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Ethiopian Institute of Agricultural Research (EIAR)

Session 1:

Climate Change Adaptation and Mitigation

Climate Change in Ethiopia: Impact, Adaptation & Mitigation

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ABSTRACT

Ethiopia is frequently portrayed as a drought-stricken country, both in the media and the scientific literature. It has been reported that global warming and climate change may increase drought. Therefore, it is critical to understand how climate change impacts Ethiopia and identify strategies for adaptation and mitigation of climate change. Ethiopian farmers commonly perceived an increase in temperature and a decrease in annual total rainfall. Metrological data indicated that rainfall decline in southern Ethiopia, during both February–May and June–September and spring droughts have occurred more frequently in all parts of Ethiopia during the last 10–15 years. However, there was no evidence that rainfall declined in central and northern Ethiopia. Also, consistent changes in the frequency or intensity of extreme events and positive trends for maximum temperature and warm days were not significant. Cropping farmers commonly assessed the impact of climate change as four different issues: 1) decrease in length of growing period, 2) increase in crop damage by insects and pests, 3) increase in crop diseases, and 4) shift in suitable growing areas. Pastoralists commonly assessed the impact of climate change as four different issues: 1) shortage of feed, 2) livestock disease, 3) scarcity of water supply for livestock, and 4) mass die-offs of livestock. It was found that women are more affected than men by the impacts of climate change related problems. While there are substantial evidence on impact of climate change, there is also evidence that multiple causes of changes are confounded, so farmers who observed decreasing crop yields may not be distinguishing between rainfall change and declining soil fertility or other conditions, which are not related to climate change. Adaptation activities such as soil conservation, changing crop variety, tree plantation and water harvesting have been conducted for the perceived temperature and rainfall changes. However, it was reported that over 40% of farmers have done nothing for adaptation. Major barriers to adaptation are shortage of land, lack of information and money and shortage of labor. It is expected that currently developing carbon trading schemes such as Reducing Emissions from Deforestation and forest Degradation (REDD) will provide a opportunity-mitigation efforts enhancing carbon sequestration and reducing greenhouse gas emissions can provide economic benefits as well. Throughout, reforestation, conservation tillage, optimizing synthetic fertilizer use, retaining crop residues, reducing grazing intensity, and restoring indigenous agroforestry, local communities can contribute to mitigate global warming and climate change and also obtain additional economic benefits.

Keywords: Ethiopia; Climate Change; Impact; Adaptation; Mitigation; Carbon Trade

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Effects of Climate Change and Coping Strategies by Smallholder Farmers in Sustaining Coffee Production in Mbozi District, Tanzania

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ABSTRACT

The increasing threats of effects of climate change in existence of many agricultural food crops and those with commercial importance in Tanzania have forced many farmers to adjust their way of farming accordingly. This study assessed the effects of climate change on coffee production and the role of adaptation strategies employed by smallholder farmers in sustaining coffee production in Mbozi district, Tanzania. Using random sampling approach two wards of Igamba and Isansa which represent 11.8% out of 15 wards found in Mbozi District were selected. Through purposive sampling approaches, Shiwinga village which represent 11.1% of the total nine villages found in Igamba ward and Iyenga and Itumpi villages which represents 16.7% of total twelve villages found in the Isansa ward were selected for this study. Thereafter a total of 112 heads of households from the three villages of Shiwinga (42), Iyenga (43) and Itumpi (27) who engaged in coffee production in the past 10 years and beyond were selected for this study. Focused group discussion, key informant interviews and transect walk was also employed in data collection process. The collected data were analysed using Statistical Packages for Social Sciences version 12.0. The study revealed that there were changes in rainfall and temperature in the study area which led to the decrease of coffee yields. Moreover, the study showed that smallholder coffee farmers have employed various adaptation strategies such as; farm expansion, irrigation system, mulching, planting trees within coffee farms, improved coffee seedlings and crop rotation which helped to improve the production of coffee in their area. The mentioned adaptation strategies were found to have some positive results on coffee production in the studied villages. It is concluded that the capacity of smallholder farmers to adapt to the impact of climate change was low due to socio-economic factors. In order to have sustainable coffee production in the changing climate, it is recommended that stakeholders such as local community and government should work as a team to build capacity of the smallholder farmers in the respected areas.

