Developing Sustainable Food Systems, Policies, and Securities

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IGI Global
PUBLISHER of TIMELY KNOWLEDGE

A volume in the Practice, Progress, and Proficiency in Sustainability (PPPS) Book Series

Published in the United States of America by
IGI Global
Engineering Science Reference (an imprint of IGI Global)
701 E. Chocolate Avenue
Hershey PA, USA 17033
Tel: 717-533-8845
Fax: 717-533-8661
E-mail: cust@igi-global.com
Web site: http://www.igi-global.com

Library of Congress Cataloging-in-Publication Data

Names: Obayelu, Abiodun Elijah, editor. | Obayelu, Oluwakemi Adeola, editor.
Title: Developing sustainable food systems, policies, and securities / Abiodun Elijah Obayelu and Oluwakemi Adeola Obayelu, editors.
Description: Hershey, PA : Engineering Science Reference, 2020. | Includes bibliographical references and index. | Summary: "This book provides multidisciplinary perspectives on how to develop sustainable food systems, policies, and securities"--Provided by publisher".
Identifiers: LCCN 2019042056 (print) | LCCN 2019042057 (ebook) | ISBN 9781799825999 (h/c) | ISBN 9781799826002 (s/c) | ISBN 9781799826019 (eISBN)
Subjects: LCSH: Sustainable agriculture--Nigeria. | Food security--Nigeria. | Women in agriculture--Nigeria. | Land use, Rural--Developing countries.
Classification: LCC S473.N5 D48 2020 (print) | LCC S473.N5 (ebook) | DDC 333.76/1609669--dc23
LC record available at https://lccn.loc.gov/2019042056
LC ebook record available at https://lccn.loc.gov/2019042057

This book is published in the IGI Global book series Practice, Progress, and Proficiency in Sustainability (PPPS) (ISSN: 2330-3271; eISSN: 2330-328X)

British Cataloguing in Publication Data
A Cataloguing in Publication record for this book is available from the British Library.

All work contributed to this book is new, previously-unpublished material. The views expressed in this book are those of the authors, but not necessarily of the publisher.

For electronic access to this publication, please contact: eresources@igi-global.com.

Practice, Progress, and Proficiency in Sustainability (PPPS) Book Series

Ayman Batisha
International Sustainability Institute, Egypt

ISSN:2330-3271
EISSN:2330-328X

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Table of Contents

Section 5
Gender and Its Implications on Sustainable Food Systems and Food Security

Section 6
Migration, Remittances, and Food Security

Detailed Table of Contents

The world has understood that hunger is one of the most dangerous problems for the future. Accordingly, food security and sustainability are both important issues through sustainable development. This chapter highlights the role of seafood security and sustainability for sustainable development. In this context, seafood security and sustainability for Turkish seafood market was investigated. Turkey is a coastal country, which has accepted 2030 Sustainable Development Goals, with a seafood market and a good sample to investigate seafood sustainability. This study employed secondary data from TURKSTAT and FAO websites to determine Turkish seafood market profile. The study determined seafood security and sustainability based on five dimensions as availability, economic access, physical access, utilization, and stabilization. Seafood sustainability is vital for coastal countries because seafood market brings economic, social, and environmental benefits at the same time.

Section 2
Food Policy and Agricultural Systems

This chapter analyzes the implications of urban sustainable growth, development, and governance structures for the revitalization of open vacant spaces in agriculture and farming. After reviewing the extensive corpus of literature on the subject, the authors used the critical socio-ecological analysis methodology to determine the main issues, trends, practices, and implications of the urban vacant spaces in relation to the urban sustainable growth and development, the use of urban vacant land in urban agriculture, farming, and gardening, and the collaborative urban governance structures and revitalization of open vacant spaces. It is concluded that transitional use of vacant land and parcels are to be used and utilized for developing a sustainable green city. However, urban vacant land and parcel spaces are required to be utilized for revitalization purposes to be stimulated. Social-ecological analysis focusing on vacant lots in underdeveloped urban spaces hold potential for urban transformation to meet the social needs and improve the ecological services.

The contemporary food system, in its global and local dimensions, is a central element of the debate on the sustainability of the planet, a debate that increasingly involves more stakeholders and areas of knowledge in the search for answers to the multiple questions related to the attainment of more sustainable patterns for food and agriculture. The present chapter analyses the participative multi-stakeholder and multilevel model of food governance of the Community of Portuguese Speaking Countries (CPLP), in which stakeholders from different societal and expertise sectors participate in equal manners in the process of co-construction of institutional, technical, and financing measures for the functioning of a given food system. The present chapter has the main goal of sharing and critically analysing the CPLP´s institutional context for the promotion of sustainable food systems as an example of an integrated methodological approach to support the creation of coordinated public policies and institutional conditions to implement a transition to more sustainable food systems and diets.

Using the dichotomous choice contingent valuation method, this chapter helps shed light on the potential for marker-based insurance schemes in Vietnam by empirically exploring the demand for minimum price insurance among rice households. The study showed that the majority of rice farmers accepted the guaranteed price of VND 4,500 per kg, and their accepted insurance fee was about 13% of the guaranteed price and 30% of the break-even price. Farmers growing rice under a monoculture system were less likely to pay for the proposed insurance service, while those with access to any formal credits were more likely to pay for it.

Section 3
Agricultural Resource Management and Management of Food Resources

This chapter investigates how land-use/land-cover (LULC) changes under different scenarios will affect ecosystem services provisions in Nigeria using multiple data sources. The Markov and dynamics of land system models were integrated to predict future LULC changes while the value transfer methodology was adopted to evaluate the economic value of ecosystem services. The results revealed varying patterns and trends of LULC change under the baseline, forest protection priority, and sustainable economic growth scenarios. Based on the predicted LULC change, the total ecosystem services value in Nigeria will decline under the baseline and forest protection priority scenarios but increase in the sustainable economic growth scenario. The sustainable economic growth scenario showed major positive impacts on the ecosystem service functions of recreation, climate regulation, soil formation, and erosion control. This study concludes that the sustainable economic growth scenario is the best to ensure expected production while safeguarding the environment in Nigeria.

Land is one of the most valuable assets required for agricultural production. In Africa, smallholder agricultural producers are faced with a lot of challenges that have highly impacted on productivity and sustainable food systems. The global demand for agricultural land for food and bio-fuel production has increasingly led to the emergence of land grabbing after the 2007-08 food price crisis. The rural poor are the victim of land grabbing as they are faced with declining farmlands, low income generation, and loss of livelihood activities. These have affected the food security status of the rural poor as farmlands are taken from them. The proponents of land grabbing revealed that developing countries are expected to benefit from investments inflow on grabbed land, development of infrastructure, increased income generation, and job creation. They argue that investment in agriculture is necessary to stimulate agricultural production; however, this situation has brought negative effects as most investors failed to keep their end of the transaction on land acquisition deals.

Section 4
Management of Agricultural Value Chain Development

The study investigated trends in rice grain and cassava tuber value addition through processing. Among the staple foods in Nigeria, rice and cassava have gained special prominence and priority attention by the government in terms of their production and value addition. The result indicated that the rice and cassava value chain is affected by different policy regimes. It was also found that women in the north central of Nigeria participated actively in rice and cassava value addition with some challenges. It is recommended that women processors of these commodities should have access to productive resources that can help add value to these commodities, training women on improved value added technologies and innovations by both public and private organizations, and most importantly, making these innovations and technologies affordable, adoptable, and adaptable will go a long way to boost their value added on these commodities through processing.

The study assessed training needs of palm oil processors in Ogun State, Nigeria. A well-structured questionnaire was used to elicit information from 90 palm oil processors. The data was analyzed using both descriptive and inferential statistics. Majority of the respondents were young, married, and experienced in palm oil processing. Women are mostly involved in palm oil processing using manual method of processing with oil palm fruits sourced more from family farms. Respondents require training for manual

and mechanized processing methods. Socioeconomic factors have significant influence on different stages of palm oil processing. Poor extension service, high cost of labour, and processing machine were the most perceived constraints to palm oil processing in the study area. The study therefore concludes that there is need for training in oil palm processing. Extension service providers should intensify efforts in this regard so as to boost the palm oil supply both within and outside the country.

Section 5
Gender and Its Implications on Sustainable Food Systems and Food Security

The dominance of men in decision-making processes and leadership positions within the communities has made land allocation, land use, and control skewed in favour of men. This study examined the effects of women's land rights on households' food security status using a sample of 300 representative farmers. Descriptive statistics, household food expenditure, logistic regression, and ordered logit models were the analytical tools used. Results revealed that about 35% of the rural women farmers had land use rights while the remaining 65% had land ownership rights. Women with ownership rights were more food secure, with the majority of the women having residual rights, while only a few had sell rights. Secure women land rights are germane to achieving and sustaining household and national food security. Strategies and instruments for protecting women rights should be developed and implemented, while efforts geared towards designing strategies, assessing multiple dimensions of women empowerment for improved food security status, and welfare of the households should be intensified.

