as carrying capacity reached. One proposal was made to treat population pressure as one of the goals, thereby invoking a Critical Square.

### FINAL RECOMMENDATIONS

#### I. Macro and Market Policy

##### -- Macro - Guiding principles:

- try to ensure peace and security,
- assure low and stable inflation,
- avoid bias against tradeable goods through liberalized foreign exchange and trade policies,
- avoid price controls and allow competitive markets,
- avoid large budget deficits that crowd out private investment,
- emphasize less-favored areas in public investment (for equity purposes).

##### -- Market policies:

1. Facilitate development of private commodity exchanges (regulatory and legal framework),
2. Allow cooperative development by minimizing negative government interventions,

3. Facilitate collection and dissemination of market price and other market information, e.g., deregulate communication,
4. Establish licensing/bonding of private grain storage facilities and allow market credit using warehouse and receipts as collateral,
5. Subsidize transport cost of providing inputs to remote areas (emphasizing higher potential food deficit areas), phasing out subsidies as infrastructure and private markets develop,
6. Establish/foster rural credit schemes for stockists, traders and middlemen,
7. Establish a seed certification system to accommodate informal seed supply system, e.g., extend Tanzania's example,
8. Appropriately adapt these recommendations, to take care of potential negative effects on fragile lands.

## II. Land and Environmental Policy

1. Establish policy and legal structures that ensure security of tenure by farmers, including rights to land and inheritance by women,
2. Initiate resettlement programs through identification of new areas and provision of services (e.g., roads, land-grants, credit) to encourage voluntary emigration from overpopulated highlands.
3. Strengthen the capacities of the environmental management institutions to ensure:
  - reclamation of degraded hillsides,

- development and implementation of appropriate land use plans,
  - community involvement,
  - private use of degraded forest land,
  - actions to manage watersheds.
4. In order to diversify sources of funding for watershed management, government should create mechanisms for downstream, potentially affected parties to co-finance watershed management.

### III. Rural Financial Aspects

- Objective: Encourage the development of good practice rural financial institutions.
- Formulate policies which:
1. Recognize savings mobilization by non-formal financial institutions, especially where savings mobilization has been illegal for them.
  2. Continue efforts to liberalize interest rates,
  3. Institutionalize non-traditional forms of collateral.
- Governments and donors should take action to:
4. Undertake research on non-formal rural financial practices in hillsides/highlands areas,
  5. Establish training programs designed to enhance the capacity of formal financial institutions to adopt these practice for small scale clients in

highland areas.

6. Direct funding to best-practice rural financial institutions (including NGOs), especially for loan portfolios and capital funds.

#### IV. Technology Development and Transfer

1. Establish an inventory of all research undertaken to address problems of hillside areas, assess their adoption and appraise reason for them not having been accepted.
2. Strengthen the capacity to do research, particularly in the following areas:
  - ex-ante and ex-post impact assessment,
  - integration of productivity and conservation technology development,
  - yield gap analysis,
  - policy support research on proposed alternatives,
  - identification of constraints to private sector investment and identification of incentives.
3. Channel financial resources to community-level organizations, in a manner to allow farmers to contract extensionist and researchers in addressing their technological problems. This would ensure that extension and research is demand-driven.
4. Consider alternatives to (3) in terms of decentralized research organizations, involvement of farmers in priority setting, etc..

## V. Infrastructure and Social investment

1. Off-farm employment (e.g., agroprocessing enterprises such as juice canning, drying, packing, grading) is a driving force to rural growth. In order to promote it, governments should create the enabling environment for the private sector to establish within the highlands by creating and/or strengthening infrastructure (roads, electrification, etc.), regulation, and fiscal incentives.
2. Health, nutrition, and education policies are essential to land and labor productivity improvement in the highlands. According to yet existing infrastructures, governments should consider the needed investments and services such as health centres and personnel, drugs, schools, teachers, awareness building, etc.
3. Information and communication is vital for enlightened decisions on agricultural and non-farm production and to engender people's participation in their development and overall social welfare. Information flows are needed on market prices and opportunities, government development programs, services, and people's felt needs (demand).
4. Gender and equity. There is a need to alter social attitudes toward child labor and women's rights through public campaigns (involving NGOs).
5. Improved infrastructure is an essential prerequisite to promote rural development given that it enables increasing market integration and access to a range of public and private goods and services. Investment in rural

infrastructure should be closely linked to other agricultural policies (e.g., development strategies and provision of credit) as well as other sectoral programs in education, health, and communications. Priorities for targeting investment by geographic area and type of infrastructure should be guided by at least three criteria: population density, agricultural development, and potential market integration.