Keywords: Adaptation Strategies; Arabica Coffee; Climate Change; Smallholder Farmers; Temperature; Rainfall

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Photographical Analysis Expressing Adaptive Strategies to Mitigate the Impacts of Climate Change in Central Arid Areas of North Kordofan State, Sudan

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ABSTRACT

The current study was conducted in the central arid area, Bara locality, North Kordofan State, Sudan. The area considered as one of most vulnerable regions to desertification and soil degradation. It faces a complex of interactive problems in terms of environmental and socioeconomic led to resource degradation and shortage of potable water, lack of services and fluctuation of agricultural output resulted in poor standard of living and increase poverty. This paper intended to describe vulnerability of natural resources based in the area with emphasis to agricultural and forestry resources. Based on that the paper was a accomplished by providing Photographic analysis to express the adaptive strategies practiced by the local community in the targeted area. The study depended mainly on the data provided by the Comprehensive and Sustainable Agricultural Development Project in Central Arid Area of North Kordofan. A composite of research methodology comprising descriptive statistics, SWOT analysis and Photographical analysis were used. The results showed the severity of desertification, soil degradation and sand dunes formation in the study area. It also expressed the natural calamities in terms of recurrent drought episodes, desert creeping, and unfavorable socioeconomics conditions together with climate variability pertinent to amount and distribution of rainfall and temperature. Beside, the environmental benefits of trees, local communities in the area tend to conserve *Faidherbia albida* as productive species for fodder for their animals and shed for social occasions during the dry season. Also they adopted many strategies such as home gardens, wind barrier, live fencing, agro-forestry systems in terms of tree based shifting cultivation, *Leptadenia pyrotechnica* for sand dunes stabilization.

Keywords: Climate Change; Adaptive Strategies; Desertification; Photographical Analysis; North Kordofan State

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Knowledge Management on Climate Change Adaptation: Communication and Information Structures in Ethiopia

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ABSTRACT

Ethiopia is one of the first countries in Africa that developed a comprehensive strategy that aims to tackle the existing and future's climate change impacts while having a continuously growing green labelled economy. Respectively the launch and implementation of the 2011 announced Climate Resilience Green Economy Strategy (CRGE) Ethiopia's government faces potentials and problems in the targeted sectors. With a rural population of more than 80%, the agricultural sector which is particularly vulnerable to climate change is one of the focal points of the strategy.

As adaptation to a changing climate and environment is a locally determined and a learning process it requires access to information and communication infrastructure and processes, and the ability to exchange, process and apply knowledge. But besides emphasizing the mainstreaming of knowledge the practical way of implementation under the prevailing local socio-economic and cultural context and circumstances did not seem to get sufficient attention. Nevertheless theoretical concepts on social and human capital, collective action and social networks, partly linked to the adaptive capacity, are pushed by several authors and serve to position knowledge management in a theoretical and conceptual framework.

The study shall examine several stakeholders and aspects that are providing the context and influence the feasibility of knowledge management respectively to climate change adaptation in Ethiopia. Therefore it involves the analysis of national documents as well as semi-structure interviews with institutional and community representatives on different administrative levels. The qualitative approach conducted in a climate change affected case study area gives insight on the perception and knowledge of the local people respectively to climate change and the consequences. It shows the prevailing demand of knowledge and gives an endogenous view on structural and social components enabling and limiting communication and information transfer and hence affecting the level of adaptive capacity. This contributes to understand limitations and opportunities of implementing relevant policies.

Keywords: Adaptive Capacity; Ethiopia; Climate Change Adaptation; Knowledge Management; Social Capital

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Session 2:

Buffer Zone and Collaborative Land Management

Management of Gullying by Shelter-belts

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ABSTRACT

Since ancient times soil erosion has affected the Ethiopian highlands and many attempts were made to slow down or to stop it. Some of it were successful but many were in vain. Out of all kinds of soil erosion gullying is the most serious. In its extended form it not only acts as a guide rail for the surface runoff but it even cuts a particular landscape into pieces.
Adaptation and mitigation are the most common strategies to diminish the denudation. Among the different soil and water conservation measures the construction of shelter-belts alongside the gullies could be a useful approach of mitigation. In case of planting fruit trees it provides the shelter-belts with a certain socioeconomic value as well as it fixes the soil mantle and thus it kills two birds with one stone. The main aim of the project is to provide suggestions for improving soil conservation practices in the field.