Over the past decades, the food systems in developing countries have transformed rapidly. However, the rise in social inequalities has negatively affected, the vulnerable groups as the benefits associated with these transformations are still skewed. This chapter examined the role of gender inclusiveness in promoting sustainable food systems. Employment trends revealed that agricultural employment was higher among males. Five asymmetries (assets, access to agricultural market, access to technology, resilience and risks, and decision making) were identified as limitations to sustainable food systems stemming from the gender differentiated roles. The gender action learning system methodology was adopted using strategies such as empowering men and women through community action learning during catalyst workshops, gender mainstreaming for innovation and institutional change at organizational level, and through advocacy network for policy improvement at the national level. The study concluded that gender inclusion played a crucial role in achieving sustainable food systems.

Section 6
Migration, Remittances, and Food Security

Foreign remittance has remained a major source of income and a means to reduce hunger for many poor people in developing countries. The contribution of foreign remittances to food insecurity status of rural households in Nigeria was assessed using data from 2015/2016 Living Standard Measurement Study-Integrated Surveys on Agriculture (LSMS-ISA). Food insecurity status was achieved using the household food insecurity access scale. Data were analysed using descriptive, ordered, and nested logit models. Female-headed households residing in south-east zone with 51 to 70 years old heads and more than six members had greater access to remittances but were severely food insecure. Drivers of food insecurity were age, gender, marital status, education of the household head, membership of cooperatives, access to extension, farm size and per capita income, and living in the north central geo-political zone. Foreign remittances had a positive effect on the food insecurity status of rural households.

The study examined the impact of rural-urban migration on the food consumption pattern of farming households. The study revealed that 73.8% of the households had migrants, while 80.2% of the migrants were male. The highest level of education of most of the migrants was secondary school (71.4%). The study showed that the major reason (63.3%) for migration was for job. The average remittance sent per year was ₦108,119.14. The study revealed that household expenditure on carbohydrate food group accounted for 54.4% of the total households' expenditure on food. The average dietary diversity indices for the migrant (0.345) and non-migrant (0.346) households were low. The study revealed that migration (short and long term) positively influenced per capita food expenditure of respondent. Despite the remittance from some of the migrants, the need to develop the rural areas in terms of provision of basic infrastructures by government is imperative in order to reduce rural-urban migration.

Foreword

Food is one of the basic needs of mankind and access to the right quantity and quality of food at the right time on a sustained basis continues to be a major challenge for majority of the world's population. In-spite of rapid advances in technology and technical knowhow in the past several decades, this challenge of hunger and malnutrition has continued to linger. This problem is compounded by the advent of climate change and the growing incidence of unsustainable land use practices, especially across the African continent, which threatens the long-term stability of the environment, with potentially serious long-term food insecurity implications on vulnerable populations.

The question is: How can the nations of the world substantially mitigate this lingering threat of hunger and malnutrition in the coming decade? In addressing this question, we must first understand that food security is a product of sustainable food systems. Thus, appropriate agricultural and food policies must be put into place to drive the emergence of sustainable food systems across the globe, if the global threat of hunger and malnutrition is to be substantially mitigated.

This book titled "Developing Sustainable Food Systems, Policies and Securities" is unique and timely, as it provides a one-stop shop for the most important considerations in understanding the link between food security, sustainable food systems and food policies. The various chapter contributions are original, well thought out, informative, illuminating and incisive.

The book provides a framework for the creation, exploration, or transformation of food systems that will provide solutions to food insecurity challenges through appropriate food policy regimes. It provides an insight into how land use management policies and strategies can help improve agricultural productivity, while minimizing the opening up of new lands and conserving natural ecosystems.

The book extensively explores the difficult question of how to create the enabling policy environment needed to support the development of sustainable food systems, that will in turn guarantee food security. It provides useful insights into how sustainable economic growth policies could help ensure increased agricultural sector output while simultaneously preserving the environment. Furthermore, the book explores the effects of large-scale land acquisition in Sub-Saharan Africa on the local agri-food systems and the implications of emerging land resource utilization patterns for food security and poverty reduction among the vulnerable local populations.

In addition, contributors highlight the importance of gender inclusiveness in achieving sustainable food systems and identifies specific areas of gender asymmetries and key actions required to bridge gender gap so as to achieve sustainable food systems. It advocates the development of gender responsive policies that will factor in gender-specific responsibilities, constraints and resources in agricultural development programmes, recognize and protect women's land ownership rights, and in the long-term ensure that women and men's priorities and needs are reflected at all levels of policy formulation and programme implementation.

In-spite of the numerous challenges faced by farmers in carrying out post-harvest activities, there are opportunities to encourage them in the promotion of value addition to these commodities through equitable and sustainable policies affecting the processing and value addition of these commodities. This book provides some important insights into areas within the agro-processing sector that requires specific policy focus with the aim of achieving food security among rural and urban households.

This book will be an invaluable text for students of agricultural economics and economics in Universities in Nigeria, Africa and other continents of the world. Policy making agencies, planners, consultants, policy researchers, and those interested in issues related to food security and sustainable food systems will also find this book very informative, interesting and useful. I therefore strongly recommend this book for the above-mentioned audience and all other persons that are interested in understanding how appropriate agri-food polices can help to mitigate the threats of food insecurity through the creation of sustainable food systems.

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Adebayo B. Aromolaran *is a Professor of Agricultural & Development Economics and the current Dean of the Faculty of Agriculture, Adekunle Ajasin University, Akungba, Akoko, Ondo State. He is currently, the Country Coordinator for Agricultural Policy Research in Africa (APRA) Workstream 1 Research Project on Agricultural Commercialisation in Nigeria. He obtained his PhD (Agric Economics) from the University of Ibadan, Nigeria (1993) and was appointed Rockefeller Postdoctoral Research Fellow on "Economics of the Family" at Economic Growth Center, Yale University (2001–2003). In 2009, Professor Aromolaran won the UMA LELE award of the International Association of Agricultural Economists (IAAE) for the "Best Contributed Paper on Gender", at the association's 27th Triennial Conference in Bejing, China. The paper titled: "Does Increase in Women Income Relative to Men's Income increase calorie intake among poor households? Evidence from Nigeria" was subsequently Published in Agricultural Economics 41: 239–249, (2010). His primary areas of research are food security, nutrition economics and household economics. He has published in several widely circulating Journals some of which are Food Policy, Oxford Development Studies, Agricultural Economics, International Journal of Development Issues, Food Security Journal, International Economic Journal, African Journal of Agric Resources, African Development Review, Journal of Sustainable Agriculture, Outlook on Agriculture etc. Prof. Aromolaran is a member of the Agricultural and Applied Economic Association (AAEA), Nigerian Association of Agricultural Economists, Farm Management Association of Nigeria, International Association of Agricultural Economics (IAAE), and Nigerian Economic Society (NES). He was Scientific Adviser for the International Foundation of Science (IFS), Stockholm, Sweden (2004– 2010) and the African Institute for Applied Economics (AIAE), Enugu, Nigeria (2010 to 2013). In terms of community engagement and consultancy services, he has worked on several "agricultural development projects" funded by several international organizations as Consultant: UNDP, FAO, World Bank, UNEP, Forum for Agricultural Research in Africa (FARA), USAID, DFID, IFPRI, and UNICEF.*

Preface

INTRODUCTION

The concept of food system is gaining more prominence in recent years amongst both scholars and policymakers because despite the growth in the world food production, a lot of people (more than 800 million) are still chronically malnourished (FAO, 2017). Developing a sustainable food systems can therefore help to find solutions that will provide the world's growing population with a sufficient supply of healthy food within the environmental limits. Sustainable food system is a prism of the present and the future challenges for nutrition, health, sustainable development, community and economic development. It has often been a subject of discussion in nutrition, food, health, community economic development and agriculture. Developing sustainable food system (SFS) is very crucial, though a tough nut to crack, to correcting the world food system's failure. It involves a collaborative network that integrates food production, processing, distribution, consumption and waste management but it remains difficult to engage all these sectors in joint policy actions. The SFS is necessary to achieve Sustainable Development Goal (SDG) 2, which focuses explicitly on food by seeking to "end hunger, achieve food security and improved nutrition and promote sustainable agriculture" by 2030. The SDG 2 is a multiple of other goals that are related to challenges in the food system. SDG 1 focuses on poverty reduction, where agriculture and food has a key role to play. Sustainable agriculture plays a central role in achieving SDG 6 on water, SDG 12 on sustainable consumption and production, SDG 13 on climate change adaptation and mitigation and SDG 15 on land use and ecosystems. Food systems are at the heart of achieving these goals.

