

WELCOME TO AFRICA
Scientific Cooperation Network on
Climate Change Adaptation

Abstract Booklet

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Session 1:
Climate Change Adaptation

Ecosystem Change and Ecosystem Services: Towards Ecosystem-based Adaptation Strategies for West Africa

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ABSTRACT

WASCAL (West African Science Service Center on Climate Change and Adapted Land Use) is a large-scale research-focused program designed to support the West African scientific community that deals with the impact of climate change, aiming at enhancing the resilience of human and environmental systems, to be linked with the scientific community in Germany. The initiative involves ten West African countries (Benin, Burkina Faso, Côte d'Ivoire, The Gambia, Ghana, Mali, Niger, Nigeria, Senegal, Togo) and Germany.

WASCAL is organized around three principle components: (i) the Core Research Program, (ii) the Graduate Research Program and (iii) the Competence Center. The Competence Center, located in Ouagadougou (Burkina Faso), carries out research and provides science-based advice to policymakers and stakeholders on climate change impacts, mitigation, and adaptation measures. The center aims to assist partner countries to collect panel data on climate, hydrology, land use, biodiversity, demography and economic development. In addition it will formulate a research program to be jointly implemented by a German and regional research consortium.

During the past 50 years, Africa's population has increased from about 200 to 820 million. In consequence, there has been a steadily increasing demand for arable and grazing land, accompanied by an accelerated rate of deforestation. Over 60% of all forests were lost during the last century. It is projected that by the time Africa's population stabilizes, over half of its present natural forest vegetation (800 million ha) may have been converted to arable and grazing land. In West Africa, (near-) natural ecosystems – including fallows, grazed savanna land, and protected areas – render a large variety of ecosystem services, including a significant contribution to livelihood security through providing feeding requirements of domestic livestock and pollination and dispersal mechanisms for regeneration in keystone and utilized plant species. Unfortunately, the supply of ecosystem services is alarmingly threatened by unsustainable land-use practices. Underlying ecological mechanisms are habitat degradation, destruction, and biodiversity loss triggered by maladapted land-use practices. As ecosystem functioning and services are often closely linked to biodiversity, its loss may substantially reduce ecosystem functionality and ecosystem services. Hence, biodiversity loss creates an 'ecosystem service debt'.

This talk will present the structure and general objectives of WASCAL. Furthermore, I will give an insight in my own research, dealing with the impact of bee diversity on pollination of cash crops along a land use gradient in Burkina Faso.

Keywords: Sub-saharan savanna, habitat degradation, pollination, livelihood security

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Historical Path of Forestry and the Role of ‘Ujamaa’ Ideology to today’s Policy of Community Forest Management in Tanzania

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ABSTRACT

Tanzania was colonized by Germany and after World War II was put under British mandatory by the United Nations. Later on the country got her independence in 1961 and adopted the capitalistic economy. Through the Arusha Declaration in 1967, it abandoned the capitalistic and adopted a socialistic policy to guide her socio-economic development. This policy was named ‘Ujamaa’ (family-hood) because it had more emphasis on African socialistic cooperation. Socialism was pursued by Julius K. Nyerere who was the first president of Tanzania. This review explored the forest management path from pre-colonial period today’s regime where community forest is a main concept adopted by the Tanzanian forest policies of 1998 and the newly reviewed of 2012. The study revealed that colonialism and introduction of Christianity diluted the traditional systems that were used by most communities for management of forests. During Ujamaa and resettlement of isolated rural populations more forests were cleared to meet immediate wood demands. Rural dwellers lost control of their traditional land and lost lives to diseases and wild animals. Despite these shortfalls, socialism/ujamaa created a platform for better forest management through political stability, decentralized governance and decreased levels of forest-based resources dependency especially for food and medicines. Forests managed under Ujamaa village governments had better conditions than the rest of forests. Ujamaa was the basis for community resource management of today. The first policy with community participation concept was enacted in 1998 and the forest sector was the pioneer of this. Consequently we can conclude that together with external influence Ujamaa formed a basis for Participatory forest Management (PFM) in Tanzania.