Keywords: Soil Erosion; Gully; Fruit Trees

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Monitoring Deforestation and Degradation Processes and Land Use Systems in Umabdalla Natural Reserved Forest, South Kordofan, Sudan

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ABSTRACT

The current study conducted in *Umbdalla* Natural Reserved Forest, South Kordofan State, Sudan. The study aimed at estimating the changes in the forest cover over successive period comprising the land use system and population dynamic of the tree species, also to investigate the causes of forest gaps and extend of development in to large area deforestation. A successive forest inventories during the years 1998, 2007 curried by the Forest National Corporation and 2011 by the author to the forest including 248 sample plots (of 0.1 ha each) was conducted. Trees and area of gap were measured. 100 questionnaires distributed among respondents and analyzed. Remote sensing data from Landsat TM 1992, ASTER 2005 and 2012 imagery covering the forest area were acquired and integrated with in-situ forest inventory data and ground truth points. Supervised classification was employed in data analysis using ERDAS version 9.1. The results showed that the forest is very rich in tree species about 53 species were recorded, however, the study revealed a significant variation ((p >0.05) in the number of trees per hectare in the forest between the three period. The analysis of the social survey data showed different causes of forest gaps among which trees cutting and fires scoured (40% and 23%) respectively. Remotely sensed data classified the land use system into seven classes namely, gap within sandy soil, special soil (Gardoud), dense vegetation, burned soil (Fire), medium dense vegetation, rocks with scattered trees, and gap within clay soil. The area of gaps in the clay soil decreased during 1992, 2005 and 2012 gradually by (38%, 25%, 16%) respectively, as well as the fires decreased in the same years by (7%, 5%, 3%) respectively coupled with increase in the area of medium dense vegetation at the expense of the dense vegetation.

Keywords: Forest Gap; Remote Sensing; Land Use; South Kordofan; Deforestation; Degradation

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Session 3:

Value Chains

Current Challenges and Opportunities of Developing the Use of Baobab (Adansonia digitata L.) in the African and European Food Industry Value Chains

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ABSTRACT

Since 2008, dried baobab fruit pulp has been accepted as a novel food ingredient in the European Union as well as for the US market. The fruit properties meet health claims such as pre-biotic and antioxidant functions, high calcium, vitamin C and high pectin and fiber contents, which make it a suitable candidate for a new generation of functional foods and drinks.
The paper presents initial results of an explorative study undertaken to characterize the current structure and size of the global baobab market, as well as the current organization of the baobab value chain in various regions of Africa. It identifies a number of open questions that further research work needs to close.

Keywords: Global Supply and Demand**;** Baobab Value Chain**;** Commercialization of Underutilized Fruits

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Market Chain Analysis of Agroforestry Products: The Case of Avocado at Tembaro Woreda, South Ethiopia

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ABSTRACT

In densely populated areas of central and south Ethiopia, fruit trees based agroforestry is an important land use system with its economic and environmental benefits to smallholder farmers. However, the smallholders are not getting enough benefit from the practice. Rather, food aid is common practice. The nature of the product on the one hand and the lack of efficient marketing system on the other hand have resulted in low producers' price and low benefit to the producers. This study was carried out to analyse the market chain of the avocado fruit. Data was collected from 140 avocado producing households, 7 local collectors and 13 retailers through structured interview, focus group discussion, key informant interviews, and field observation. Structure, Conduct and Performance (SCP) approach was used to analyze avocado market. Also multiple linear regression model was used to identify the factors that affect the supply of avocado. The result shows the presence of four marketing channels with producers, local collectors, retailers, and consumers being the actors. Among the channels the producer-retailer-consumer channel was identified as the first channel in terms of the volume of fruits transacted while the producer-local collector-consumer channel is the least channel. None of a single producer and consumer have influence on the avocado market implying the market structure close to a competitive market. The results of the econometric analysis shows that price, access to extension services and market information, distance, and quantity produced positively and significantly affected the supply of avocado fruits, whereas distance from the market has negative and significant effect on the quantity supplied. Thus, both physical and institutional infrastructures should be improved to promote buyers come to the production area than producers to export the fruits to long distances. This will increase the efficiency of the marketing system by reducing the information asymmetry between the buyers and sellers and reducing the market inefficiency due to the pershabilty of the products. As the tradition in the area considers trading fruits a low profile activity mainly handled by female traders, we recommend concerned stockholders to create awareness that fruits are important cash crops in the study area.