Information on policies that would enhance productivity and sustainability of individual agricultural sector is very important but literature is practically devoid of these information and experiences from countries and communities, with respect to comprehensive approach (cross-sectoral policies) to SFS. Hence, this book on "Developing Sustainable Food Systems, Policies and Securities". This book is believed to be the first effort to fill this gap, providing information on proven options for enhancing SFS and how to identify opportunities and actions for exploiting cross-sectoral synergies. The book is a collection of research studies that guide the development of sustainable food systems in practice through an integrated food policy. It explores the nature, extent, and causes of nutrition problems as well as the role that agricultural policy plays on sustainable food systems, in order to tackle food insecurity challenge. This book takes a transdisciplinary approach and considers multi-sectoral actions, integrating health, agriculture, environment, economy, and socio-cultural issues to comprehensively explore develop food systems that is sustainable. Consideration is given to the multi-dimensional nature of food systems, policy, gender and a broader range of scientific topics. Featuring research on topics such as food security, carbon emissions, and nutrition. While the eating patterns are important for building sustainable food and agricultural systems, the development of agricultural and food systems must take into account actions and policies aimed at making food systems more sustainable.

REASONS WHY COUNTRIES IN THE WORLD MUST CHANGE THEIR CURRENT FOOD SYSTEMS

Food systems are experiencing rapid and intense transformations, having to feed a growing global population in a context of persisting economic, environmental and social challenges. Global food is clearly insecure and global food system appears to be approaching its environmental limits. The global food system is escalating environmental challenges through deforestation, pollution, soil degradation, biodiversity erosion, diminishing freshwater resources and greenhouse gas emissions with more than 820 million people facing food insecurity and undernutrition, 672 million people suffering from obesity and 1.3 billion are overweight. Agricultural production and rural livelihoods are being increasingly jeopardized by the impact of climate change and continuing depletion of natural resources (FAO, 2019). This is further exacerbated by challenges such as price volatility, conflicts, crises and migration. Addressing these complex challenges requires integrated and context-specific solutions. The way food is produced, transformed, distributed and consumed are all failing in terms of livelihoods, human health and the environment. A sustainable food system will ensure the production and consumption of sufficiently varied diets containing the right micronutrients (vitamins and minerals) and the fundamental elements of a sustainable food future. Many countries do not produce enough food to feed everyone making such countries to depend on cheap food imports, which works as a quick fix to their food deficit, but does not address the low agricultural productivity that keeps the deficit in place. Studies have established that the challenges countries in the world are facing can be linked to the current food systems. These include excessive tillage of arable land leading to degrading soils, greater release of carbon and locking farmers into unprofitable production systems. People are also eating less diversified diets than before because varieties of food are probably not affordable due to high prices with fewer production by fewer hands. Owing to increasing population and food need, there is the prospect of developing food systems that are sustainable by going on greening of agriculture (increasing use of farming practices and technologies that simultaneously).

Many countries are suffering from pastoral conflict where arable farmers and pastoralists compete between and among themselves for the same natural resources, such as water, fuelwood and fertile land results in a further decline of the ecological resilience of the system and increases tensions and violence which in turn decrease the willingness to invest and food insecurity. Lack of policy formulation or implementation to control the situation serves as a constraint to agricultural productivity, which affects food security and nutrition of the affected countries.

THE CHALLENGES OF FOOD SYSTEMS AND TRANSITIONS TO SUSTAINABILITY WITHOUT CONFRONTATIONS

Today, agriculture stands at a crossroads. There are renewed calls virtually in all the countries for a change in the way food is produced and distributed if the poor and hungry are to be served better and if the world is to cope with a growing population and climate change. Both the conventional and traditional food systems generate substantial pressure on the environment and are currently hard-pressed to meet the food and nutrition requirements of millions of vulnerable people. The cost of externalities caused by current agricultural practices, include those from use of inputs such as pesticides and fertilisers, pollution of waterways and emissions from farm machinery and food-related transport. Expansion of

agricultural land at the expense of forests are also enormous. As a result, the challenge for governments is to implement policies that promote not only improved productivity, but also ensure food quality and safety along the value chain.

Food systems that are sustainable are tremendously relevant to growing food security. Large companies are strongly influencing the food system by coming with big supermarkets and food shopping complexes, which harms small and local food systems. Traditional (subsistence) smallholder agriculture is prominent in most developing countries, with limited or no use of off-farm inputs and attendant low productivity, low value added per worker and primarily reliant on extracting soil nutrients with insufficient replenishment by either organic or inorganic fertilisers. The current food system is also susceptible to yield losses due to erratic rainfall, pest and weed infestations and other production related risks, characterized with release of huge amounts of greenhouse gas (GHG) and other toxic pollutants. Degradation of the environment and the natural resources delivers low-cost food at a high cost to the environment is unsustainable owing to the increasing stress on ecosystems. This could jeopardise the achievement of sustainable food systems if a more comprehensive and integrated approach is not factored into the policy actions.

Furthermore, the current traditional food system has limited scope for capital intensive, farm mechanisation and intensive use of agrochemical inputs. Many smallholders' plots, predominantly located in developing countries, are too small to realise the economies of scale required for most of the available commercial farm machinery. In addition, the high cost of purchased inputs, such as chemical fertilisers, pesticides and seeds, generally require that at least some portion of the crops produced must be sold to recover costs. Although, most countries have policies targeted to different components of the food systems to ensure food security, but these policies are typically made in isolation with no specific food plans and strategies that bring them together. Hence, a sustainable food system does not operate in silos but in interconnection of "everything and everybody that influences, and is influenced by all activities involved in bringing food from farm to fork and beyond (Hawkes & Parsons, 2019). In developing sustainable food systems, policymakers and donors must recognize that an important way to support food processing is through increased crop productivity, innovation and technology transfer. Transition to sustainable food systems will require moving from an agriculture-centered to a food systems policy and research framework. In doing that, there is a need to be able to account for and measure externalities produced by these processes. Policies are also needed to increase incentives (and decrease disincentives) for availability, access, and consumption of diverse, nutritious and safe foods through environmentally sustainable production, trade, and distribution. It is therefore not feasible to fix the food system with a few partial measures.

To overcome these challenges, it is important that all actors from input supply to consumers and policy makers see the need for changes and work together to find practical solutions. Development of sustainable food systems should shift from an exclusive focus on boosting production but has its focus on eradicating poverty, increasing resilience, ensuring people's food and nutrition security, promoting good nutrition and health, reducing inequalities, contributing to peace, promoting political stability, regenerating ecosystems, and mitigating climate change.

KNOWLEDGE GAPS IN RESEARCH FROM FOOD SYSTEMS LITERATURE

There is no doubt that there is a growing body of research in food systems literature on the possible ways of transition to sustainable food systems considering the contemporary social, political, health,

demographic (growing population) and environmental changes e.g. climate change, resource depletion, biodiversity loss) in recent time. In the course of preparing this book, we identified some knowledge gaps. First, a "whole food systems" approach is still limited in the body of research that makes reference to sustainability transition in food systems in line the findings of Markard Markard, Raven, and Truffer (2012). Second, lack of attitudinal change in embracing gender mainstreaming into the sustainable food systems framework in many countries limits its success. Third, there is a dearth of enough work on how consumer behaviour can be changed towards healthier diets, reduction in food waste and loss. Fourth, there is a paucity of information on what it takes to make agriculture an attractive investment to youths and what the future investment models for agricultural research and development should be, in order to ensure that investments are motivated by facts and priority needs rather than political interests. Fifth, there is still a lack of an operational approach that enables a diagnosis in a given country or region about what are the (a) various dominant food systems (b) inventory of the traditional and modern systems considering the merits and demerits in both cases and (c) the alternatives to dominant ones that may harbour promising innovations for improving or changing unsustainable systems and create new contexts of opportunities for a transition process. Getting all these done will be useful to inform research on transitions to sustainable food system, as well as for policy makers to guide agricultural investments and see how they can orient their innovation policies to support desired transition pathways and respond to any unsustainable dominant food systems.

