



### **Stellah Mikalitsa Mukhovi PhD**

University of Nairobi, P.O. Box 30197-00100 Nairobi, Kenya  
E-mail: [smmukhovi@uonbi.ac.ke](mailto:smmukhovi@uonbi.ac.ke); [stellah.mukhovi@gmail.com](mailto:stellah.mukhovi@gmail.com)

### **Professional and training background:**

Dr Mukhovi is a human geographer specializing in agricultural geography. She holds a Bachelor of Education (B-Ed), Master of Arts (M.A) and PhD degrees all from University of Nairobi. Her research interests are on household food security, gender and agriculture, rural livelihoods, natural resources management, climate change and agriculture.

Name of University Department and Faculty; University of Nairobi, Faculty of Arts

Position in the Project: Supervisor, PD

### **Abstract**

Socio-ecological Resilience of Food Systems in North West Mount Kenya region, Kenya  
This study is an exploratory survey of the socio-ecological resilience of food systems in Mt. Kenya region. The three food systems under investigation include agro-industrial food systems that produce for international markets (horticulture), regional food systems that produce for regional markets (wheat beef and dairy) and local food production systems that are geared towards self-sufficiency and surplus which is often minimal is sold at the local markets. Food systems, natural environment and social systems are intertwined. Without natural resources such as climate, water, energy, land and soils, food systems cannot thrive. Socio-ecological resilience exists when both socio-economic and ecological systems have the ability to maintain their core functions to achieve sustainability. Resilience measures the amount of change a system (ecological or social) can undergo and still retain its function and structure, the degree to which the system is capable of self-organization and its ability to build and increase its capacity

for learning and adaptation (Folke et al., 2010; Cabell and Oelofse, 2012). For the purpose of this study resilience is defined as the capacity of socio-ecological system to withstand, cope with and recover quickly from disturbance and disasters (both natural and anthropogenic) as well as to learn and adapt. Resilience is important for reducing vulnerability and enhancing sustainability and therefore a necessary step to achieving sustainable development. This study will provide the much needed scientific data and understanding of the vulnerabilities of food system, social interactions that support food systems, buffer capacity, self-organization, environmental stewardship, household social learning strategies and adaptive capacities and strategies. This will provide critical science based information that will be important in formulation and realigning of policies that can enhance food systems sustainability. The study will sample households from local food system, horticultural farms, and wheat, dairy and beef ranches and pastoralists in north western Mt. Kenya region in the counties of Meru and Laikipia. Questionnaires, interviews, observation and focus group discussions will be used as sources of data. Qualitative data will be subjected to content analysis while quantitative data will subjected to descriptive analysis.

Dr. Mukhovi is a visiting Researcher at International Cooperation Centre for Agricultural Education (ICCAE) at Nagoya University, Japan

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**Professor Elias, H.O. Ayiemba**

Department of Geography and Environmental Studies,  
Faculty of Arts, University of Nairobi,  
P.O. Box 30197-00100, Nairobi, Kenya.

Email : [Olayiemba@yahoo.com](mailto:Olayiemba@yahoo.com) / [ehoayiemba@uonbi.ac.ke](mailto:ehoayiemba@uonbi.ac.ke)

Professor Elias H.O.Ayiemba is a renowned Population Geographer and Demographer. He is currently Professor of Geography in the Department of Geography and Environmental Studies, University of Nairobi, Kenya. He is also, the current representative of the entire College of Humanities and Social Sciences in the Board of Postgraduate Studies, University of Nairobi. His research interests are broad embracing population impact on the environment, sustainable development issues, and Occupational Health and Safety (OHS). He has published widely on population and related issues.

Position in the Project: Supervisor

Name of M.A student: Antony Ogolla

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**Dr. Salome Bukachi**

Senior Research Fellow

Institute of Anthropology, Gender and African Studies

P. O. Box 30197, 00100

Nairobi

Email: [sallybukachi@yahoo.com](mailto:sallybukachi@yahoo.com) / [salome.bukachi@uonbi.ac.ke](mailto:salome.bukachi@uonbi.ac.ke)

Salome has over 10 years research and teaching experience. The courses she teaches includes nutritional anthropology, cultural anthropology, among others. Her current areas of interest entail looking at social and behavioral aspects of human and animal health, agriculture, and gender issues.

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**Stephen O. Otieno**

Department of Geography & Environmental Studies  
Faculty of Arts  
University of Nairobi  
P.O Box 30197-00100 Nairobi, Kenya  
Email: otienostiv@gmail.com  
Skype: scotlene

### **Supervisors:**

Dr. Stella Mukhovi – University of Nairobi.  
Prof. Chinwe Ifejika Speranza – University of Bern.  
Dr. Alex Awiti – Aga Khan University.

PhD Research Title: **Environmental Performance of Food Systems and their impact on Food Sustainability in Northwest Mt. Kenya.**

### **Brief professional and training background**

Stephen Otieno holds a Masters degree in Environmental Planning & Management from the University of Nairobi, and a Bachelors degree in Urban & Regional Planning from the same institution. He joins the project from the East African Institute of the Aga Khan University where he has been working as a research fellow coordinating the implementation of an Urban Food Systems project in East Africa. The project seeks to address one overriding issue: feeding people living in cities while minimizing the ecological footprint of their food procurement systems.

PhD Research Title: Environmental Performance of Food Systems and their impact on Food Sustainability in Northwest Mt. Kenya.

