Integrating Climate Change in Agribusiness Value Chain Development: Experiences from North-South Partnerships

Conference Track / Type of Submission: Organized Symposia

Submitted by: Prof. Willis Oluoch-Kosura (UNIVERSITY OF NAIROBI)

Chair(s): Willis Oluoch-Kosura (UNIVERSITY OF NAIROBI) Willis.Kosura@gmail.com, Elmar Kulke (HUMBOLDT UNIVERSITY, GERMANY) Elmar.Kulke@geo.hu-berlin.de, Muluken Adamseged (HUMBOLDT UNIVERSITY, GERMANY) Muluken.Adamseged@agrar.hu-berlin.de, Hellen Kamiru (KARATINA UNIVERSITY, KENYA) Hwangech@gmail.com

Abstract

The symposium seeks to engage professionals in Agricultural and Applied Economics in sharing experiences and insights to develop a common understanding on agricultural value chain analysis. Reaching consensus on how to integrate climate change aspects in agricultural value chain research and capacity development in institutions of higher learning will be important. Focusing on horticulture value chains, the symposium will provide a forum to refine, harmonize or contextualize agribusiness curricula in Universities across the world with a view to integrating value chain and climate change aspects in training modules and research.

Primary Topics: Agribusiness Economics & Management, Food & Agricultural Policy Analysis, Rural/Community Development

JEL Codes: Q13 Agricultural Markets and Marketing; Cooperatives; Agribusiness, Q16 Agricultural R&D; Agricultural Technology; Biofuels; Agricultural Extension Services, Q18 Agricultural Policy; Food Policy

Regional Classification: Sub-Saharan Africa

Objectives of the Symposium:

• Show case Value Chain activities through poster presentations
• Share insights and experiences from on-going activities in research, stakeholder consultations,
curriculum review and student exchange in Africa and Europe

• Raise awareness of Value Chain activities to global audience to facilitate feedback

• Obtain stakeholder feedback at professional level on value chain development and climate change integration.

Presentations of the Symposium

1. Overview of the Project
   • Project Background: Prof. Willis Oluoch-Kosura (University of Nairobi) Willis.kosura@gmail.com

   • Developing Understanding on Value chain framework: Prof. Bokelman (HumboldtUniversity,Germany) w.bokelmann@agrar.hu-berlin.de

Wolfgang Bokelman ((HumboldtUniversity,Germany) w.bokelmann@agrar.hu-berlin.de

Abstract
Globalization, urbanization and global environmental changes put increasing pressure on the organisation of Agro-Food Value Chains in developed as well as in developing countries. Once seen and characterized by autonomy and independence of the different actors it got clear that today those value chains are highly interconnected with a large number of complex relationships. These tendencies can be seen as a challenge for rural development and the livelihood situation of rural households. Rural poverty will only be reduced significantly if low-income rural communities engage more successfully with the market. Smallholders must be able to meet market conditions if they are to become relevant players of the system. A value chain framework presented in this paper is helpful because it allows understanding why poor participants currently are not benefiting from their production activities and what can be done to improve the success of this engagement in a comprehensive manner.

2. Curriculum Design and Review

   • Integrating value chain concepts and practices in University curricula:

David Otieno Jakinda (University of Nairobi) jakinda1@yahoo.com; Willis.kosura@gmail.com

Abstract
Agribusiness training holds considerable promise for enhancing the commercial orientation of smallholder farming and related enterprises. However, existing curricula in both developing and developed countries appear to focus on different aspects and generally lack a coordinated linkage with industry practices. In order to harmonize such curricula and make them responsive to the changing stakeholder needs, this study emphasized on demand-driven integration of relevant value chain concepts in the training modules. Various levels of stakeholder engagements were undertaken in Kenya and their insights incorporated in revamping Agribusiness curricula. The main stakeholders consulted included farmers, agri-industry experts, research and training collaborators. The key lessons learnt are that: effective engagement of all levels of stakeholders makes curriculum content reflective of the real challenges facing smallholder agriculture; smallholder farmers show interest in
co-funding education programmes that strengthen their business capacities and enhance market access opportunities; integrating diverse understandings and contexts of climate change in Agribusiness curriculum design improves smallholder farmers’ timeliness of mitigation response mechanisms; and simple locally-contextualized communication materials are important to make Agribusiness training demand-driven from the stakeholders’ point of view. These insights are crucial for ensuring widely acceptable training programmes in Universities and other education institutions that offer Agribusiness education.

