EGERTON UNIVERSITY

DIVISION OF RESEARCH AND EXTENSION

Transforming Kenya's Smallholder Agriculture in the Context of Climate Change, Devolution and Increasing Land Constraints

John Gowland Mwangi, PhD
Deputy Vice Chancellor (Research and Extension)
Egerton University P. O. Box 536-20115 Egerton, Kenya
Mwangijg5@yahoo.com; dvcre@egerton.ac.ke

Introduction

In Africa, and Kenya in particular, agriculture is extremely important both in terms of social and economic development. Two out of three Africans rely on it for a living. Most of ***Kenya's poorest people live in rural areas*** and depend ***mostly on agriculture*** for ***food and income***. These people are the ***most vulnerable to hunger*** and ***dependence on food relief***. In Kenya smallholders are approximately 80% of the farmers and therefore play a key role in development of the agricultural sector. Transforming the sector, which is a priority of the Kenya Government requires an environment in which farmers can practise business-oriented farming to produce ***affordable***, ***market competitive*** and ***consumer friendly products*** in terms of ***safety*** and **quality**. It also requires an effective ***Model of Extension Technology Delivery System*** as well as ***Climate-Smart Agriculture (CSA),*** which simultaneously increases ***productivity***, strengthens ***resilience to climate variability***, mitigates ***Green-House Gas (GHG) emissions*** and contributes to ***food security***. It further requires ***use of seasonal climate forecast*** in agricultural ***decision-making***.

Major Challenges Facing Smallholder Farmers

The major challenges slowing down transformation of the sector include ***low agricultural productivity*** and ***increasing land fragmentation*** into smaller farm units partly due to ***rising population***, ***real estate development*** and ***rapid urbanization***. Land fragmentation makes it harder for smallholder farmers to benefit from ***economies of scale*** and to change from subsistence to commercial farming where breakeven is difficult in some enterprises. However, ***intensive production can ensure profitable farming*** but to do it well, proper training is needed

right from farmers to policy makers to make them fully understand their role in addressing the consequences of land fragmentation. Other challenges facing smallholder farmers include ***rising cost of land***, which makes access to land a reserve of the affluent in society; ***limited use of farm machinery for making work easier and more cost effective***; ***unaffordable farm credit***; ***poor access to timely extension advice and improved technologies***; ***disorganized and unreliable markets***; ***lack of adequate market information***; ***climate variability and change*** as well as ***soil infertility*** and inadequate ***soil moisture***. Over 80% of our smallholder farmers are concentrated in less than 20% of Kenya's land mass as the rest of the country is arid or semi-arid (ASAL). People who move to the ASAL in search of greener pastures lack the ***knowledge and skills*** to manage the ***fragile ecosystem*** that is the ASAL. To succeed in the new environment, they need ***adaptation skills***, which only experts in agro-climatology and the local people can provide. In this context, how can policy makers and scientists help them deal with soil fertility and limited soil moisture?

Reason for the Conference

Egerton University, under which Tegemeo Institute falls, conducts research geared towards improving smallholder Agriculture and has organized this conference to give participants an opportunity ***to reflect together on how well we are doing as a country in our efforts to transform smallholder agriculture.*** How, for instance, can Kenya transform its smallholder agriculture despite the increasing land constraints?

Challenges Associated with Climate Change

Kenya is particularly vulnerable to climate change, variability and disaster risks due to its ***limited adaptive capacity, poverty level*** and ***development challenges. It experiences adverse weather with increasing frequency***, which poses a ***burden to sustainable development*** and is a ***threat*** and ***impediment*** to achieving the ***Sustainable Development Goals***. In Kenya, climate change ***lengthens the growing season during the short rains of October-December*** while ***decreasing the long rains of March to May*** (Kalungu; Folho & Harris, 2013; NCCRS 2010). ***This effect has implications on crop and livestock production***, which are key livelihood sources for many Kenyans. Famine cycles in Kenya, as you are probably aware, have reduced from 20 years (1964-1984), to 12 years (1984-1996), to 2 years (2004- 2006) and to yearly (2007-2009),

necessitating government distribution of relief food annually for ***3.5m to 4.5m people*** (Mutimba *et al.*, 2010).

