ELABORATION OF STUDENT-LED CONFERENCE SUB-THEMES

1. Sustainable land management in drylands

Sustainable Land Management (SLM) can be defined as "the use of land resources, including soils, water, animals and plants, for the production of goods to meet changing human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions" (UN Earth Summit, 1992). SLM is crucial to minimizing land degradation, rehabilitating degraded areas and ensuring the optimal use of land resources for the benefit of present and future generations. SLM is based on four common principles: land-user-driven and participatory approaches; integrated use of natural resources at ecosystem and farming systems levels; multilevel and multi-stakeholder involvement; and targeted policy and institutional support, including development of incentive mechanisms for its adoption and income generation at the local level. SLM is imperative for sustainable development and is especially critical in the merger of agriculture and environment through twin objectives: i) maintaining long term productivity of the ecosystem functions (land, water, biodiversity) and ii) increasing productivity (quality, quantity and diversity) of goods and services, and particularly safe and healthy food. To operationalize the sustained combination of these twin SLM objectives, it is essential to understand drivers and causes of land degradation and to take into account issues of current and emerging risks. SLM encompasses other established approaches such as soil and water conservation, natural resources management, integrated ecosystem management and involves a holistic approach to achieving productive and healthy ecosystems by integrating social, economic, physical and biological needs and values. Therefore, there is need to identify and publicize SLM best practices and new innovations that have worked in different areas and that have the potential in being replicated in others areas. These can be in restoration of degraded lands, grazing and pasture management, soil and water conservation, water harvesting, dryland farming, and agroforestry among others. Each case should bring out the aspects of sustainability in such best models and practices.

2. Economic opportunities for resilient pastoral livelihoods

Pastoral economy makes the most efficient use of the scarce and unpredictable resources. This viable, extensive and prosperous economy occupies more than 25% of the total land mass globally. However, the effect of globalisation, increasing human population and recalcitrantly climate change has increased the pressure on the system and consequently increased the vulnerability of pastoralists. In the context of these factors, building an economy that is adapted to the harsh and variable conditions of the drylands will require a major effort. The existing opportunities for improving pastoral economic and livelihood systems are tremendous. This might include sustainable

intensification of livestock production, increased market opportunities for dryland resources, safety nets, microfinance, and proper grazing management. Diversification of household income, building social capital, as well as investment in suitable services particularly education, health and extension can provide a suitable path way to resilience. Integration of pastoral economy in the existing formal market can play a crucial role in alleviating the current nutritional insecurity. This however, requires strengthening the role of pastoralists, agro-pastoralists and farmers by enhancing their capabilities to efficiently use the current resources and safely transform the subsistence system to more commercial oriented production system. On the other hand, strengthening pastoral livelihood in the drylands requires a critical examination of the current production system in order to identify weak-linkages to be addressed as well as best practices to be evaluated and up-scaled. Investment in livestock inputs such as large and small scale fodder production, animal health and infrastructure is critical. Furthermore, up-scaling camel, poultry and apiculture are among other viable livestock enterprises that can provide a path way to sustainable livelihood in the quest to achieve food security and resilient pastoral economy.

3. Drylands governance, rights and local institutions

As human populations and their demands on natural resources continue to grow, the search for effective solutions to environmental problems intensifies. However, the poor performance of Africa's central governments in the protection of natural resources has led to new ideas on resource governance over the past few decades. One of the now popular approaches seeks to devolve property rights over natural resources to local individuals and communities and is based on the premise of more efficient, flexible, equitable, accountable, and participatory outcomes. However, in most of the drylands in Africa, there remain relatively few cases of communities securing legal rights over lands and associated natural resources. Centralized control over natural resources and unclear property rights persist, while local institutions that prevailed prior to colonial disenfranchisement of local communities are largely ignored and undermined.

There are strong political economic incentives for political elites and central bureaucracies to consolidate their control over natural resources. Similar challenges apply at the local level, when local governance institutions are not downwardly accountable to the community and benefits are disproportionately captured by local elites. The result of all these has been widespread conflicts between local groups and other more powerful actors, including both state agencies across the region. The insecure property regimes can be partly linked to dryland ecosystems degradation and accompanying widespread livelihood insecurity in the drylands of the Horn of Africa (HoA). These trends have led to a shift from this predominantly centralized natural resource management towards more devolved models known very broadly as Community-Based Natural Resource Management (CBNRM) during the past several decades. The CBNRM models work to strengthen locally accountable institutions for natural resource use and management, enabling local groups of people

to make better decisions about the use of land and resources. Despite some level of success in some areas, the CBNRM approach has some fundamental challenges. It is, however, an important strategy for pursuing the goals of various multilateral environmental treaties, such as the Convention on Biological Diversity (CBD), the Convention to Combat Desertification (UNCCD) and the UN Framework Convention on Climate Change (UNFCCC). Existing local institutional designs, for example, provide opportunities for establishing pilot payments for ecosystem services (PES) projects such as Reduced Emissions from Deforestation and Degradation (REDD).