Keywords: Forest resources management, socialism/Ujamaa, community based forest management, Tanzania, villagization

Contribution of National Adaptation Plan of Action Project to Sustainable Livelihood in North Kordofan State – Sudan

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ABSTRACT

Climate Change recognizes as a critical challenge to ecological health, human well-being and future development. Sudan has good agricultural potential, but variations in rain intensity and distributions with frequent drought cycles represented a serious measure of risk confronting sustainable agricultural productivity and sustainable livelihood. The objective of this study was to investigate the role of National Adaptation Plan of Action (NAPA) Project in enhancing the sustainable livelihood of farmers and pastoralists in North Kordofan State – Sudan. Data was collected from primary and secondary sources. The primary data was collected from the stakeholders (farmers and pastoralists) using face-to-face interview. A self-administered questionnaire was used to collect data from the project staff and governmental officials for validation of findings. The main findings in the study area; the state is vulnerable to climate change which created difficult conditions for growing food, raising livestock and living. Land quality and productivity is strongly influenced by climate change and become highly degraded as asserted by the entire interviewed sample. Accordingly, ecosystems and biodiversity habitat changed due to overexploitation. Other impacts of climate change, as perceive by the respondents includes; poor rural economies and food security (76.4%), land degradation (62%), human health (42%) and conflicts (29.7%). The main activities tackled by the project are; awareness raising, capacity building, identification of vulnerable systems, and identification of the urgent and priority adaptation needs. The criteria deployed for the selection of urgent projects that contribute to adaptation of local communities are; prepared through a participatory and consultative approach, and aimed at improving the adaptive capacity. The main projects proposed by primary stakeholders in the state are; conservation of the environment, biodiversity, and conservation of rangelands, rehabilitation of gum gardens, development of the Gurdud soils, improve fodder production to reduce conflicts, review and define new animal routes to reduce conflicts. Major adaptation activities identified in the state are; community-based forest, rangeland management and rehabilitation; replacement of household goat herds with sheep herds to reduce pressure on fragile rangelands; lessening of pressure on local forests through use of mud brick building design and alternative energy sources; land use conversion from agricultural activities to livestock raising; introduction of drought-resistant seed varieties, and afforestation of areas denuded of trees for building construction and firewood.

Keywords Climate change; livelihood; adaptation; rangelands; land use

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Local People's Perception of Climate Change and their Coping and Adaptation Strategies in mountainous Areas of Uganda

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ABSTRACT

Climate change is a major global problem threatening humanity as it is associated with a number of impacts. Despite its global nature, it is not known whether local people understand it and also know how to deal with its impacts. We therefore examined the perceptions of local people towards climate change in addition to assessing their coping and adaptation strategies to climate change in the mountainous areas of Uganda as they are the most prone areas to climate change impacts in Uganda. This was done through conducting structured and semi-structured interviews in Manafwa District which is located on Mt. Elgon in Eastern Uganda. The data was analyzed using descriptive statistics. It was found that the nearly all the people have an awareness of the prevailing climate change which they described in terms of increased variability in temperatures, rainfall amounts and distribution, floods and their associated consequences prominently increased occurrence of landslides and diseases among other effects. A number of coping and adaptation strategies including tree planting for slope stabilization, soil erosion control measures, collection of fertile soils from downslope to upslope and water harvesting among others. In conclusion, local people in mountainous areas of Uganda do experience and understand climate change and are making all efforts to cope and adapt to its impacts. However, there are many challenges that they still face hence requiring more interventions.

Keywords: Climate change, awareness, coping, adaptation, Uganda

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Role of Indigenous Knowledge in Traditional Farming System Management under Changing Climate – Sudan

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ABSTRACT

The purpose of this paper is to investigate about the utilization of communities indigenous in farm management practices under climate change in North Kordofan. The area population has a long history with climate change hazards and effects which started since early 1970s including drought, desertification and flash flood. Climate or weather events have resulted in devastated effects in rural communities in North Kordofan including loss of livestock, failure of crops, food insecurity and famine. Consequently the community members has accumulated knowledge base concerning the weather related events and the expected outcomes. Therefore, the study utilized both primary and secondary data. Secondary data were collected from relevant sources include meteorology station in Elobeid and reports from ministry of Agricultural in addition to previous studies. Primary data were collected from three main sites in north Kordofan represent three distinctive ecological zone (Enhud, Bara and Umrawaba) using stratified simple random sampling technique with total sample size of 300 respondents. The results show that more than 60 percent of the target communities have experience climate change in their respective communities. Also the majority of them (more than 60%) have accumulated their climate knowledge from relatives through knowledge transfers from generation to another. Also the results showed that rural people were utilizing the indigenous knowledge to cope with or to adapt to climate change in soil conservation, forest protection and animal herds management.