- In areas of high population density and good agricultural potential, infrastructure investments should focus on support of agribusiness and the non-farm sector. Priorities are consolidation and maintenance of road and electricity networks, as well as upgrading education and health services (e.g., Central and Western Kenya, Eastern Uganda are well suited to agricultural strategies of high input cereals, perishable cash crops, dairy-intensive livestock, non-perishable cash crops as well as rural non-farm development).
- In areas of low-medium population density and good agricultural potential, infrastructure investment should focus on developing the agricultural sector and promoting in-migration through investment in rural roads and targeted electrification as well as the provision of health and education services. The development of local infrastructure for supplementary irrigation, soil and water conservation, and storage, should be promoted primarily through more formal credit facilities (e.g., Southwest Ethiopia may be suitable to foster agricultural development strategies of high input cereals, non-perishable cash crops and livestock intensification).

- In areas of high population density and low-medium agricultural potential where market access is already good, infrastructure investments should focus on maintenance of existing road networks as well as supplementary irrigation.

#### COMMENTS FOLLOWING THE PLENARY PRESENTATION OF HIGHLANDS RECOMMENDATIONS

The question was raised as to how realistic the proposal was to give public funds to farmers to commission their own research as a way of achieving more demand-driven, site-specific research. Are governments going to invest in research? If farmers don't see the full value of public goods, will they under invest? Rather, change needs to take place in the incentive structure within research. Research institutions need to be reformed to make them more participatory and to do site-specific work.

Also, while market policies can be good for countries, they can have negative impacts. Modifiers may be needed to buffer negative impacts.

The Highlands group noted the inclusion of recommendation for government subsidy of transportation costs to buffer the impact of marketing policies. With respect to research, they noted that while it should be publically funded, greater involvement of communities was needed, with part of the money for research going to farmers organizations to enable them to be in the driver's seat. Tanzania offers an example of demand-driven research whereby farmers participate in identifying priorities and funds are allocated to rural areas to address priorities.

Concern was expressed on the potential effectiveness of resettlement programs in terms of having to establish new eco-systems and the likelihood of substantial

opportunity and moving costs. However, the group responded that infrastructure can be used as an incentive for resettlement with the idea being to induce resettlement in places where there is scope for agricultural potential.

A final comment was made on the need to put less emphasis on research and to more actively examine new ways of funding and prioritizing farmer-driven extension activities.

## DRYLANDS GROUP

### PRELIMINARY DISCUSSION

The group preceded its recommendations by articulating an overall vision and related strategies, as follows:

Vision: To increase human well-being in fragile lands without degrading the natural resource base.

#### Strategies:

- strengthen policies for sustainable development,
- promote a property rights environment that induces efficient and sustainable natural resource use and management,
- strengthen local organizations,
- improve the resource base,
- achieve an enhanced understanding of traditional risk-coping strategies,
- improve linkages with the outside economy,
- increase opportunities for income diversification,

- reserve fragile lands for extensive livestock systems and more sustainable crop systems,
- increase crop areas where profitable and sustainable; increase yields in all cases, and
- explore solutions outside of dry fragile areas.

Final recommendations centered on the policy environment, property rights to land and other resources, farmers' organizations, and resource management.

## FINAL RECOMMENDATIONS

### I. Policy Environment

-- Objective: Promote the formulation and effective implementation of policies that enhance sustainable development and eradication of poverty in the drylands.

-- Actions:

- Develop policies for the sustainable development and eradication of poverty in the drylands  
Actors: governments and resource users
- Use participatory methods that involve all stakeholders in the formulation of such policies  
Actors: development agencies, NGOs, local administration, resource users
- Take adequate measures to ensure that mechanisms and institutions required for implementation and accountability at all levels are well-defined.

Actors: governments, national and local people

- Define policy formulation, coordination, and implementation responsibilities at all levels. Use participatory methods to formulate implementation policies.

Actors: government at all levels, NGOs, resource users

- Ensure that policies for drylands are adequately integrated with other sustainable development activities.

Actors: national and regional governments.

## II. Property Rights: Croplands, pastures, water, trees

-- Objective: Foster a property rights environment that induces efficient and sustainable resource management and use.