Keywords: Agro-forestry; Market chain; Structure, Conduct and Performance; Concentration Ration; Marketing Margin

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Trend of Forest Product Marketing in Ethiopia

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ABSTRACT

The Ethiopian economy has been experiencing an unprecedented spell of economic growth over the last decade. The country's economy is heavily dependent on agriculture (crop, livestock and forestry production).The sector is the main driver of economic growth, accounting for about 44% of GDP, well above 80% of export revenues, more than 80% of employment, and a major source of the nation's food supplies. The contribution of forests to local livelihoods and the national economy as a whole is significant, but is largely unrecorded and consequently unrecognized. Ethiopia is not an exception to this fact. The country's Central Statistics Authority estimates that the forestry sector absorbs 0.29% of the nation's total employed persons (31.44 million). However, this figure does not include the employment opportunities for households in the collection and sales of biomass fuel and exudates. The forestry sector contribution to total gross domestic product (GDP) has decreased considerably during the past 10 years from 6.4 to 3.1 per cent. However, there has been increase in the production, distribution and marketing of forest products in the country for various uses like construction activities which increased recently amounts of forest products as input and materials. Ethiopian forest product exports are natural gums and resins, natural honey, wooden furniture, bamboo and wood charcoal while the imported forest products are wooden furniture, Veneer sheets and sheets for plywood and coniferous wood sawn or chipped. The value as well as volume of imported NTFPs has generally shown increasing trend. During the last 15 years their value has increased on average by 58% annually while the volume has increased by 55%. The volume as well as the value of imported wood products has also shown similar increasing trend to that of NTFPs. The volume and value of wood products and products made from wood in general has grown annually for the last 15 years on average by 18% and 21% respectively. The performance of export of major NTFPs and wood products has also similar trend. Export volume of wood products during the period 1997-2011 has increased by almost 400%, where as the export volume of major NTFPs for the same period has increased by 376%. Since more than 85% of Ethiopian population lives in rural areas the dependence on forest products is significant. To increase the benefit of the primary producers and improve the export income their bargaining power should be improved through appropriate technical as well as financial supports.

Keywords:

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The Availability of Medicinal Plants in Uganda's Natural Forests: Local Peoples' Perspective

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ABSTRACT

Forests provided a wide range of products and services. In Uganda, a huge proportion of the population lives below the poverty line and is heavily dependent on natural resources such as forests for livelihood support. One of the products obtained from forests is medicine that is gotten from medicinal plants. Despite the acknowledgement of the important role played by medicinal plants in Uganda, especially amongst forest-dependent communities, there is little if any documentation about the availability of medicinal plants in the forests. This study therefore aimed at exploring the availability of medicinal plants among other plant species in Uganda's natural forests. The specific objectives were to: (i) Identify and document the various plant species in Uganda's natural forests that are considered medicinal, (ii) Document the known uses of identified plant species and (iii) Document the local peoples' perspective on the abundance of each identified medicinal plant. This involved utilization of forest inventory data collected using the International Forestry Resources and Institutions methodology. Data analysis focused on extracting data on medicinal plant species in the database and summarizing it using descriptive statistics. The results show that, based on the local peoples' perspective, a number of plant species of medicinal value are available in Uganda's natural forests despite their being less abundant. This calls for mechanisms for their conservation which among others could require a value chains analysis of these medicinal plants in Uganda.

Keywords: Uganda; Value Chains; Medicinal Plants; Local People; Conservation

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Market Chain Analysis of Baobab (*Adansonia digitata* L.) Fruits in Nuba Mountains, Sudan

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ABSTRACT

The overall objective of this study is to obtain insight in the structure and functioning of baobab fruit markets. Specifically, the study objectives were to: (i) identify and describe all chain actors, their characteristics, activities and linkages; (iii) map the market of baobab fruits and assess the benefits distributed between actors; and (v) formulate possible scenarios on how to add more value to baobab fruit and how better to organize its market chain. Purposive sampling technique was employed to select individual stockholders in baobab fruit market chain. Quantitative and qualitative data were collected using participatory methods in 2011/12 season in Rashad locality of Nuba Mountains. The quantative data were analyzed using SPSS and Excel, whilst qualitative data were analyzed using text analysis. The study results showed that the chain actors were collectors, traders, processors and consumers. The baobab fruit marketing channels and constrains for each actor were identified. The study results also explained that the commercialization margins were 10.5%, 25%, and 56% for the collectors, traders and processors, respectively. The study concluded that baobab fruit marketing is financially profitable for the actors in the market chain. The study recommended some scenarios for promoting value addition to baobab fruit and better market organization.

Keywords: Baobab Fruits; Participatory Methods; Value Addition; Market Organization; Sudan

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