Keywords: Climate, indigenous knowledge, traditional farm management

Quarterly Climate Change Preparedness Workshop in Arsi Negelle, Ethiopia

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ABSTRACT

Quarterly climate change preparedness workshops were carried out in Arsi Negelle district of Oromia Region of Ethiopia since 2011 with the main objective to present the seasonal weather forecast to farmers and relevant stakeholders in order to assess the ways in which the local people interpret and use the weather forecast for the next season of sowing, planting, crop harvesting, storing and marketing. The series of workshops undertaken with the local stakeholders served as a platform for sharing weather forecasts and compare with local climate monitoring results, as well as for assessing their relevance and accuracy. The quarterly climate change preparedness workshop involved participants of 8 Kebeles (peasant association). In addition, a district administrator/representative, and representatives from the department of agriculture and meteorological agency, development agents including Ethiopian team members have participated in the workshops. The stakeholders also examined the interplay between household vulnerability, forest conservation and access. Within the Kebele, individual households have a varying capabilities and entitlements, based on some characteristics like gender and clan affiliation that rely on forest-based incomes in different ways. Most of the farmers expressed experiences regarding climate variability and change. They perceived an increase in temperature and elongation of drought periods. They also revealed a decrease in precipitation amount and further pointed out that undependable rainfall pattern; which is erratic, poorly distributed, and often of high intensity are prevalent in the district.

Keywords: Variability, Arsi Negelle, weather forecast, dry and rainy seasons, precipitation

Impact of Farmer Field Schools (FFSs) in Diffusion Information about Climate Change in South Kordofan State, Sudan

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ABSTRACT

In many developing countries, research institutions or extension system have been established to develop and/or adapt technologies that would help agricultural development to bridge the gap of climate change effects and ensure food security. Farmers in rural area have been able to boost agricultural yields and increase food production by raising their awareness including knowledge and skills need regarding agricultural innovations particularly in rain-fed sector. This study was conducted in South Kordofan State, Sudan. The main objective of this research is to study the role of Farmer Field Schools (FFSs) in diffusing information about climate change among rural farmers in the area. While the specific objectives are; to find out the appropriate approaches used, to explore the respondent's perception towards FFSs and to what extent the beneficiaries benefited from FFS. The study based on two sources of data, primary and secondary, the primary quantitative data were collected from field survey using structured questionnaire (in-depth and repeated interview) which designed and pre-tested. Secondary data was collected from books, scientific journals and relative documents. Seventy five respondents (members of FFSs) were randomly selected to represent the study population. Statistical Package for Social Sciences (SPSS version 12) was used for data analysis (Descriptive Statistic) in addition to Chi-square Test. The findings indicated that majority of respondents were literate (56.7%), different approaches were used in delivering knowledge such as field Days, demonstration plots, and group discussion 25.3% , 9.6%, 37.3% respectively. 82.6% of beneficiaries' farm productivity was increased due to improved skills in agricultural practices and 26.7% acquired knowledge about climate change effects. Finally, the study recommends that more farmer field schools should be conducted in the areas which are vulnerable to climate change and displacement.

Keywords: Impact, farmer field school, diffusion, information, famers, climate change, Sudan

Effects of Climate Change on the traditional Rain-fed Agriculture in Sheikan Locality, North Kordofan State, Sudan

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ABSTRACT

The study focused on the climate change and its effects on traditional agriculture in Sheikan locality during the period “1976-2005”. The research aimed to study the causes of climatic change in the study area and its effects on the traditional agriculture activities, more over to know the adopted strategies which followed by the farmers in order to mitigate with current climate condition. The study depended on statistical, historical and regional approaches. The data was collected via interviews, observation and questionnaire, beside books periodical and theses. The study sample constitutes one hundred and fifty farmers which represent 2% out of the total farmer’s population in the area. Simple random sample was used for choosing the samples in the study area. Data analysis depended on criterion and mean deviation, beside line regression equation and correlation coefficient. The study revealed that, there is a physical cause led to climatic change which has major effect on the traditional agriculture in the area, such as rainfall fluctuation which showed a rate of change up to 23% and variance coefficient of 32.4%. These conditions led to short-term drought period rotation, especially during the years “1981-1987” and “1995-1998”. The drought in this period created poor vegetation cover and increases the water deficit by 30%. Also the effect of the location, increasing rate of evaporation that reached 14.5mm, sandy soils which is quick heating represent by 40c specially in May. All this factors affect the climatic change in the study area as physical causes. Moreover, there are human causes led to climatic change which affected the traditional agriculture in the study area such as: the rapid increase in the population which reached 49.7% during the period “1998-2005”. The increase in population reflects on traditional agriculture by decreasing the production as mentioned by 66.7% of the respondents, the production of “*Makhamas*” is less than 2 sacks. Also the study revealed that, strategies which adopted by the farmers to mitigate with the climatic change were not succeeded due to shortage of rain-fall (73.3% of respondents). The study recommended with providing more metrology station, extensive agricultural extension and adoption of surfer water harvesting techniques in the study area.