JUSTIFICATION OF THE BOOK

Food systems are at the heart of many of the major challenges facing the world today because they affect people, and challenges of food systems are the product of many different policies. Real solutions to food systems challenges therefore require an enhanced role of food policy (Hawkes & Parsons, 2019). Sustainable food system is not just about the availability of food, but also about affordability and the preferences (often driven by policy or other incentives) that influence people's access to that food. The focus in recent time has been shifted from activities within the food production system (production, transport, processing) to the outcomes of those activities in the form of the consumption. Because access to affordable, healthy and diverse food depends not only on production but also on factors outside the food production system, a broader approach is required when analysing the impact of policy interventions aimed at enhancing food security. Based on the growing awareness and increase focus on sustainable food systems view as the best to overcome the world's food and nutrition security, this book on 'Developing Sustainable Food Systems, Policies and Securities' presents some major challenges and opportunities in transition from the current traditional food and agricultural systems to a green agriculture; identifies knowledge gaps between food systems, policies and securities; and create a coherent narrative for the necessary sustainability transition.

The book is necessitated to bring together research findings that provide potential solutions to the problems in the development of sustainable food systems and securities as well as agricultural and food policy as the world is bracing up for hard-choice challenges and potentially massive trade-offs around issues related to food and nutrition security in the coming decades. The book is essential for tackling pockets of food and nutrition insecurity; pastoral conflict where arable farmers and pastoralists compete between and among themselves for the same natural resources, such as water, fuelwood and fertile land going on in most countries in the world; reflect on the usefulness of policies in food systems and security;

and draw out some shortcomings, as well as areas of further research and development. The contribution of the book to knowledge is that, it tackles the most contemporary issues in food policy, food security and food systems, while accounting for increased effect of globalisation and growing population. The book is organized into six sections with thirteen chapters disaggregated into different relevant sections after a double blind peer-reviewed and a proper checking that no part of the work was plagiarised or published elsewhere. The book through a systematic review of literature and quantitative data contains basic insights to development of sustainable food systems, food policies and food security with suggestions for transformation options (Chapters 1 and 2), food policy and agricultural systems (Chapters 3, 4 and 5), agricultural resource management, and management of food resources (Chapters 6 and 7), management of agricultural value chain development (Chapters 8 and 9), gender and its implications on sustainable food systems and security (Chapters 10 and 11), as well as migration, remittances and food security (Chapters 12 and 13). The book is expected to deliver new insights for a more accurate process of public policy formulation and private sector investment priorities in food systems and food security. The book is ideally designed for economists, environmentalists, food producers, policymakers, researchers, academicians, and students seeking coverage on agricultural and sustainability issues.

WAY FORWARD

A key message is that food systems are designed by many different decisions and decision-makers beyond what might generally be considered 'agricultural and food policy'. The persistent challenges of food systems and food securities therefore call for better policies. Developing sustainable food systems will require transforming both the content of policies and the processes they are made. It will involve cross-examining the existing policies to see if they are undermining other goals in the system, and whether they align with a vision of what we want the food systems to look like.

ORGANIZATION OF THE BOOK

This book on "Developing sustainable food systems, policies and securities" is made up of 13 chapters distributed across six sections.

Section 1: Basic Insights to Sustainable Food Systems, Food Security, Food Policies, and Transformation Options

This section discusses some contemporary issues and importance of policies on sustainable food system through review of relevant literature and content analysis to examine relationships between sustainable food systems, agricultural and food policy, and food security and draw out some salient lessons.

The first chapter by Obayelu A. E. and Ayansina S. O., sets the scene and identifies critical issues addressed in the rest of the book by bringing out evolving understandings on the links between agricultural and food policies in the development of sustainable food systems, and food security through a systematic literature review. It takes stock of what we know and some of the things we do not know so far about importance of policy in sustainable food systems and food security, outlines the direct or indirect links between agricultural and food policy to food systems and the implications on food and nutrition

security. This chapter explores a number of endpoints to create a context for exploration, mitigation, and transformation of food system. The chapter concludes that we need agricultural and food policies that will provide solutions to food systems and food insecurity challenges. Seda Yildirim and Merve Kaplan, in the second chapter using grey literature, explore the importance of seafood security and sustainability in the context of sustainable development using Turkish seafood market as a case study.

Section 2: Food Policy and Agricultural Systems

This second section helps to decipher the importance of agricultural and food policy and how they interact with agricultural systems. José G. Vargas-Hernández, in the third chapter, examines the implications of urban sustainable growth, development and governance structures for revitalization of open vacant spaces in agriculture and farming through a systematic review of the literature. The contribution to the existing literature lies in the fact that the chapter provides, through a systematic review, a comprehensive assessment of the utilization of urban vacant land for sustainable food systems. The fourth chapter by Sérgio Pedro explores the sustainable patterns for food and agricultural controversies in developing and emerging countries. The chapter discusses some contemporary issues through review of relevant literature and content analysis of responses to multiple questions on how to attain sustainable food and agriculture. Huynh Viet Khai in the fifth chapter uses quantitative data and dichotomous choice contingent valuation method to highlight the effect of price of insurance demand on rice producers in the Vietnamese Mekong Delta in Vietnam.

Section 3: Agricultural Resource Management and Management of Food Resources

This section of the book centres on issues relating to resources management and management of food resources. In the sixth chapter, Arowolo, A.O., Ibrahim, S.B., Aminu, R.O. Samie A. and F.P Funminiyi present a multiple scenarios-based impact analysis of predicted land-use change on ecosystem services value on sustainable food system using Nigeria as case study. In Chapter 7, Agatha Osivweneta Ogbe and Sarah Edore Edewor analyse the effects of land grabbing on sustainable food systems.

Section 4: Management of Agricultural Value Chain Development

This section accentuates the issues of agricultural value chain development through exploration of some key innovations in the course of transition to sustainable food systems in developing and emerging countries. Adejo, E.G, Saliu, O.J. and Adejo, P. E., in Chapter 8, use qualitative data to analyse the perspective of policy interventions in rice and cassava value chain among women in Nigeria. In Chapter 9, Idumah, F., Olarewaju, T. O., Oseghale, A.I., Orumwense, L.A., Oke, O. S. and Okedeji, E. use both qualitative and quantitative data to examine training needs assessment in sustainable food system using a case of palm oil processors in Ijebu North Local Government area, Ogun State, Nigeria.

Section 5: Gender and Its Implications on Sustainable Food Systems and Food Security

This section examines the roles of gender in sustainable food systems and food security. The tenth chapter by Adepoju, A.O. and Adewole, R.A. analyse women's land rights and food security status of farming households in Oyo State, Nigeria, while Sarah Edore Edewor and Agatha Osivweneta Ogbe investigate whether gender inclusion really matter in sustainable food systems in Chapter 11.

Section 6: Migration, Remittances, and Food Security

The section examines the roles of remittances in sustainable food systems and food security. In Chapter 12, Obayelu, O.A. and Akinmulewo, R.F. assess the contribution of foreign remittances to attaining zero hunger in rural Nigeria, while Sowunmi, F.A. and Adeduntan, F.L. assess the impact of rural-urban migration on food consumption pattern of farming households in Nigeria using data from Ibadan/Ibarapa agricultural zone of Oyo State in Chapter 13.

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Acknowledgment

The editors appreciate the Almighty God who has made the dream on this book project come true. We wish to acknowledge the concerted efforts of all the contributing authors, the reviewers, and the members of the Editorial Advisory Board (EAB). The idea of the title of the book project stemmed from the fact that the world food production can no longer feed the growing population and production are still taking place in unsustainable manner across many different countries. The questions that therefore came to our mind were: Are there no agricultural and food policies toward sustainable food systems and food security? How do we develop sustainable food systems? Are the policies supportive to sustainable food systems? What are the new solutions to sustainable food systems? We packaged these thoughts and put on a proposal to IGI international. The idea was eventually accepted leading to call for proposals to develop chapters of the book.

We thank the IGI international for the intellectual stimulation and modification of the initial title of the proposal submitted and the various links provided which helped in the widely dissemination of the information. We also thank the African Growth and Development Policy Modelling Consortium (AGRODEP) for putting the proposal on their website.

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Chapter 10
Women Land Rights and Food Security Status of Farming Households in Oyo State, Nigeria

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ABSTRACT

The dominance of men in decision-making processes and leadership positions within the communities has made land allocation, land use, and control skewed in favour of men. This study examined the effects of women's land rights on households' food security status using a sample of 300 representative farmers. Descriptive statistics, household food expenditure, logistic regression, and ordered logit models were the analytical tools used. Results revealed that about 35% of the rural women farmers had land use rights while the remaining 65% had land ownership rights. Women with ownership rights were more food secure, with the majority of the women having residual rights, while only a few had sell rights. Secure women land rights are germane to achieving and sustaining household and national food security. Strategies and instruments for protecting women rights should be developed and implemented, while efforts geared towards designing strategies, assessing multiple dimensions of women empowerment for improved food security status, and welfare of the households should be intensified.