Bio-cultural Community Protocol (BCP) through agreements that reflect the communities' underlying bio-cultural values offers one way of ensuring that communities take control and are involved in benefit-sharing from natural resources. Overall, emphasis on resource governance and rights should be placed on community-centered policies and supporting local communities and civic organizations by building their capacity to engage in collective action that builds stronger political constituencies for resource governance reforms. More democratic forms of resource governance in sub- Saharan countries are largely contingent on such collective action.

4. Innovation and technology transfer for dryland development

The 'drylands', cover about 41% total Earth's land surface, with over 80% of Kenyan land mass being dryland. These areas need to contribute significantly to global yields of products and services. The challenge of limited soil moisture as a result of low rainfall and high evaporation has resulted to gradient decrease in primary productivity. Development in drylands is a major focus for all African countries including Kenya due to their contribution to livelihoods for the vulnerable rural poor. The increasing pressure over the resources in these areas calls for sustained improvements in the productivity of the human and natural resources employed in dryland production systems, which will require technology development and transfer. These technologies should promote proper management systems for the croplands, rangelands, water resources and forestry upon which the rural poor and the landless are so dependent. Investment in technological development and applications therefore becomes a priority if sustainability of these fragile ecosystems is to be improved. Local, regional and international organizations have a role in fostering innovative dryland and rangeland practices, as well as financing technology transfer for local community management and support systems. This conference sub-theme focuses on sharing developed technology and innovations so far gained in the Kenyan drylands. Further, it seeks to identify the potential areas that need more advancement and research for the realization of millennium development goals (MDGs). Special focus should also be given to ways of improving the technology transfer systems in Africa's drylands.

5. One Health: A holistic approach in public health, food safety, and disease control in drylands

The livestock sector in Kenya contributes to about twelve percent of Kenya's Gross Domestic Product and employs fifty percent of the country's agricultural workforce. Seventy five of Kenya's livestock population is in the arid and semi-arid drylands which supports around six million people (or fifteen percent of Kenya's population). Sixty percent of the pathogens that cause diseases in humans are of animal origin! These diseases emerge or re-emerge at the interfaces between animals, humans and the ecosystems in which they live. This situation is the result of several factors, including the exponential growth in human and livestock populations, rapid urbanization, changing farming systems, closer interaction between livestock and wildlife, changes in ecosystems and globalization of trade in animals and animal products. The increase in the human population is also putting pressure on land use thereby exposing humans and domestic animals to new pathogens.

The overarching objective of the conference is to prime joint efforts among participants in national and sub-national levels to develop effective interventions to ensure coherence of action and awareness among the general public and policy makers of risks and appropriate actions needed to minimize human infection by pathogens of animal and ecosystem origin by engaging abstracts from the following One Health related areas: Antimicrobial resistance, chronic diseases, communications and outreach, disaster preparedness and response, ecosystem health (wildlife, plants and environment), environmental agents (detection and response), animal and human welfare, food safety and security, human-animal bond (enhancing physical and mental health), infectious diseases (surveillance, prevention and response), interdisciplinary education and training, interdisciplinary research (basic and translational), and water safety and security (diseases and supply).

6. Vulnerabilities and risk management in drylands

Drylands cover an estimated 41% of the Earth's surface and are inhabited by 36% of the world population including an estimated one billion poor people in rural areas. Over the years, communities living in these regions have adopted sustainable livelihood systems, for instance those based on locally adapted crop and livestock rotation, drought-tolerant crop species, irrigation practices and market oriented livestock production. However, shocks (e.g. conflicts, disease outbreaks, drought floods) and stress factors, including climate change and unfavorable socio-economic factors have continued to undermine traditional strategies for coping with the environmental and socio-economic insecurity thereby threatening the existing socio-ecological systems. This has led to soil and water degradation, food insecurity, migration and conflicts among other effects. Further, increased urbanization and globalization have strained the socio-ecological equilibrium. Therefore, a better understanding of the relationship between the various stresses

occurring in drylands, and the resilience of the existing socio-ecological systems is critical in enhancing the capacity of affected populations to with stand future shocks and stresses thus reduce vulnerability. Such findings are valuable in prioritizing interventions for vulnerability reduction and subsequently improving on sustainable dryland development.

Dryland risk management requires avoidance and lessening of the potential impact of stresses through activities and measures aimed at prevention, mitigation and preparedness. This may involve using administrative directives, organizations and operational skills and capacities to implement strategies and policies. Advocacy, communication and peer learning is crucial in bridging the gaps between knowledge producers and users and this helps in better response to the growing threats of drought, climate change and food insecurity in African drylands.