-- Actions:

- Evaluate the impact of previous property rights policies in order to determine successes and failures, identify constraints and needs, evaluate alternatives, and develop new orientations.

Actors: state, people involved in research , international organizations, offices for international conventions in cooperation with local communities.

- Create a legal and institutional framework that provides tenure security and that is comprehensive and implementable either as common, private or state property. Promote dialogue with communities and users while taking

into consideration all resource uses and users. Clearly identify the roles and responsibilities of state or local institutions involved.

Actors: state and all stakeholders

- Create the framework for conflict resolution by reinforcing local and regional institutions, defining the role of state/local institutions, and allowing subsidiarity.

Actors: local government institutions

- Create a system of monitoring and evaluation with indicators focused on resource management, conflict resolution, and investment.

### III. Farmers' Organizations

- Objective: Improve/create farmers and herders associations to address poverty and allow sustainable growth.

-- Actions:

- Improve education by improving facilities for basic and adult education.

Actors: government, extension agencies, NGOs

- Improve monitoring activities of the organization. Farmers should be informed about the objectives and processes of running organizations clearly.

Actors: local governments

- Improve democracy among farmers groups, including joint responsibility on the management of resources and monitoring and evaluating progress.

Actors: local governments and local people

- Increase accountability whereby local governments work closely with farmers

groups and institutions.

Actors: ministries of health, agriculture, education, and local government.

- Improve dialogue among farmers groups, government, and researchers to foster more participatory client consultation.

Actors: government, NGOs, farmers

- Reduce hierarchical behavior by not imposing ideas, but rather consider local experiences to enable better organization.

Actors: government, farmers

- Improve transparency of decision-making by reinforcing, recognizing, monitoring, and controlling structures.

Actors: government ministries

- Recognize local strength. Governments should transfer authority to local traditional organizations.
- Reduce interest group conflict. Use and management of local resources should be left to local institutions with government assistance (e.g., Burkina Faso).

Actors: governments, NGOs, farmers

#### IV. Resource Management

-- Objective: Improve food security through enhanced productivity and water supply

-- Actions:

- Develop demand-driven participatory R&D systems through farmer empowerment and alternative R&D policy focusing on

- drought resistant, short-duration varieties;
- disease resistance, high productivity, locally adapted animal breeds, and
- integration of crop-livestock systems.
- Inventing and improving agricultural equipment for purposes of:
  - moisture conservation
  - transportation
  - processing
  - biomass
  - labor savings
  - water harvesting
- Implement strategies for exploiting indigenous knowledge integrated with science-based technologies, such as participatory project evaluation, decision-making on farmer-driven research, and co-financing (by farmers and herders) for research.

#### COMMENTS FOLLOWING THE PLENARY PRESENTATION OF DRYLANDS RECOMMENDATIONS

More specificity was called for, especially on what policies were being considered on sustainable development and land tenure. In terms of farmers' organizations, it was not clear where the demand needed to be filled and where the niches are. In terms of linkages to the external economy, where should investments be targeted?

The group's response highlighted their reluctance to impose a particular legal

framework without site-specific research on local realities and constraints. Rather, more attention is needed to examine how to bring policies down to the local level. Questions that need to be asked are:

- Under what conditions do we have common property?
- In what circumstances do we devolve property rights?
- What is the role of the state and the role of the community?
- What sort of organizations do we need for conflict resolution, not just at the local level?
- How can we structure monitoring and evaluation so that it feeds back into the existing regulatory framework?

Another comment centered on the need for different approaches tailored to the different environmental realities of highlands and drylands. In the highlands, there are terrain problems, population is high, and production is intensive. In the drylands, populations are low and production is extensive. In the highlands, road construction is difficult because of the terrain and non-conventional means of transportation may be needed. It was suggested that perhaps the groups had not thought sufficiently about the particularities of these regions.

It was argued that GIS as discussed in the Wood presentation can be used for this purpose. The question was then whether governments should invest in an Africa-wide GIS database. If so, this would have to be built up and needs lots of micro-level data. To do this effectively, capacity needs to be built in African countries to collect data and to use it.