INTRODUCTION

Women play a critical role in agricultural production in developing countries where they usually make up most of the agricultural workforce (World Bank et al., 2009). While their participation in agriculture in sub-Saharan Africa accounts for close to 70-80% of labour and 90% food processing and storage,

DOI: 10.4018/978-1-7998-2599-9.ch010

they own less than 20% of the land (Murisa, 2008). Land rights is defined as the indisputable ability of individuals and group of individuals to obtain, possess and utilize land at their discretion as long as their activities on the land do not impede on other individuals' rights (Adi, 2009). Under the customary land tenure system, which is still very much prevalent, the distribution of rights is based on socio-political system (the political history of the village and region from which the alliances and hierarchical relationships between lineages are derived) and on family relationships (access to land and resources depending on one's social status within the family). It is also worth noting that in most of these customary landholding systems, community level decisions about land are taken by chiefs or headmen on behalf of and in trust for the clan or family (Umezulike, 2004).

In Nigeria, the Land Use Act, enacted in 1978, was meant to standardise land administration systems across the country. It vested all urban land within a state in the state governor, and all non-urban land in the local governments in which they are found. The state governor and local government authorities are empowered by the Act to grant "statutory rights of occupancy". While both urban and rural land is secured in Nigeria through certificates of occupancy (instruments of title issued as evidence that the state has conferred on the holder of the certificate the statutory right to occupy the land for a defined period of time and deeds of assignment (agreement between the person with the rights to a piece of land and the person to whom the rights are being transferred), rules for transfer and succession depend on whether the person died with or without a will recognised by the courts and mainly by inheritance rights, which are primarily guided by native and customary laws (with variations across ethnic groups) and religious laws (sharia law, based on the Koran). For example, sharia laws, applicable across the 19 northern states, stipulate that female children get half of what males get and that children who are non-Muslims lose their inheritance rights (Africa Check, 2015).

However, secure access to productive land is critical to the millions of poor people living in rural areas, who depend on agriculture, livestock or forests for their livelihood. This is because it reduces their vulnerability to hunger and poverty; influences their capacity to invest in their productive activities and in the sustainable management of their resources; enhances their prospects for better livelihoods, and helps them develop more equitable relations with the rest of their society, thus contributing to justice, peace and sustainable development (International Fund for Agricultural Development [IFAD], 2010). Throughout Africa, most poor women (most of whom depend on land for their livelihood) are either landless or have limited and insecure rights to land. This reality has important consequences for sustainable socio-economic development of the continent as well as their food security status since they play a major role in agriculture (Odeny, 2013). In other words, when deprived of access to, ownership and use of land, women are left without the means to create stable and sustainable livelihoods and are food insecure.

However, food security, defined as a situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life, has been linked to having secured land rights. This is particularly pertinent for women in ensuring equality of basic rights, reducing poverty and ensuring household food security (Jonckheere *et al.,* 2013). For instance, it had been shown that if women had the same access and ownership to productive resources as men, they would increase yields on their farms by 20-30 percent. This could raise total agricultural output in developing countries by 2.5 – 4.0%, which is enough to pull 100-150 million people out of hunger (Food and Agriculture Organization [FAO], 2010). Yet, women's land rights have been largely ignored mainly because of the highly patriarchal nature of most societies in the developing world.

Further, across the developing world women are less likely to own or operate land; when they do, the land they can access is often of poorer quality and in smaller plots. For example, in Kenya, men's landholdings are on average three times larger, and in Bangladesh, Ecuador and Pakistan they are twice the size of women's (FAO, 2011). These gender inequalities not only affect women's status; they have significant implications for food and nutrition security at the level of the household and community. Landesa (2012) reports that where women lack rights or opportunities to own land, there is an average of 60 per cent more malnourished children. They also report that when women have direct control over assets such as land and income, this increases their decision-making power and status, resulting in positive nutritional impacts for them and their families. Though state laws, including land titling, may protect women's rights to own land, customary laws often take precedence at the local level. A number of countries recognise both formal and customary land tenure systems and laws, but there are inherent contradictions in trying to accommodate both systems. For example, in Malawi and many other African countries, formal recognition of women's right to own land co-exists with an often contradictory parallel set of customary laws. When divorced women return to their natal villages they may only use land through male members of the family or are allocated a piece of land by the Chief or their clan members. In other cases, widows are chased away from their natal villages (ActionAid et al., 2012). In Nigeria, it is striking that there is no recognized formal category for the particular character of women's land access. Marriage is used as a determining variable in women's land rights because it is the major means by which women and men access land in Nigeria. However, whereas women's land rights are dependent on their relations with men, men's land rights are not dependent on their relations with women. Moreover, women are threatened with dispossession if divorced or widowed.

The justification of this study is rooted in the need to adequately respond to the problem of food security and peculiar difficulties women face in meeting their responsibilities as food providers particularly that of weak land rights as no literature has yet been sighted on women land rights in Oyo state. Considering that women have the tendency to grow food as opposed to cash crops and to spend income on family food, their security of tenure must be viewed as a key link in the chain from household food production to national food security (Mahoi, 2015). This study will thus take the initiative that will later stimulate further specialized researches on this problem. Also, closing the gender gap in secure access to land is fundamental not only for women's empowerment, but also for broader family food security, children's health and economic gains (FAO, 2011).

While there are many studies on land access, the relationship between women land rights and food security has not been well explored in literature. Thus, the justification of this study lies in its heuristic nature, implications for policy theory, research, and contribution to the body of data on gender, food security and secured women land rights. Based on this foregoing, this study therefore attempts to empirically assess what type(s) of land rights women in the farming households have; what factors influence the type of land rights of women in the farming households and the effects of women land rights on the food security status of farming households in Oyo state, Nigeria.

METHODOLOGY

The study was carried out in Oyo state Nigeria. Oyo State is one of the states in the south western part of Nigeria, It is located within Latitude 8^0 N, and Longitude 4^0 E with a total land mass of 28,454 square kilometres reaching a height of about 1,219 meters and a population of 5,591,589 according to (NPC,

2006) and it is bounded in the North by Kwara State, in the East by Osun State, in the South by Ogun State and in the Western part by Ogun State and partly by the Republic of Benin. The state has an equatorial climate with dry and wet seasons and relatively high humidity. The dry season lasts from November to March while the wet season starts from April and ends in October. Average daily temperature ranges between 25^{0}C (77.0 ^{0}F) and 35 ^{0}C (95.0 ^{0}F), almost throughout the year. The vegetation pattern of Oyo state is rain forest in the South and guinea savannah in the North. Thick forest in the south gives way to grassland, interspersed with trees in the North also, the climate in the state favours the cultivation of crops like maize, yam, cassava, millet, rice, plantain, cocoa tree, palm tree and cashew etc.

This study made use of primary data obtained through questionnaire administration to respondents. The information used for this study are the socio-economic characteristics such as age (years), gender, education, household size and marital status, food security variables such as expenditure on food as well as type of land rights that women have in the study area. A multi-stage random sampling technique was employed for the purpose of this study. The first stage was a random sampling of one Local Government Area (LGA) each from the three Senatorial Districts (SD) in Oyo State. Thus, Afijio LGA was randomly selected from Oyo Central SD, Iseyin LGA from Oyo North SD and Ibarapa East LGA from Oyo South SD. The second stage was the random selection of five communities/villages from each of the LGAs. This gave a total of 15 villages/communities. The last stage was a random sampling of 20 women farmers from each of the selected communities. In all, a total of 300 respondents were selected. However, only data from 293 farming households were analyzed as others were discarded for inconsistencies and or incomplete information .

Analytical tools used include Descriptive statistics, Logistic and Ordered Logit regression Models. Descriptive statistics was used to examine the socio-economic characteristics and type of land rights women have in the farming households while the Logistic Regression Model was used to examine the factors influencing the type of land rights of women in the farming households. Two separate logistic regression analysis were carried out for the types of land rights (Use and Ownership rights). The Logistic model is associated with a cumulative normal probability function and it is a type of regression model used to analyze binomial response variables (dichotomous variable).

The basic logistic model is specified as follows:

$$P\ (Yi=m) = 1/1+ e^{-z} \quad (1)$$

$$P/1-P = e^{z} \quad (2)$$

where

P is the probability of occurrence of the dependent variable Yi equal to a certain value, m;
z is the predictor variable and can be said to be a linear combination of the conversion factors;
e is the base of natural logarithm and
P is the estimated probability of occurrence of one point of the dependent variable.

From equation 2,

$$1-P = 1- 1/1+e^{-z} \quad (3)$$

1-P is the probability of failure.