The Proposed Masters in Applied Agribusiness Management and Innovations [MAAMI]

Courses to be offered:

- Agribusiness Institutional Arrangements & County Development
- Agribusiness Investment Management & Analysis
- Agribusiness Value Chain Analysis
- Business Leadership, Ethics & Regulation
- Business Research Methods & Report Writing
- Strategic Management in Agribusiness
- International Agribusiness Trade & Stock Markets
- Business Network Development & Management
- Business Innovations
- Procurement & Supply Chain Management
- Customer Care & Business Relationship Management
- Global Consumer Welfare Issues in Food Markets
3. Stakeholder Participation

3.1 Farmer involvement in priority setting in Kenya

Dorcas Jalang'o (University of Nairobi) Jalango88@yahoo.com; David Jakinda Otieno (University of Nairobi) jakindal@yahoo.com; Dennis Etemesi Olumeh (University of Nairobi) etemesideaty@gmail.com

Problem identification with tomato farmers in Taita Taveta
Market assessment with Indigenous vegetable farmers in Siaya
3.2 Stakeholder engagement in value chain and climate change research and training: Experiences from Eastern Ethiopia
Mengitsu Ketema (Haramaya University, Ethiopia) mengistuket@gmail.com, Degye Goshu (Haramaya University Ethiopia) degyeabgos@yahoo.com
Sustainable agricultural value chains minimize adverse effects on climatic conditions through balancing its triple bottom line of social and environmental factors along with economic factors. Agricultural value chains, however, suffer from extreme weather events. These have severe consequences, not only for farmers, but also for all value chain actors. Consequently, problems related to climate change and value chain cannot be tackled by a single entity in the value chain. It is necessary to bring on board all relevant stakeholders to create a common understanding on the problems and strategies for solving them, through research and training. However, choosing stakeholders to be involved is very complex. Creation of stakeholders’ forums and networks for open dialogues on the problem to enable recognition of other stakeholders as legitimate partners is critical. This paper presents practical ways of ensuring collaboration and engagement of stakeholders in value chain research and training for sustainable value chains.

4. Research
4.1 On-going Research
Title: Devolution of Supermarkets in Kenya: But why are smallholder farmers not selling to these outlets?
Dorcas Jalang'o (University of Nairobi) Jalango88@yahoo.com, David Jakinda (University of Nairobi) jakinda1@yahoo.com
Abstract

Supermarket revolution has been considered to be an important driver of agribusiness growth in many developing countries including Kenya. Recent trends show an even rapid expansion of these outlets in the rural areas. However, the smallholder farmers who were expected to benefit from "supermarketization" of rural areas have not considerably taken up the initiative to supply their produce to such outlets. This study investigated the key reasons why devolution of supermarkets seems to be a false promise. Various bottlenecks to smallholder farmer participation in rural supermarkets were identified. These offer relevant insights to development policy on effective value chain integration.

Introduction

Indigenous vegetable production has become an important agribusiness enterprise in Kenya because of their popularity in providing nutritious food; both in the rural and urban households as well as their medicinal value. Production is concentrated in the rural areas and supports a significant proportion of households as a source of income and food. Consequently, there has been an emergence of domestic high value markets for fresh vegetables; the major one being supermarket outlets. In addition, other outlets like hotels, schools and hospitals have rapidly sprung up with an aim of boosting economic and rural development. However, the major challenge experienced is lack of access to these high value markets. Smallholders have not been able to reap the potential income from the sales of their produce.

Research Problem

Supermarket revolution has been considered to be an important driver of agribusiness growth in many developing countries, including Kenya. Recent trends show an even rapid expansion of supermarket outlets in the rural areas. However, the smallholder farmers who are expected to benefit from supplying their produce in these high value markets have not taken up the initiative. As a result, a majority of them have failed to reap potential income from their sales. There exists very little information as to why smallholders do not take their vegetables to supermarkets and the emerging high value markets along the value chain. This study investigated the reasons why smallholders prefer other marketing outlets along the value chain and why ‘supermarketization’ is a false promise for smallholders.

Objectives

The objectives of the study are;

i. To characterize smallholders of indigenous vegetables in rural Kenya
ii. To compare marketing outlets along the indigenous vegetable value chain

Methods
The study conducted a participatory field survey on 150 indigenous vegetable producers in Siaya County. Semi-structured questionnaires were used for conducting interviews with small scale farmers. A focused group discussion was conducted with various actors along the indigenous vegetable value chain, these included representatives of; farmer groups, supermarkets, hospitals, hotels, market vendors, processors and government extension staff.