Keywords: Climate change, rain-fed agriculture, North Kordofan, population

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Can Rain Water Harvesting mitigate Flooding associated with Climate Change in Urban Areas? A Case Study of Jinja Municipality, Uganda

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ABSTRACT

Climate change continues to be a major global challenge as it is associated with a number of impacts. One of the consequences of climate change is increased variability in rainfall amounts and distribution. In some places, the frequency and intensity of the rainfall has greatly increased resulting in floods. This therefore calls for mitigation measures to deal with flooding. Jinja Municipality, the second largest town in Uganda, frequently receives heavy rains associated with climate change and continues to grapple with flooding problems whenever the heavy rains occur. It is therefore necessary to develop mitigation measures to the flooding problem. One of the hypothesized mitigation measures was rain water harvesting. Therefore, this study was carried out to assess the potential of rain water harvesting as a mitigation measure to flooding in Jinja Municipality. The study methodology involved use of both use of interviews and observations. It was found that there are attempts to collect rain water in some areas of the city while other areas did not have any mechanisms in place. Specifically, areas with rain water gutters and harvesting tanks experienced less frequency of floods as compared to areas without gutters and tanks. The flooding was also associated with poor waste management, inadequate drainage systems, and increased surface run off as a result of increased infrastructural developments like roofs, roads, path ways and concrete compounds which do not let rain water infiltrate in the soil. In conclusion, rain water harvesting has a great potential of mitigating flooding associated with climate change in urban areas. However, since its coverage is low, more sensitization about its values in the community, including increasing water security and reducing pressure on open water bodies, should be done.

Keywords: Climate change, water security, mitigation, rain water harvesting, floods

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Session 2:

Agroforestry, Reforestation and Climate Change

Agroforestry in reducing Emissions from Deforestation and Forest Degradation (REDD⁺): Africa, where are we?

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ABSTRACT

This paper draws from recent world empirical literature to highlight the position of agroforestry in Post-Kyoto arrangements, particularly the mechanism for Reducing Emissions from Deforestation and Forest Degradation (REDD+) and summarize its prospects to mitigate global climate change and adaptation especially in Africa where majority of agroforestry practitioners occur. Agroforestry has long been known as a novel land management approach to sustain farms and landscapes, enhance livelihoods of smallholder farmers and to promote biodiversity conservation particularly in the tropics by constant supply of multiple important goods and services, and by increasing rural incomes and land productivity. However, the importance of agroforestry has received wide spread added attention in recent times from both industrialized and developing countries due to the recognition that agroforestry systems provide high, sustainable and low-cost opportunities to mitigate climate change by reducing greenhouse gases (GHGs) concentrations in the atmosphere, and that it could also help natural and human systems adapt to climate change effects. Current global prediction models show that area under agroforestry management will increase substantially and thus considerable increase in opportunity to capture and store atmospheric CO₂ (C sequestration) indicating even more potential for agroforestry to enhance GHGs sinks. In conclusion, this paper ends by highlighting efforts to incorporate agroforestry into national REDD+ strategies in Africa.

Keywords: Agroforestry systems, greenhouse gases, carbon sequestration, smallholder agroforests, REDD+, co-benefits, sustainable forest management

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Role of Agroforestry in Community Livelihood and Climate Change Mitigation and Adaptation in Southern Africa Countries

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ABSTRACT

Any significant change in measures of climate (such as temperature or precipitation) lasting for an extended period of time (typically decades) is what is referred to as Climate Change. The most profound and direct impacts of climate change in Southern Africa over years have been droughts, fluctuations in annual rainfall, extreme temperatures and floods. These have resulted in low and unstable food production, especially maize which is the staple food in most Southern African countries. Agroforestry as the system of incorporation wood perennials in cropland has been reported to hold great potential for mitigating climate change effects by addressing food security and livelihood needs of smallholder farmers in southern Africa. Howbeit, Agroforestry has been reported also to improve community livelihood in terms of environment, economic and social benefits. Literature proves that, Agroforestry act as the win-win situation that provide adaptation benefits while meeting other social, environmental, or economic objectives, including climate change mitigation as it helps in carbon sequestration. The role and the way Agroforestry acts as the win-win action has been discussed. Therefore Agroforestry should be emphasized in African countries so as to increase the attention as a strategy to sequester carbon (C) and mitigate global climate change while taking advantage of the food security and ecological benefits.