Given that Y =P/1-P (4)

Then, $Y = e^{z} = \exp(z)$ (5)

Y = P/1-P, represents the odd of the evaluative factors occurring for each explicative factors.

Assuming Z is a linear function of a set of predictor variables, then,

$$Z = \beta_0+\beta_1X_{1i} +\beta_2X_{2i} +\beta_3X_{3i} +\dots B_nX_{ni} \quad (6)$$

If equation (6), then;

$$Y = e^{\beta 0+ \beta 1X1i+ \beta 2X2i+ \beta 3X3i+\dots + \beta nXni} \quad (7)$$

$$Y = \exp (\beta_0+ \beta_i\Sigma X_{1i}+\beta_2\Sigma X_{2i}+\beta_3\Sigma X_{3i}+\dots B_n\Sigma X_{ni}) \quad (8)$$

where Y= Land rights (Ownership/Use rights =1, 0 otherwise). X_{is} include those socio-economic factors that influence the type of land rights. These include:

X_1 = Age (years), X_2 = No formal education, X_3 = Primary education, X_4 = Secondary education, X_5 =Christianity, X_6=Islam, X_7 = Married, X_8=Separated, X_9=Divorced, X_{10}=Widowed, X_{11}=Access to credit facilities, X_{12}=Income (₦),X_{13}=Membership of cooperative societies, X_{14}=Inheritance, X_{15} =Marriage, X_{16} =Gift, X_{17}=Farming experience, e_i = Error term or Disturbance term.

The Household Food Expenditure approach was used to classify households into their food security status. The share of the total household expenditure spent on food is an indicator of household food insecurity because the poorer and more vulnerable a household, the larger the share of household income spent on food. This implies that households that are very poor and consuming the lowest-cost foods will be unable to substitute cheaper foods and will be forced to spend more on basic staples, reduce the quality of their diets or even reduce the quantity consumed of the least expensive foods while also reducing non-food expenditures that may be equally needed (Lele et al., 2016).

This indicator is commonly calculated with data from Household Consumption and Expenditure Surveys (HCES) that include the monetary value of household consumption disaggregated into food and non-food items and is a measure of current economic vulnerability.

$$The\ share\ of\ household\ expenditure\ on\ food = \frac{Expenditure\ on\ food}{Total\ Expenditure} \times 100$$

Households spending over 75% of their income are considered very vulnerable and consequently highly food insecure whereas people spending between 65 and 75% are considered to be moderately food insecure, those spending 50 to less than 65% are moderately food secure and those that spend less than 50% of their income on food are considered to be food secure (Smith and Subandaro, 2007). Although

there is no agreed international threshold, this indicator is one of the several indicators included in the ADePT-FSM (Food Security Module), developed by the Food and Agriculture Organization (FAO) and the World Bank that allows users to easily derive food security indicators from household survey data. This indicator is also included in the FAO suite of food security indicators (FAO, 2016)

The Ordered Logit Regression Model was used to examine the effects of Women Land Rights on the food security status of the farming households.

The Ordered Logistic Regression model is stated explicitly as follows:

$$y_i^* = \beta i\, Xi + \varepsilon i \; -¥ < y_i^* < -¥ \tag{9}$$

where

y_i^*: Food security status
βi: Vector of parameters that would be estimated
xi: Observed vector of non-random explanatory variable which shows the characteristic of ith person
εi: Residual error which is logistically distributed.

Since y_i^* is a latent variable, standard regression techniques are not applicable to estimate the sample size.

If y_i is considered as a discrete and observable variable which shows different levels of food security of the respondents, the relation between latent variable yi* and observable variable yi is obtained from the ordered logit model as follows:

$$y_i = 1 \text{ if } -¥ \leq y_i^* < \mu_1, i = 1,\ldots, n, \tag{10}$$

$$y_i = 2 \text{ if } \mu_1 \leq y_i^* < \mu_2 \; i = 1,\ldots, n, \tag{11}$$

$$y_i = 3 \text{ if } \mu_2 \leq y_i^* < \mu_3 \; i = 1,\ldots, n, \tag{12}$$

$$y_i = J \text{ if } \mu_{J-1} \leq yi^* < +¥ \; i = 1,\ldots, n,$$

in which "n" is the value for the sample size, "μ" and "s" are the thresholds that define observed discrete answers and would be estimated. The probability of $y_i = J$ would be calculated by the following relation:

$$\Pr(y_i = J) = \Pr(y_i \geq \mu_{J-1}) = \Pr(\varepsilon i \geq \mu_{n-1} - \beta Xi) = F(\beta Xi - \mu_{J-1}) \tag{13}$$

The dependent variables Y_i include the levels of food security: Y_1= highly food insecure, Y_2=moderately food insecure, Y_3=moderately food secure and Y_4=food secure. Xi includes various socioeconomic and demographic variables that influence women's right to land. The explanatory variables include:$X_{1=}$ Age (years), X_2 = No formal education, X_3 = Primary education, X_4 =Secondary education,X_5=Christianity, X_6=Islam, X_7 = Married, X_8=Separated, X_9=Divorced, X_{10}=Widowed, X_{11}=Access to credit facilities, X_{12}=Membership of cooperative societies, X_{13}=Inheritance, X_{14}=Marriage, X_{15}=Tenancy, X_{16}=Leasehold, X_{17}=Gift, X_{18}=Purchase, X_{19}=Type of land right (ownership rights = 1, 0 otherwise),e_i = Error term or Disturbance term

RESULTS AND DISCUSSION

The result of the socioeconomic characteristics of the farming households (Table 1) shows that a larger percentage (33.4%) of the farmers were between the ages of 41 and 50 years with a mean age of about 44 ± 11.5 years. This implies that most rural women farmers in the study area are still productive and active. More than two-fifths of the respondents had no formal education, while about half had either primary or secondary education, but with majority having primary education. However, less than 5% had tertiary education. Majority of the farmers had household sizes of between 4 and 6 members with a mean of about 6 ± 3 members per household. More than four-fifths of the respondents were engaged in farming as their major occupation while a few were involved in the processing and marketing of farm produce. A larger percentage of the respondents are married and had access to credit facilities obtained mainly through informal sources such as thrift societies. According to Udoh (2005) in agricultural financing, informal credit sources are unquestionably the most popular. These informal sources are provided by traditional institutions that work together for the mutual benefits of their members (Ijere, 2000).

A wide extension agents-farmers gap was observed as about two-fifths of the respondents did not have access to extension agents at all and about one-fifths had access only bi-annually. This finding corroborates earlier findings in literature that only 5% of women farmers spanning 97 countries have access to extension services (FAO, 2013)

With respect to women's land rights in the farming households (Table 2), a little above half of the respondents farmed less than 1hectare of land while only less than 2% farmed more than 5 hectares. This situation is worrisome, given the leading role that women play in food production and provision for family consumption in developing countries. Women farmers' access to land is even more limited due to cultural, traditional and sociological factors. This is as a result of the customary nature of land distribution and ownership that operates in the study area. Such limited access is very tenuous and can be quickly lost (FAO, 2002; Mirtuse et al., 2006; Quisumbing et al*.,* 1995). Also, about two-fifths of the respondents respectively acquired their lands through inheritance and marriage owing largely to customary laws governing land ownership in the study area. In other words, land ownership depicts affluence and power in the rural community and serves as home to ancestors in some places. Although women can purchase land, the institutional arrangement that exists in most rural societies does not always favour this, because women have to rely on their husbands before making a purchase and as such it is uncommon in the rural areas for a woman to purchase land in her own name with or without her husband's consent. Thus, a common scenario is for women to access land only through their husbands or senior male relatives (Ademola, 1994; Törhönen & Palmer, 2004; Elliss, 2000). Almost about two-fifths (35.1%) of women in farming households have land use rights as against 64.9% that have only ownership rights. Of those that had ownership rights, 48.5% had residual rights (the right of a woman to use land perpetually which can be redeemed later by the husband upon divorce, by her husband's relatives after her husband's death or by the community if such a woman commits an illicit act that is against the communal custom and tradition), 10.9% had transfer rights (the right of the woman to transfer the ownership rights to her husband, her children, her relatives or to whosoever she wishes as long as the beneficiary is an indigene of the community) while just 5.5% had sell rights to their lands (absolute right to own, use and control the land). Historically women's access to land is mainly based on status within the family and involved the right of use, not ownership (Juma & Ojwang, 1996).