Findings

Women are observed to have dominated in indigenous vegetable production as an agribusiness enterprise as they constitute of 60% of the farmers. Moreover, out of 70% of the farmers who have embraced indigenous vegetable production as a full-time activity, more than half are women. Almost half of the smallholder farmers are between the ages of 33–47 years of which over 60% are women. The highest level of education obtained by close to 70% of the farmers is primary education of which are mainly women. Most of the farmers rely on their personal savings as their financial source for their farming enterprise. Close to 80% of the farmers own land sizes of between 0.1–2 ha of which 60% are women. Almost 90% of the farmers grow and sell at least two varieties of indigenous vegetables with over 50% of the farmers depending on rain-fed production. The popularity of the vegetables as grown and sold by the farmers is as indicated in Figure 1 below;

![Popularity of vegetables grown and sold](image)

Figure 1: Popularity of vegetables as grown and sold

Generally, indigenous vegetables are widely grown in the area because of their unique taste, medicinal value and they are also a source of food for a majority of the households. In addition, the local weather is conducive for their growth. However, nightshade is the most preferred by the farmers because it has a higher demand in the area, fetches higher prices and has a longer lifespan (6 months). Cowpea is also preferred as it is cheaper to produce as compared to the others.

The traditional marketing system dominates in output supplied as it constitutes of 90% of the vegetables supplied by smallholders. The individual market share of outlets along the value chain is as indicated in Figure 2 below.
The open air market has the largest share because of timely/regular payment from the buyers. The farm gate is also preferred because farmers find the outlet as time saving as most of the buyers collect from the farm. The outlet also is preferred due to familiarity and trust between buyers and farmers. Supermarkets and other emerging high value markets have a lower market share because of their stringent quality requirements, complex contractual arrangements, and delay in payments and they require consistency in supply that smallholders are unable to maintain.

Value addition and preservation activities by the farmers are minimal. However, different actors along the value chain carry out various value addition activities to ensure quality vegetables reach the consumers. Figure 3 illustrates the indigenous vegetable value chain in Siaya County.
Seeds, fertilizer/manure, agrochemicals, credit, extension services

Small scale farmers
Planting, harvesting, cool air drying, cleaning, packaging

Rural brokers
(14.6% output)
Weighing, grading, sorting, packaging, storage

Rural wholesalers (4.5% output)

Rural retailers (1.6% output) Water sprinkling, packaging

Farmer group (2.6% output)
Sorting, weighing, grading, packaging, blanching, storage

Rural Processors
Sorting, weighing, blanching, freeze drying, product development (simshade/simama,)

Open-air markets (38.8% output)
Sorting, weighing, grading, water sprinkling, 

Supermarkets (0.9 % output)
Sorting, weighing, grading, storage,

Hotels (7% output)
Hospitals (0.3% output)
Sorting, weighing, blanching
Conclusion

Smallholder farmers of indigenous vegetables in the rural areas have still been excluded from participating in supermarkets and other emerging high value markets along the value chain. They are far from enjoying the benefits that come with supplying their produce in these prestigious markets. This has been attributed to the strict standards, consistency in supply and complex transactions required by these markets. In order for their inclusion, there is need for smallholders to come up with strategies that would enable them fit, compete, maintain consistency and satisfy the needs of these markets. This trickles down to improving on their production methods and enhancing the quality of their produce as well as having support systems to facilitate their activities.

b) Impacts of climate change on horticultural export production in Kenya

Gilbert Nduru (Karatina University, Kenya) gilnduru@gmail.com

Abstract

Kenya’s horticultural sector (fresh fruit and vegetable production) has received a great deal of attention over the past decade due to the rapid and sustained growth of its exports to Europe. This impressive growth has undoubtedly contributed to increased rural incomes and reduced rural poverty where the horticultural commodities are produced. However, by driving geographic shifts in the suitability and yields of different crop species, climate change affects agricultural patterns and productivity through the occurrence of unfavourable weather conditions, diseases, pests and invasive species. The impacts of climate change on agriculture adds significantly to the development challenges of ensuring food and nutrition security as well as wealth creation. The paper uses the value chain framework to show the possible impacts of Climate change on horticultural export production in Kenya.