## 8. CONCLUDING SESSION

Thanks were extended by the chairperson, Bruno Ndunguru, to the participants, interpreters, facilitators, and logistical and back-up persons. He commended the excellent work of the facilitators, the support from NARO, the hotel management, and the government of Uganda for the peace enjoyed during the meetings. He noted that it was a participatory meeting, whereby all participants had a collective responsibility for the recommendations, for which they took full ownership. While there would be gaps and issues not fully addressed, he expressed hope that the participants would use these shortcomings to make improvements in the future. Ndunguru thanked DSE and the Advisory Committee for the meeting, with a special ‘thank you’ to Juergen Richter of DSE. Thanks were also extended to the farmers who participated in hosting the field trip.

The chair person reviewed the meeting’s objectives to assess whether the group had achieved them:

*Overall goal:* Balanced agricultural growth and food security together with sustainable resource management and environmental sustainability.

*Specific objectives:*

- Foster common understanding of the issues and challenges in the development of fragile lands to solve the problem of food security and poverty alleviation;
- Identify constraints to successful management of fragile lands;
- Formulate recommendations for designing appropriate policies and strategies for fragile lands to meet the livelihood needs of people while conserving and

sustainably managing the natural resource base; and

- Identify appropriate follow-up activities for implementing the agreed-upon policies and strategies.

Andrew Ephraim Temu presented the Final Recommendations for the Highlands (see section on Final Recommendations).

Mohamed Sidi Mohamed Toure then presented the Final Recommendations for the Drylands (see section on Final Recommendations).

Ndunguru announced that the outlines of the presentations would be available that afternoon.

Concluding remarks were delivered by the Prof. J.K. Mukiibi of NARO: *The opening ceremony emphasized following up on workshop recommendations. We have all worked hard over the past four to five days, even nights, and produced an impressive set of recommendations and notes. Some of the areas we have emphasized are that there should be improved macro policies and marketing in both the highlands and drylands, land and environmental policies, rural development, technology transfer, infrastructure and financial investment, both in the highlands and drylands. The government of Uganda is doing a lot in these areas. Macroeconomic policies are especially important. Also critical are marketing and land issues. There has been a debate over the past two to three weeks over proper utilization of land. Rural financial institutions are important because without them, we revert to traditional agriculture.*

Being the head of an agency promoting technology adoption, Dr. Matthias

Magunda of NARO assured the participants that he had noted these recommendations carefully and their importance, saying that they are problems the Uganda government is trying to address. These recommendations he felt would reassure government officials that they are on course in the area of fragile lands.

Having been sent by the Minister to represent him at the closing ceremony, he read the statement the Minister had asked him to read: *This conference is timely given the dimensions of the problems in the region. It is structured in a way that optimizes sharing of experience. The methodology of the conference is a productive way to tap expertise. Identification of key issues of fragile land is very important, as is the linkage of problems and causes. These have contributed greatly to the policy triangle, not only by identifying policies, but also in evaluating why they have worked or not worked and how they can work. This analysis is important before advancing forward in attacking fragile land problems. Key strategies are to achieve agricultural intensification and poverty alleviation without compromising environmental sustainability. These strategies are right on target, and those involved in these activities are commended. As for the field trip, the nearest fragile lands to Kampala were selected. However, those further out are more fragile. We are very grateful that the objectives of the conference have been fulfilled and appeal to those involved in the follow-up activities to use the recommendations of the conference in designing intervention policies and programs. We extend thanks to IFPRI for tackling global and regional problems and for facilitating the workshop and also express our thanks to DSE and the EU for funds. You are always welcome to Uganda.*

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## Annex 2. Conference Agenda

### International Conference

#### STRATEGIES FOR POVERTY ALLEVIATION AND SUSTAINABLE RESOURCE MANAGEMENT IN THE FRAGILE LANDS OF SUB-SAHARAN AFRICA

25-29 May, 1998

#### FINAL PROGRAMME

##### Sunday, May 24, 1998

19:00 - 20:00	Dinner
20:00 - 21:00	Registration and Informal Get Together

##### Monday, May 25, 1998

08:30 - 09:00	Registration
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#### *Opening Ceremony*

09:00 - 09:10	Welcome by the Conference President J.K. Mukiibi, NARO
09:10 - 09:30	Presentation of Conference Objectives and Programme B. Ndunguru, Conference Chairman
09:30 - 09:40	Remarks by H.E. The German Ambassador (requested)
09:40 - 09:50	Remarks by IFPRI P. Hazell
09:50 - 10:00	Remarks by the European Commission A. de Ligne
10:00 - 10:30	Opening Speech H.E. The Vice President and Minister of Agriculture (requested)
10:30 - 11:00	Tea/Coffee Break/Group Picture