Table 1. Socio-economic characteristics of the farming households

Variables		Frequency	Percentage (%)
Age (years)	<30	41	14.0
	31-40	74	25.3
	41-50	98	33.4
	51-60	50	17.1
Mean: 44.4 SD: 11.5	³61	30	10.2
Educational status	No formal education	134	45.7
	Primary	95	32.4
	Secondary	50	17.1
	Tertiary	14	4.8
Household size	1-3	47	16.0
	4-6	138	47.1
	7-9	80	27.3
Mean: 5.9 SD: 2.8	³ 10	28	9.6
Main occupation	Farming	236	80.5
	Trading	12	4.1
	Civil servants	12	4.1
	Processing	31	10.6
	Marketing	2	0.7
Marital status	Single	11	3.8
	Married	214	73.0
	Separated	21	7.2
	Divorced	14	4.8
	Widowed	33	11.3
Access to credit	No	28	9.6
	Yes	265	90.4
Source of credit	Friends and relatives	42	14.3
	Thrifts/Esusu	191	65.2
	Cooperatives	26	8.9
	Commercial banks	6	2.0
Access to Ext. Agents	None	122	41.6
	Monthly	3	1.0
	Quarterly	54	18.4
	Bi-annually	60	20.5
	Annually	54	18.4

Source: Field Survey, 2017.

Table 2. Women land rights characteristics

Land Characteristic		Frequency	Percentage (%)
Size of land (Ha)	< 1	153	52.2
	1-2.99	126	43.0
	3-4.99	9	3.1
	³5	5	1.7
Mode of acquisition	Inheritance	111	38.3
	Marriage	106	36.6
	Tenancy	17	5.9
	Leasehold	2	0.7
	Gift	33	11.4
	Purchase	21	7.2
Type of Right	Use right	103	35.1
	Residual right	142	48.5
	Transfer right	32	10.9
	Right to sell	16	5.5
	Total Ownership rights	190	64.9
Type of crops cultivated	Arable crops	111	37.8
	Tree/cash crops	22	7.6
	Vegetables	160	54.7

Source: Field Survey, 2017.

In Africa, custom excludes women from ownership which makes women rights to land to be secondary and dependent on their relationships with their husbands, male relatives and the headmen in their communities. Under the customary land tenure system which is very much prevalent in the study area, the distribution of rights is based on socio-political system and family relationships, thus, most of these customary landholding systems and community level decisions on land are taken by chiefs or headmen on behalf of and in trust for the clan or family. It is worthy of note that majority of land owned by these rural women farmers are in microplots and of poor fertility which do not favour large scale commercial farming, however land rights in the study area and Africa at large is said to be gender biased (Agwu et al., 2010).

Also, more than half of the rural women farmers in the study area cultivate vegetables as their primary crops, these include both fruits and leafy vegetables, the discrimination in crops cultivated however varies across the country as some crops are designated as female crops (IFPRI, 2005). For instance, in Southeast Nigeria, yam is the traditional male prestige crop while cassava and other crops like melon, cocoyam are female crops, while in the southwest part of the country vegetable crops are mostly female crops. It can also be observed that just 7.6% of the respondents cultivate tree and cash crops and these farmers inherited the tree/cash crops plantation mostly from their parents. Gender biased differences also existed in relation to the use of forest resources. This discrimination against women in crop cultivation in the study area is mainly due to the lack of secured land, required farm productive resources as well as non- availability of labour as a result of the labour-intensive nature of tree and arable crops (FAO, 2011).

Following the household food expenditure approach as shown in (Table 3), majority of the households were classified as food secure; 24.9% and 40.3% as food secure and moderately food secure respectively while 31.7% were classified as moderately food insecure and only 3.1% as highly food insecure. This result, although contrary to *a priori* expectation is however not surprising because about 65% of the respondents had land ownership rights (secured land rights), which according to literature improves their bargaining power, decision making on foods, improved household food and nutritional security as well as overall household welfare (FAO, 2012; Mitchell & Hanstad, 2004).

Table 3. Food security status of the rural women farming households

Food Security Status	Frequency	Percentage (%)
Food secure	73	24.9
Moderately food secure	118	40.3
Moderately food insecure	93	31.7
Highly food insecure	9	3.1
Total	**293**	**100.0**

Source: Field Survey, 2017.

A profile of food security status by type of land rights showed that women that have ownership rights were more food secure when compared to those that have land use rights. On the other hand, women that have land use rights were more food insecure relative to those that had land ownership rights. These variation in food security levels could be attributed to the fact that women that have land ownership rights are likely to have better control of their lands and are able to determine what to produce. As a result, they able to vary their diets and benefit from the forest resources either for their own family consumption or sales which will boost their source of income and hence improve their food security status. In summary, households where women have land rights are more food secure and have better decision-making power relative to those without secure land rights (Miggiano, 2010; Katz & Chamorro, 2002).

Table 4. Profile of the food security status of respondents by land rights

Food Security Status	Use Right		Ownership Rights	
	Frequency	Percentage (%)	Frequency	Percentage (%)
Food secure	4	3.9	69	36.3
Moderately food secure	41	39.8	77	40.5
Moderately food insecure	51	49.5	42	22.1
Highly food insecure	7	6.8	2	1.1
Total	**103**	**100.0**	**190**	**100.0**

Table 5 presents the results of the Logistic regression analysis of the factors influencing land use rights among women in farming households in the study area. The log likelihood value of -172.1660 and Chi-square value of 26.77 which was significant at 5% indicates that the model fits the data. Age had negative effects on the likelihood of having land use rights while marital status and access to credit facilities had positive effects. Marginal effects results of the analysis are discussed as follows:

Table 5. Factors influencing land use rights of women in farming households

Variables	dy/dx	Z-Value	P>/Z/
Age	-0.0065	-2.30**	0.021
No formal education	0.0531	0.29	0.772
Primary education	0.2001	1.09	0.274
Secondary education	0.1764	0.94	0.345
Christianity	-0.2255	-1.55	0.121
Islam	-0.1908	-1.29	0.197
Married	0.4292	2.41**	0.016
Separated	0.1726	1.10	0.272
Divorced	0.1521	0.71	0.478
Widowed	0.2684	1.41	0.158
Access to credit	0.1676	1.83*	0.068
Income	-6.52e-08	-0.20	0.842
Farming Experience	0.0038	0.92	0.355
Constant		0.56	0.574

Source: Field Survey, 2017. *** Significant at 1%, ** Significant at 5%,* Significant at 10%. Numbers of observations: 283**;** LR chi^2 (14): 26.77**;** Log likelihood: -172.1660**;** Prob> chi^2: 0.0206**;** Pseudo R^2: 0.5721.

The negative effect of age on the likelihood of having land use rights showed that a year increase in the age of rural women farmers reduced the likelihood of having land use rights by 0.0065 unit. This as earlier discussed could be owing to the customary land tenure system prevalent in the study in which women cannot generally use or own land except through familial relationship. Older women are particularly disadvantaged because of their voicelessness.

Marital status on the other hand had a positive effect on women land use rights implying that rural women who were married had a higher likelihood of having land use rights relative to their counterparts who are single. This is as a result of the land use rights conferred on a married woman (whose rights are secondary to her husbands), as a result of her union. Specifically, being married increased the likelihood of having use rights by about 0.4292 unit. In addition, access to credit facilities had a positive effect on women having land use rights. In other words, having access to credit facilities increased the likelihood of having land use rights by 0.1676 unit.

Table 6 presents the results of the logistic regression analysis of the factors influencing land ownership rights among women in farming households in the study area. The log likelihood value of -92.8545 and Chi-square value of 132.64 which was significant at 1% indicates that the model has a good fit. Marginal effects results are discussed as follows:

Table 6. Logistic regression results of the factors influencing land ownership rights

Variables	dy/dx	Z-Value	P>/Z/
Age	-0.0041	-1.79*	0.073
No formal education	-1.7989	-0.01	0.994
Primary education	-1.8956	-0.01	0.994
Secondary education	-1.8600	-0.01	0.994
Christianity	0.0975	0.76	0.449
Islam	0.1250	0.96	0.338
Married	0.2878	1.66*	0.097
Separated	0.1752	0.90	0.369
Divorced	0.2204	1.05	0.295
Widowed	0.2158	1.05	0.292
Access to credit	0.1414	1.56	0.118
Income	0.5730	2.18**	0.029
Membership of cooperative	0.0200	0.17	0.864
Inheritance	2.8529	0.01	0.995
Marriage	2.1979	0.00	0.996
Gift	2.2879	0.00	0.996
Farming experience Constant	-0.0052	-1.55 -.0.00	0.122 0.998

Source: Field Survey, 2017 *** Significant at 1%, ** Significant at 5%,* Significant at 10%. Numbers of observations: 249; LR chi^2 (14): 132.64; Log likelihood: -92.8545; Prob> chi^2: 0.0000; Pseudo R^2: 0.4167.