Keywords: Agroforestry, climate change, adaptation, mitigation, food security.

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Carbon Sequestration and Greenhouse Gas Emissions in Agroforestry: Summary of global Data and Implications for Africa

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ABSTRACT

It has been recognized that agroforestry provides various benefits and services including increasing crop production, preventing soil erosion, enhancing soil fertility and water quality, and conserving biodiversity. In addition to these various benefits and services, carbon (C) sequestration under agroforestry has received particular attention. However, there is a lack of comprehensive understanding of C sequestration and changes in greenhouse gas (GHG) emissions under agroforestry. We, therefore, compiled and analyzed 109 data sets for biomass and soil C sequestration rates and 27 data sets for GHG methane (CH₄), and nitrous oxide (N₂O) emissions under agroforestry. These compiled data showed that C sequestration rates were highly variable in both biomass and soils depending on the type of agroforestry. Overall, agroforestry (at an average age of 14 years) sequestered $8.7 \pm 3.4 \text{ t C ha}^{-1} \text{ y}^{-1}$, with biomass and soil C sequestration contributing 61% and 39% of that increment, respectively. Soils under agroforestry also oxidized $1.6 \pm 0.5 \text{ kg CH}_4 \text{ ha}^{-1} \text{ y}^{-1}$ and emitted $7.7 \pm 1.7 \text{ kg N}_2\text{O ha}^{-1} \text{ y}^{-1}$. Comparing agroforestry and adjacent agricultural lands, divergent changes in net CH₄ and N₂O emissions were found in conversion from agricultural lands to agroforestry, with no clear direction of change. Overall, agroforestry was estimated to contribute to mitigating $29.6 \pm 12.0 \text{ t carbon dioxide equivalent ha}^{-1} \text{ y}^{-1}$ at least at the early stage (i.e., around 10 years). The results suggest that agroforestry can offer great potential for C sequestration and mitigate GHG emissions while it provides various benefits and services. Future studies should consider strategic approaches for data acquisition that develop comprehensive approaches to quantify all components of the GHG balance, relate net GHG emissions with quantification of the yield of produce and develop models to summarize the findings.

Keywords: Agroforestry, carbon sequestration, soil, biomass, greenhouse gas flux, mitigation

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Local People's Perception on Carbon Forest Project and its Implication for successful Reforestation: The Case of Soddo Community managed Carbon Forestry Project

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ABSTRACT

Global climate change is causing widespread socio-economic and ecological impacts. CDM & REDD+ are advancing as strategies to mitigate the build-up of greenhouse gases (GHG) in the atmosphere, which are the causes of climate change. Several CDM projects are emerging in Ethiopia, although there exists little studies of their progress, achievements and challenges so far. This study was conducted in Wolita zone with the main focus of investigating whether the anticipated carbon based incentives can bring impacts on how locals manage forests and thereby on their livelihoods. Both primary (socio-economic survey and vegetation inventory) and secondary data sources were used for the study. A total of 94 households were interviewed purposively using semi-structured questionnaires. The vegetation survey was also made by applying systematic sampling design using transects lines spaced at 300 m distances apart. Circular sample plots having 10 m radius were used at the distance of 150 m along each transect lines for the documentation of vegetation related data. From the results of the socio-economic study, it was found that due to the demarcation of land for Carbon Forest Project (CFP), most farmers' lost their farmland. As a result the average land holding by individual farmers has shrunk, and about 80% of the interviewed farmers possessed < 1.0 ha of land for farming. However, vulnerable social group and forest dependent were assessed and social mitigation strategies were prepared to assist in the development of their own livelihood strategies. As an outcome dairy farming, fattening, poultry, and little trade as supplementary of subsistence were developed by locals using the credit system stretched by the project and about 2.23% formerly food insecure households are now could satisfy their subsistence. This was an indication of initial shift in the livelihood practices, and lowering the reliance on forest for livelihood by the locals. More interesting, farmers (82%) have now developed sense of ownership of the CFP and appreciate the project for the conservation and development of their forest. Their participation in the management and protection has increased and 97.78% of the interviewed households were members of the forest user group and benefited from the projects as a daily laborer and guarding. Results from the vegetation assessment also revealed that, the CFP found to be with high number of trees, seedlings and samplings of good diversity. The population also found to be with better structure which seemed a healthy population structure as compared to the adjacent non CFP block. This might be because of increased protection and the change in trend of forest. More interesting in this study was farmers (58.89%) began planting of trees for subsistence and commercial use thereby reduce pressure on the natural forest.