### **Background and Context**

Food sustainability and environmental performance are intrinsically linked but complex phenomena. Food systems have been conceived of as a set of activities ranging from production through to consumption i.e. from planting seeds through to disposing of household waste (Ericksen, 2008). The term environmental performance refers to the environmental results that are achieved whenever the environmental aspects of activities, processes, products, services, systems, and organizations are managed and controlled (Srebotnjak, 2006). Research studies such as those conducted by Tilman et al, (2001) and De Fries et al, (2004), have shown that food systems contribute significantly to global environmental change. Global environmental change encompasses changes in the bio-geophysical environment, which may be due to natural processes and/or human activities. These changes may manifest at the global scale or they may occur locally but be so widespread to constitute a global phenomenon (GECAFS, 2005). Such changes include land-use change which have advertently driven changes in biodiversity, surface and subsurface hydrology and changes in nutrient cycles and increased emission of greenhouse gases through food system processes. The environmental performance of co-existing food systems are necessary to assesses the impacts of those food system activities against specified objectives of environmental quality and resource use efficiency.

In developing countries where the demand for food outstrips its supply, the gravity of these environmental challenges is evident where forests and woodlands have been cleared for agricultural production which usually takes place on degraded soils and landscapes. Kenya for example has about 13 percent of arable land and 75 percent of its workforce engaged in agricultural related activities ranging from production to consumption. Kenyan farmers face growing problems of soil erosion, deforestation, water pollution, and desertification (FSD, 2015). This study aims to assess the environmental performance of three food systems that co-exist in the Northwestern region of Mt. Kenya namely, agro-industrial, regional, and local food systems. It seeks to analyze the environmental performance of food system activities associated with production, processing, distribution and retailing of one food produce identified in each of the food systems. The study has identified water, greenhouse gas emissions and waste as the environmental indicators against which the environmental performance will be measured. The specific parameters of indicators to be analyzed are; the sources and quantity of water used, amount of greenhouse gases emitted, and quantity of waste generated per functional unit, at each stage of the food system.

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**Veronica Wambui Mwangi,**

University of Nairobi,  
Department of Geography and Environmental Studies,  
P.O Box 30197, 00100  
NAIROBI, KENYA  
Position in the project: PhD researcher WP3

**Supervisors:**

Dr. B. Kiteme, CETRAD  
Dr. S. Owuor (University of Nairobi)

**ABSTRACT:**

A value chain analysis of wheat, beef and dairy in North West Mt. Kenya and their effects on food security, poverty and inequality.

The primary goal of food systems is to provide food security. Additionally, food systems provide the means of livelihood for a majority of the rural population particularly, in the developing countries. However, food systems are now threatened by a myriad of challenges that impair their ability to guarantee food security, environmental as well as social welfare. A growing population, increased urbanization, changing consumption patterns are among the issues that continue to put a lot of pressure on our food systems threatening their sustainability.

Given these challenges, this calls for a reassessment of our food systems with the aim of establishing intervention points that could be used to improve their sustainability in terms of their contribution to food security, environmental and social welfare. To achieve this, this study has identified three food value chains (wheat, beef and dairy) that are key in the regional food system in North West Mt. Kenya as case studies. Using value chain analysis this research will look at the all activities in the value chain; production, processing, distribution, retailing, consumption with the objective of establishing how each of these activities that form the value chain contribute to food security, reduction of poverty and inequality for all actors.

Consequently, the results obtained can be used to inform policy decisions and interventions on ways of improving the returns from these activities in order to improve food security and reduce poverty and inequality.

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**Mariah Ngutu Peter**

Email address: [mariahngutu@gmail.com](mailto:mariahngutu@gmail.com), [mngutu@students.uonbi.ac.ke](mailto:mngutu@students.uonbi.ac.ke)

**Supervisors:** Dr. Salome Bukachi and Dr Charles Olungah

PhD (Anthropology) student, University of Nairobi (UoN), Institute of Anthropology, Gender and African Studies (IAGAS); Master of Arts (Anthropology), UoN; Bachelor of Arts (Anthropology), UoN.

Mariah Ngutu is carrying out an anthropological study on commercial horticulture as part of an agro-industrial food system in Laikipia County, North West of Mount Kenya. The study aims at generating knowledge on the actor perceptions, involvement and inter-linkages with other local food systems, as well as the major institutional transformation that have taken place in this food system. These findings will contribute social anthropological perspectives to inform future research on food systems as well as the on-going efforts to resolve the global food crisis.

### **Abstract**

**Title: An anthropological study of commercial horticulture as part of an agro industrial food system in Laikipia County, North West of Mount Kenya**

Commercial horticulture in Kenya forms part of an agro industrial food system driven by multinational interests and involves large scale production of flowers, vegetables and fruits with Europe as the destination market. The production and market demand has increased steadily causing the sector to spread beyond the mountainous high yielding areas into arid zones as in the case of Laikipia County, northwest of Mount Kenya. Kenya, like many other SSA countries depends on agriculture as its mainstay yet has in the recent years, especially from 2008 onwards, been facing major food insecurity problems (GOK, 2011). According to the 2014 food and nutrition security analysis, 80 per cent of households in Laikipia County do not have adequate food to meet their dietary needs a reflection of the on-going global food crisis despite the booming horticulture production in the region . From the new institutionalism and political ecology perspective, the global food crisis is not a natural one but the result of problems arising from access, distribution and utilization of common pool resources for the production of food. Arid zones are characterized by poor rainfall, frequent dry spells and hence prone to common pool resource contestation including land and water. The implication of practicing horticulture in an arid zone may affect the involved actors' access to land and other common pool resources of importance in fixing the shortcoming of horticulture for the local food systems and hence result in food insecurity. An analysis of existing food systems is necessary as it will provide a basis for finding ways to tackle the food crisis. The present study of commercial horticulture responds to this by exploring the food system. It will describe institutional settings, food activities and related processes, power relations of the different involved actors, co –existence of horticulture alongside other food systems and the impact of this on the use of land, water and the production of food from a new institutionalism perspective.

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