Age had negative effects on rural women's land ownership rights implying that a percentage increase in the age of rural women farmers will reduce their likelihood of having land ownership rights by 0.0041 unit. This may be owing to the customary land tenure system in which women are not included as beneficiaries of land inheritance and therefore do not have ownership rights. Conversely, being married increased the likelihood of having land ownership rights by 0.2878 unit as expected. This is because custom excludes women from ownership which makes women rights to land to be secondary and dependent on their relationships with their husbands. This finding is in line with the findings of Ademola (1994) that 67% of women acquired lands through marriage while 23% through inheritance. Marital status is thus a key factor when it comes to land ownership in Nigeria.

The positive relationship between level of income and women land ownership, indicates that a unit increase in the level of income of a rural woman farmer will increase her likelihood of having land ownership rights by 0.5730 unit, as an improved status in the community will confer on such women the ability to purchase land(s) and have full control over such land(s).

The results of the ordered logit regression analysis of the effects of women land rights on the food security status of the farming households is presented in Table 7. The log likelihood value of -287.0139 and Chi-square value of 119.65 which was significant at 1% indicates that the model is well fitted. The table reveals a negative effect of age on food security status of the households. Specifically, a unit increase in the age of rural women farmers reduced the probability of being food secure by 0.0052 unit, of being moderately food secure by 0.0008 unit and of being highly food insecure by 0.1%, while it increased

Table 7. Effects of women land rights on the food security status of the farming households

Variables	Food Secure		Mod. Food Secure		Mod Food Insecure		Highly Food Insecure	
	dy/dx	Z	dy/dx	Z	dy/dx	Z	dy/dx	Z
Age	-0.0052	-3.29***	-0.0008	-1.82*	0.0051	3.34***	0.001	2.40**
No Edu	-0.3099	-2.69***	-0.0532	-1.49*	0.3019	2.59***	0.0612	2.06**
Pry Edu	0.3946	3.05***	0.0601	1.55*	-0.3409	-2.90***	-0.0691	-2.21**
Sec Edu	0.3946	3.43***	0.0677	1.64*	-0.3844	-3.28***	-0.0779	-2.35**
Married	0.2685	2.81***	0.0461	1.53*	-0.2615	-2.70***	-0.0530	-2.11**
Separated	0.2678	2.37**	0.0459	1.44*	-0.2609	-2.30**	-0.0529	-1.91*
Divorced	-0.1409	-1.12	-0.0242	-0.91	0.1373	1.10	0.0278	1.05
Widowed	0.2892	2.60***	0.0496	1.50*	-0.2817	-2.52***	-0.0571	-2.02**
Christianity	-0.0289	-0.32	-0.0049	-0.31	0.0282	0.32	0.0057	0.32
Islam	-0.0179	-0.19	-0.0031	-0.19	0.0175	0.19	0.0035	0.19
Credit Acc	0.1420	2.20**	0.0244	1.62*	-0.1384	-2.25**	-0.0280	-1.87*
Inheritance	0.0189	0.11	0.0033	0.11	-0.0185	-0.11	-0.0037	-0.11
Marriage	0.0262	0.16	0.0044	0.16	-0.0255	-0.16	-0.0052	-0.16
Tenancy	0.0989	0.55	0.0169	0.54	-0.0964	-0.55	-0.0195	-0.54
Leasehold	0.2431	0.983	0.0417	0.87	-0.2369	-0.94	-0.0480	-0.90
Gift	-0.0442	-0.26	-0.0076	-0.26	0.0431	0.26	0.0087	0.26
Purchase	-0.0056	-0.03	-0.0009	-0.03	0.0055	0.03	0.0011	0.03
Right type	0.2711	5.65***	0.0465	2.11**	-0.2641	-6.30***	-0.0535	-2.90***

Source: Field Survey, 2017. *** Significant at 1%, ** Significant at 5%,* Significant at 10%. Numbers of observations = 293; LR chi^2 (20): 119.65; Log likelihood: -287.0139; Prob> chi^2: 0.0000;Pseudo R^2: 0.6725.

the likelihood of being moderately food insecure by 0.51%. This finding contradicts earlier findings in literature that the likelihood of food insecurity reduced with increase in age, because older people have better experience in subsistence agriculture and are able to accumulate wealth better than their younger counterparts (Olagunju et. al., 2012; Benjamin & Joseph, 2012; Bogale & Shimelis, 2009).

Further, results showed that women with no formal education have a lower likelihood of being food secure and moderately food secure by 0.3099 unit and 0.0532 unit respectively and a higher likelihood of being moderately food insecure and highly food insecure by 0.3019 and 0.0612 units respectively. On the other hand, those with at least primary education had a higher probability of being food secure with reducing effects on the probability of being food insecure. The positive signs of the marginal effects of being food secure and moderately food secure for primary and secondary education indicate that an increase in educational attainment increases the chances of the household being food secure and moderately food secure respectively while the negative sign of the marginal effects of moderately food insecure and highly food insecure reflects a reducing effect on the probability of being food insecure. The lack of education limits the ability to understand written instructions, rules and by-laws, and also access to markets, technology, training, finances, infrastructure and information that could help improve income, food security and by extension, the overall wellbeing of households (Siqwana-Ndulo, 2013; Mukudi, 2003; Battersby, 2011; Rose & Charlton, 2002; Haile et. al., 2005).

Marital status had a positive effect on food security status of the households. The positive signs for married, separated and widowed shows that such women farmers have higher chances of their households being food secure by 0.2685, 0.2678 and 0.2892 units respectively and moderately food secure by 0.0461, 0.0459 and 0.0496 units respectively. This could be owing to the benefits of being married or having been married at some point in time, in terms of land ownership, as such women are likely to have acquired land from their husbands for farming purposes (Jacobs, 2000). They also have the opportunity of deploying their children to their farms as family labour to increase agricultural productivity and by extension improve their food security status. The marginal effects of these variables are however negative for the moderately food insecure and highly food insecure categories, implying that married women, separated women as well as widows have lower likelihoods of being moderately food insecure or highly food insecure.

The marginal effects of access to credit showed that having access to credit increased the likelihood of households being food secure or moderately food secure by 0.1420 and 0.0244 units respectively while it reduced the likelihood of households being moderately food insecure and highly food insecure by 0.1384 and 0.0280 units respectively. This could be attributed to the fact that households with access to credit facilities have better access to farming inputs and other capital-intensive farm resources to boost productivity. In most developing countries, agricultural credit is considered an important factor for increased agricultural production and food security because, it enhances productivity and promotes standard of living by breaking the vicious cycle of poverty of small scale farmers (Adebayo & Adeola, 2008). Households that have the opportunity to receive microcredits would build their capacity to produce more and enhance their food security status through the use of improved seeds and adoption of improved technologies (Bogale & Shimelis, 2009).

Land ownership rights increased the likelihood of households being food secure and had negative effects on the likelihood of households being food insecure. The marginal effects results revealed that having land ownership rights by women increased the likelihood of households being food secure and moderately food secure by 0.2711 and 0.0465 units respectively while it reduced the likelihood of being moderately food insecure and highly food insecure by 0.2641 and 0.0535 units respectively. This is because land ownership leads to increased household agricultural productivity which implies increased food consumption and ultimately increased incomes which enables the purchase of more and better quality foods (Landesa, 2012). This finding is in line with that of Miggiano (2010) in five Asian countries that among the four levels of food security, the food secure groups had the largest percentage of owner cultivators at 70%.

CONCLUSION AND POLICY RECOMMENDATIONS

Land is a key agricultural input and also an important source of security against poverty in the developing world but gender has become a critical issue in women's land rights due to the fact that there is a direct relationship between accessing land resources, having secured land rights, achieving food security and overcoming poverty (Gashaw, 2015). This study therefore concluded that majority of the rural women farmers have land ownership rights but these lands are in microplots, not secured and limits the type of crops they cultivate as well as their outputs. The study also revealed that access to credit facilities and increased income played significant roles in land ownership rights as they empower the women farmers financially which will improve their productivity, food security status and ultimately the welfare of

their households. Further, having at least primary education, land ownership rights and access to credit increased the likelihood of being food secure.

Therefore, the study recommends that Government at all levels should develop and implement strategies and instruments for recognising and protecting women rights. Policies should be enacted by the government to secure the right to land for women especially in rural areas as they are involved greatly in farming activities and are key to improved food security of their households. Also, efforts of government and other stakeholders could be focused on strategies that assess multiple dimensions of women's empowerment such as human capital development and provision of support services in accessing credit, that will increase their income, enhance the food security status and ultimately the wellbeing of their households.

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