Keywords: Bio-carbon, enrichment plantation, forest management, livelihood, perception, Wolita

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Propagation Techniques for Ethiopian Highland Bamboo (*Arundinaria alpina*) in Amhara Region, Banja Districts, North-Western Ethiopia

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ABSTRACT

This study was conducted in *Arundinaria alpina* dominated areas of Banja district in Amhara Regional State to compare shoot sprouting rate of propagates and height, diameter and growth performance of bamboo culms obtained through different vegetative propagation techniques. The vegetative propagation technique evaluated were Rhizome with two nodes, Rhizome with four nodes, Rhizome with six nodes and Rhizome without culm and with the traditional one (control). An experiment was set up for a period of 4 years using Randomized Complete Block Design with three replications. Shoot sprouting, shoot height and diameter and mortality rate data was collected at an interval of six months. There was no statistical significance difference in mean number of sprouted shoots of *Arundinaria alpina* between the five treatments. Statistically significance difference occurred in the mean shoot height between the treatments of rhizome with four nodes and rhizome without culm ($137.02b \pm 22.94$, $67.10a \pm 17.97$), respectively. Rhizome with four nodes and six nodes had shown significantly higher mean shoot diameter as compared with the traditional one ($33.89b \pm 12.17$, $32.43b \pm 12.68$, $8.48a \pm 2.53$,_respectively). Mean Shoot sprout, and shoot height had shown significance difference with time change. Propagating *Arundinaria alpina* using rhizome with four and six nodes is better as compared with the traditional propagation techniques

Keywords: *Arundinaria alpina*, vegetative propagation, species

Session 3:
Biodiversity, Conservation and Bio-Energy

Land Use, Land Cover and Climate Change Impacts on the Bird Community in and around Lake Zeway, Ethiopia

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ABSTRACT

This study aimed to show impacts of land use and land cover change (LULCC) and climate on waterbird community structure of Lake Zeway and the surrounding areas. Purposive sampling techniques were used to collect primary data. Based on the purposive sampling techniques, 12 key informants and 12 focus group discussants were selected. A semi-structured questionnaire prepared in English and translated into Afan Oromo was used to interview the focus groups. The key informants participated in the interview under close inspection of the researcher. Field observations and literatures searches were also carried out on the impacts of LULCC, climate changes, lake hydrodynamics and biodiversity. Most (92%) of the discussants indicated decreases in the level and width of Lake Zeway during the last 3-4 decades. The lake water withdrawal for irrigated agricultural activities in the surrounding areas was the main reason for decreases. Eleven groups (92%) reported temperature increases and lower and unpredictable rainfall patterns as cause for the decreases. These changes reportedly resulted in decreased waterbird species diversity and abundance and changed distribution patterns across the lake and the surrounding areas. The FGD identified fish production and irrigated farm and bird habitat as the three most important values of the lake. The discussants also reported the combination of land use and climate, or climate changes, as important drivers that altered the lake water level, wetland habitats and bird community structure. Urgent conservation measures that could reduce the impacts are needed to conserve the bird species at the lake.

Keywords: Bird community, climate, changes, impacts, irrigated agriculture, land use

Assessments of Distribution, Density, Size-Class Profile and Management Approach for sustainable Development of Baobab, within Perspective to Climate Variations and Land Uses in Sudan

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ABSTRACT

The main objective of this study is to investigate the effects of rainfall isohyets shifting and temperature variation in the trends of Baobab distribution, size class profile and density over the species range. Moreover land-use types (settlements, fields, forest reserves and Dinder national park) will be considered. This study will be conducted in the east and west of the Blue Nile of the original habitat of baobab species. Data collection procedure will be based on transects of 200 meter wide extending east-west to measure baobab characteristics of diameter, height, regeneration and density. In addition, a running survey will be conducted in north-south direction to assess the species present distribution. Previous distribution of the species and climatic data from previous records, literature and relevant institutions will be collected. Regression analysis and correlation statistics will be used to assess trend of change in species distribution. Analysis of Variance (ANOVA) followed by Least Significant Difference (LSD, $p < 0.05$) test will be used to compare baobab distribution across different climatic zones and land-use types. Baobab distribution map and a model for strategic planning for management of Baobab species are expected outputs from this study. The study will provide conclusions and recommendations.