***Session I Problem Analysis***

11:00 - 11:30	Growth, Poverty and the Environment in the Fragile Lands of Sub-Saharan Africa S. Babu and P. Hazell
11:30 - 12:15	Spatial Aspects of the Design and Targeting of Development Strategies for Fragile Lands J. Brunner, A. Dai, F. Nachtergaele, K. Sebastian and S. Wood
12:15 - 12:30	Discussion
12:30 - 13:30	Lunch
13:30 - 14:00	Impact of Market Liberalization on the Poverty Alleviation in Fragile Lands A. Abdulai and P. Hazell
14:00 - 14:15	Discussion
14:15 - 14:30	Working Method, Terms of Reference for Working Groups & Formation of Working Groups U. Nagel
14:30 - 16:00	Working Groups A-D on Problem Analysis
16:00 - 16:30	Tea/Coffee Break
16:30 - 18:00	Working Groups (continued)
19:00	Reception and Dinner hosted by NARO

**Tuesday, May 26, 1998**

08:30 - 08:40	Introduction to the Day
08:40 - 10:00	Plenary Presentation and Discussion of Working Group Results

***Session II Potential Interventions***

10:00 - 10:30	Strategies for Sustainable Agricultural Development in the East African Highlands J. Pender, F. Place and S. Ehui
10:30 - 11:00	Tea/Coffee Break
11:00 - 11:30	Technology Options for Increasing Agricultural Production in the Fragile Lands A. De Jager

11:30 - 12:00	Property Rights Institutions for the Development of Fragile Lands A. Knox McCulloch and P. Hazell
12:00 - 12:30	Discussion and Terms of Reference for Working Groups
12:30 - 13:30	Lunch
13:30 - 16:00	Working Groups A-D on Potential Interventions
16:00 - 16:30	Tea/Coffee Break
16:30 - 18:00	Plenary Presentation and Discussion of Working Group Results
19:00	Dinner
20:00	Poster Session in Plenary Room
Posters	
•	Dambo Irrigation System: Indigenous Water management for Food Security in Zimbabwe Meinzen-Dick and G. Makombe
•	Effect of Agricultural Policies and Agricultural Production and the Environment-Bioeconomic Modeling at the Community Level in Burkina Faso B. Barbier
•	Soil Conservation Practices in Semi-arid Land Tanzania A. Temu
•	Soil Conservation and Environmental Recovery in Machakos District of Kenya F. Gichuki
•	Soil Conservation in the Highlands of Uganda J. Zake and M. Magunda
•	Conservation of Fragile Wetlands in Uganda M. Magunda and J. Zake

**Wednesday, May 27, 1998**

***Session III Field Interaction of Stakeholders  
(Farmers, Policymakers, Donors)***

08:00 - 08:30	Presentation for Field Trip (Wetlands and Forest Margins) Terms of Reference for Working Groups (A-D)
08:30	Departure by Bus
19:00 - 20:00	Dinner

**Thursday, May 28, 1998**

08:30 - 10:30	Working Groups A-D on Field Interaction
10:30 - 11:00	Tea/Coffee Break
11:00 - 12:30	Plenary Presentation and Discussion of Working Group Results
12:30 - 13:30	Lunch

***Session IV Formulation of Strategies***

14:00 - 14:15	Terms of Reference for Working Groups
14:15 - 16:00	Working Groups A-D
16:00 - 16:30	Tea/Coffee Break
16:30 - 18:00	Working Groups (continued)
19:30	Dinner Reception hosted by DSE

**Friday, May 29, 1998**

08:30 - 10:00	Plenary Presentation and Discussion of Working Group Results
10:00 - 10:30	Tea/Coffee Break
10:30 - 12:00	Preparation of Priority Recommendations
12:00 - 13:30	Lunch

***Session V Presentation of Recommendations to Special Invitees and Closure***

13:30 - 13:45	Conference Summary B. Ndunguru
13:45 - 14:30	Presentation of Recommendations on Strategies for Highlands on Strategies for Lowlands
14:30 - 15:00	Plenary Discussion on Recommendations
15:00 – 15:15	Closing Remarks by the Conference President J.K. Mukiibi, Director General NARO
15:15	Farewell Reception hosted by IFPRI and EC  Departure