4.2 Forthcoming study in the Project

Title: Economics of Climate Change, Production Efficiency and Farm Incomes: the Case of Smallholder French Bean Farmers in Eastern Kenya

Geoffrey Sikei (FEWSNET) goosikei@yahoo.com

Abstract

Several studies have reported that smallholder farmers stand to suffer greater impacts from climate change related problems. In Kenya, smallholder farmers are grieving from the effects of global warming with prolonged droughts and unexpected shift in normal weather patterns, with the globally competitive horticultural sector remaining the most vulnerable to climate risks. Even so, it remains unclear how climate variability affects horticultural value chains emanating from smallholders in Kenya. This study’s seeks to determine the impacts of climate change on smallholder French bean farmers in South Eastern marginal agricultural areas of Kenya. French bean which ranks second after cut flowers in terms of volume and value among export crops is mainly produced by smallholder farmers and it is the most susceptible to climate related shocks. The study’s novelty is the approach integrating the value chain framework in analyzing climate change impacts to the smallholder farmers.
Introduction

Crop production and farm incomes are invariably affected by changes in climate. Several studies note that smallholder farmers will suffer greater impacts from climate change related problems. In Kenya, smallholder farmers are grieving from the effects of global warming with prolonged droughts and unexpected shift in normal weather patterns, with the globally competitive horticultural sector remaining the most vulnerable to climate risks. It is therefore important to have a better understanding of how climate change impacts our production systems so as to contribute such empirical findings directly to the on-going policy debates around climate change and its effects in African agriculture.

Problem Statement

Climate change will continue affecting agricultural and natural systems in many ways. The reliance of this sector on climate-sensitive resources makes it more vulnerable, especially if one considers that about 96 percent of agricultural land is rainfed (Rockström et al., 2004). Crop production and farm incomes are therefore affected by changes in climate. Studies have noted that smallholder farmers will suffer greater impacts from the emerging climate change related problems. One of the sectors most vulnerable to climate variability is the globally competitive horticultural industry in Kenya. The major direct effects of climate change on horticultural production in Kenya are through changes in temperature, precipitation, and length of growing seasons. Specifically, the sensitivity of French beans to high temperatures, rainfall and soil conditions makes it more vulnerable to climatic changes.

French bean (Phaseolus vulgaris L.) is the most important export vegetable in Kenya accounting for over 60 percent of all exported vegetables and about 21 percent by value of the horticultural exports (HCDA 2010; Nderitu et al., 2007a; Monda et al., 2003; Okello et al., 2007; Mwangi et al., 2014), and it ranks second after cut flowers in terms of volume and value among export crops. Katungi et al, (2010) noted that drought is by far the most crucial constraint to bean production in Kenya, with a probability of occurrence estimated at 60 percent in Eastern Kenya. Yield losses due to drought are estimated to be over 40 percent in Eastern Kenya. Farmers are already applying some adaptive responses to cope with the effects of climate change. These strategies are meant to help farmers improve their productivity and efficiency in crop production and therefore farm incomes. Many studies have analysed the impacts of climate change on African agriculture (Mendelsohn and Dinar 2009; Nelson and van der Mensbrugghe 2013; Boko et al., 2007; Muller et al., 2011) with the degree of climate change impacts on agricultural production differing between crops (Challinor et al., 2007; Liu et al.,2008; Schlenker and Lobell, 2010; Thornton et al., 2011) and agricultural systems (Thornton et al., 2010; Cooper et al., 2008). However, none of these studies has taken a look at how climate change affect crop production efficiency, and subsequently household crop income in Kenya. There exist scarcity of literature on how climate change affects production efficiency hence this study will attempt to fill this knowledge gap.

Study objectives

The overall objective of this study will be to determine the effects of climate change on smallholder farmers production efficiency and farm incomes in Eastern Kenya. Specifically, the study will;
i. Determine how changes in climate variables (rainfall and temperature) affect production efficiency of French beans farmers in Eastern Kenya;

ii. Determine the effects of climate variability on crop income;

iii. Determine farmers vulnerability and risks to climate related shocks;

iv. Determine major constraints to adaptation to climate change among smallholder farmers.

**Methodology**

**Analytical framework**

In determining the impacts of climate change on French bean farmers’ production efficiency, the stochastic production frontier model will be adopted, taking into account that production of French beans is subject to large weather variations and other heterogeneous environmental factors (Maruyama et al., 2014). In addition, a fixed effect panel regression model will be employed to understand the effect of climate variability on farm incomes.

**Data needs**

This study will rely on both primary and secondary data sources. A multi-stage sampling procedure is proposed in undertaking primary data collection from households in Two French beans producing counties in Eastern Kenya. Additionally, secondary data on climate variables (temperature and rainfall) will be sought from Kenya Meteorological Department, and from FEWS NET’s climate science unit.