Keywords: Adansonia digitata, baobab, climate variations, distribution, size class, transects, management, Dinder National Park, Blue Nile

Ecotourism as Alternative Means of Biodiversity Conservation and improvement of the Livelihood of the Local Community. The Case of Bale mountain National Park, Ethiopia

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ABSTRACT

Ecotourism is responsible travel to natural areas which conserves the environment and improves the welfare of local people or creating and satisfying a hunger for nature, about exploiting tourism's potential for conservation and development and about averting its negative impact on ecology, culture and aesthetics

Ecotourism, when properly planned, developed and managed has enormous potential to promote conservation based ecosystem management, mitigating climatic change, improve and diversify local community's livelihood. It provides benefits such as employment and revenue generation to local communities and the public at large. The components of this paper are based on literature review related to ecotourism, biodiversity conservation, and climate change mitigation. The results of this study were based on Bale mountain national park which is located at (6°29'-7°10'N and 39°28'- 39°57'E) in south east of Addis Ababa and part of the Bale- Arsi massif, which forms the western section of the southeastern Ethiopian highlands. The Bale Mountains, with Bale mountain national park at its heart, are a unique natural heritage with outstanding beauty, diverse attractions and great ecotourism potential. Resilience ecosystems can be enhanced through the adoption of biodiversity-based adaptive and mitigate strategies and hence the risks of damage to human and natural ecosystems reduced. Ecotourism, in its purest sense, is an industry committed to making a low impact on the natural environment and local culture, while helping to generate income and employment for locals. It is environmentally friendly, since the activities carried in natural settings which promotes better environmental conditions and produces economic benefits for the local communities to encourage conservation of the natural environment. Ecotourism has high financial potential for natural conservation through entrance fee, levies, concession, carbon trade and other economic activities.

Generally, Bale mountain national park which have a potential for newly growing off farming industry need further study and attention and policy advisors and makers have to formulate clear directions on economic benefit from ecotourism towards the betterment of environmental conservation and community livelihoods.

Keywords: Adaption, climate, conservation, ecotourism, livelihood

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The role of Wood Fuel in Climate Change: a Need for a sustainable Wood Fuel Sector in Uganda

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ABSTRACT

Biomass resources are the most important energy sources in Uganda. Households, small and medium scale industries form the biggest market for these resources. These resources are currently being depleted at an alarming rate. Literature shows that wood fuel consumption is growing at the same rate as the population growth. This trend of fuel wood consumption therefore calls for serious concern and action by every Ugandan. Over reliance on wood energy has increased the deforestation rates and has therefore risen volumes of green house gases into the atmosphere. As a consequence, changes in climate patterns resulting in extreme conditions like floods, heat waves and drought have been observed. Environmental crisis has loomed in as forests are under threat. Given Ugandans limited ability and will to mitigate the negative effect of climate change, the forests are our front line of defense to climate change and therefore the wanton destruction of forests due to unsustainable wood harvesting for charcoal and firewood is increasing Uganda's vulnerability to environmental and climate hazards both visible and invisible. Though biomass energy is said to be a clean energy source and carbon neutral, wood harvesting for fuel is done unsustainably therefore breaking the carbon cycle. Therefore, the need for a sustainable wood fuel sector.

Keywords: Wood fuel, deforestation, carbon cycle, environmental crisis, sustainability

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Session 4:

“Way Forward” - Aspects on Future Collaboration

Methodological Fundamentals of Socio-Economic Climate Change Adaptation Research at the Institute of International Forestry and Forest Products, TU Dresden

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ABSTRACT

Research is placed in a socio-ecological coevolution context and embedded in a constructivist approach. It has a strong development oriented focus and is fueled by both, traditional and modern knowledge. The constructivist approach implies, that all research step are discussed with involved stakeholders from theory as well as from practice (Pretzsch et al 2014). Following the theoretical construct of Habermas (1965) who differentiates the three research spheres analytical, humanistic and critical sciences, all three spheres are covered. Beside the traditional analytical sciences based research process, which is characterized by the formulation hypothesis and its verification or falsification, hermeneutic research is of special importance to understand climate change processes. Further on the application of critical sciences is important for action, emancipation and change.

Climate change adaptation is a very complex process. In recent years a methodological framework was elaborated with a focus on the implementation of socio-economic field laboratories. They have character of a long term research & development (R&D) process on the level on local communities or households, involving local people as well as scientists and students. The process covers all stages of an innovation cycle; a common diagnosis as baseline, looking together for innovative solution, often based on scenario techniques, creative workshop and information exchange and finally common implementation. The process follows and adaptive management strategy; there are strong feed-back mechanisms and frequently there are set backs in the diagnosis stage.

Because of the long duration of the R&D process and the successful implementation of field, which may take more than ten years, there are strong limitations in their implementation combined with a high moral responsibility of scientists. In the situation of the Cooperation with East African Universities this might be buffered by a strong cooperation network, which survives normal funding cycles.

Keywords: Constructivism, socio economic field laboratories, climate change adaptation, action research

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Enhancing Resilience of Rural Livelihoods: South-south field Laboratories between Rural Communities in South America and East Africa (Project Proposal)

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ABSTRACT

Small-scale farmers in mountain ecosystems from around the world manage their crops and varieties as well as their associations so as to promote diversification as a strategy to reduce risks associated with the climatic conditions typical of these regions (Tobin et al. 1998). These strategies, some of which at risk of being lost (Valdivia et al., 2010), provide relevant knowledge on successful adaptations to biophysical hazards worldwide. This is the case, for example, of drought resistant varieties of orphan crops, agroforestry practices (Jost & Pretzsch, 2012), terrace systems and water harvesting techniques.

The main objective of the proposed project on enhancing resilience of rural livelihoods through south-south field laboratories is to contribute to the development and transfer of technology and knowledge between African and South American countries by deriving and testing sustainable livelihood strategies for small-scale farming and forestry systems. Based on scientific research and local experience and in cooperation with local stakeholders, the proposed project will develop bridges between scientific and indigenous knowledge.

The proposed research is as well as innovative, a constitutive continuation and a consequential expansion of the research efforts carried out during the last years. Among other collaborations, the main baseline in research is provided by the project INCA (International Network on Climate Change, 2010-2014) with focus on bio-physical and socio-economic factors that influence livelihood strategies of small-scale farmers in Andean ecosystems and the “Welcome to Africa” project with focus on transboundary knowledge creation and sharing regarding climate change adaptation strategies (2012-2015) with partner universities in Ethiopia, Uganda, Sudan and Tanzania. Hence, a further network building and a transcontinental alliance appear like necessary next steps.

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The Performance of GAPAs on Enhancing the Production and Marketing of Gum Arabic Production in West and North Kordofan States, Sudan

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ABSTRACT

Gum Arabic producers associations were established in North Kordofan in 1992, in 2002 the Forests National Cooperation started the establishment of the associations in all the productive states in Sudan.

The study was conducted in three sites located in the central part of the gum Arabic belt, Alkhawi locality (West Kordofan State), Shiekan and Umrawaba localities (North Kordofan State), with objective to evaluate the performance of gum Arabic producers associations on enhancing production and marketing of gum Arabic.

Primary data were collected via questionnaires, field visits, group discussion and direct observations. Secondary data were obtained from documents of relevant institutions and previous studies. The preliminary data was analysed using descriptive analysis.

The results show that the associations vary significantly in their activities and services they provide for their members. Significant differences are the availability of financial and technical support provided by governmental and non-governmental institutions, and the degree of the association committee awareness and training skills. Members in these associations suffer from the lack of awareness in the responsibilities and duties towards their associations.

The preliminary conclusion is that gum Arabic associations without financial or technical support from outside will not be perform services for their members.

Keywords: Gum Arabic, Gum Arabic Producers' Associations, Kordofan, Sudan

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CHAnces IN Sustainability – Promoting Product Chains of Natural Products in Eastern Africa

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ABSTRACT

Natural resource management systems combined with the upgrading of product chains may considerably contribute to a better balance between economic development and nature conservation. Despite the extensive experiences on application of a collaborative management approach, not enough facts are available about potential contribution of natural products and their value chains to rural development. This paper presents a collaborative research project initiated in 2013 for participatory identification and implementation of pilot measures for promotion of three NTFP value chains in Ethiopia and Sudan. The main focus of the pilot measure is development of innovative management systems and upgrading the product chains for three natural resource based commodities in East Africa (bamboo, gum Arabic, incense). The implementation of the research project follows a participatory approach, integrating all relevant stakeholders along the product chain. At levels of production, processing and marketing the research is focusing on (1) sustainable resource management practices, value adding activities and enabling frame conditions; (2) the contribution to livelihoods and rural development; and (3) participation as innovative approach to analyze and develop forest based product chains. In addition to the scientific objectives the project contributes to strengthen the cooperation between partners from research and practice. The research project follows a standardized sequence, organized in 9 working packages, which permits to compare the case studies, learn from best practice cases and draw the lessons learned and conclusions towards applicability for other production systems and product chains. Preliminary findings confirm the participatory approach as a successful instrument for stakeholders' dialogue, facilitation of common understanding and identification of priority measures for upgrading the product chains.

Keywords: Value chain, participatory approach, natural gums, Gum Arabic, bamboo, sustainability, Ethiopia, Sudan

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