Temperature changes and ***increased flooding*** and ***drought*** are likely to have profound negative consequences on smallholder agriculture. Climate change is affecting the supply and quality of water not only in Kenya but in the whole of Africa. Around ***300 million people (>40%) in sub-Saharan Africa currently lack access to safe drinking water*** and the situation is unlikely to improve. Smallholder farmers suffer the ***largest proportion of losses*** from ***climate variability and change***, both of which are ***human-induced global problems*** (FAO, 2015; Intergovernmental Panel on Climate Change - IPCC, 2014; Kalungu; Folho & Harris, 2013;). Humans are responsible for ***losses in biodiversity*** as a result of ***excessive extraction of natural resources, forest clearance for pasture or cropland***, ***large-scale mono-cropping*** and use of ***chemical fertilisers and pesticides***. In 2002, *13 million people in southern Africa needed food relief due to drought.* ***By 2020, yields from rain-fed agriculture in some African countries could reduce by up to 50%*** and ***crop net revenues could fall by as much as 90% by 2100, with small-scale farmers being the most affected (***IPCC, 2007, Summary for Policy Makers)***.*** In most parts of Kenya, the temperature has gradually increased since 1960 (The National Climate Change Response Strategy – NCCR -, 2010). Use of ***Irrigation, climate smart agriculture (CSA) and crop insurance*** have been suggested as ***adaptation mechanisms***. FAO (2010) defines CSA as agriculture that simultaneously ***increases productivity***, ***strengthens resilience to climate variability***, ***mitigates GHG emissions*** and contributes to achieving ***food security and development objectives***. An FAO (2014) pilot study on CSA in Kaptumo in Nandi County shows that ***integrated crop-livestock systems*** can be relatively ***climate-friendly*** when combined with ***agroforestry*** and ***improved pasture management.*** How viable are these adaptation mechanisms and are there alternative options for addressing climate variability, change and unpredictability?

Challenges that Come with Devolution

In implementing Government Policy on devolution, many functions in the agricultural sector were devolved to County Governments to speed up development at the grassroots. ***To its credit***, devolution has brought key agricultural support ***services to the people*** ***leading to improved infrastructure*** particularly rural roads, which have ***improved smallholder farmers' access to markets***. Many Common Interest Groups (CIGs) have transformed themselves into Cooperative

Societies, which are legal entities giving members an opportunity to benefit from economies of scale in procuring goods and services and in selling their farm products. Largely because of devolution, most local leaders now feel empowered to fast-tract development in their respective areas. ***On the negative side,*** devolution has come with new challenges that must be firmly and effectively addressed. These challenges include ***mismanagement of available scarce public resources*** partly due to lack of preparedness for the job, inefficiency and widespread corruption; ***delays in disbursement of funds*** from the State to County Governments and ***negative politics***. Other challenges include ***new taxation rules***, ***un-harmonized standards***, ***conflict of interest during the budget approval process*** as well as inconsistency and ***lack of effective coordination*** between the State and County Governments. Being a key Development Expert in your respective discipline, ***what advice would you give the Government on how to effectively address devolution challenges to ensure success of the transformation initiative?*** Other challenges requiring your input and advice on how they should be effectively addressed include ***input intensification and subsidy***. Use of subsidies enable newer and modern technology to reach smallholder farmers, which is crucial in improving agricultural productivity and farmers' livelihoods. ***In your view, is the Government's Goal of using subsidies to improve farm productivity and farmers' livelihood being achieved?*** How successful are Kenya's subsidy programs and what adjustments would you recommend? ***If I were privileged enough to be a man of collar, I would say: Speak now or forever keep your silence!***

Challenges Associated with Information Systems and Innovations

Smallholder farmers' access to technology is crucial in transforming their agriculture. ***But do they get extension advice in real time when they need it for decision-making? What innovations propel smallholder farmers towards higher productivity and incomes? Which innovations do you recommend for up-scaling and out-scaling?***

Conclusion

To the conference organizers and professionals present here today, I ask:

1. As a country, have we made substantial new investments to build infrastructure that can withstand flooding, or to improve irrigation to make agriculture less vulnerable to drought?

2. Have we substantially changed the patterns of Kenya's smallholder agriculture by making it more resilient to climate change, variability and unpredictability?
3. Are we managing our shared water and other resources in the most effective manner?
4. Are there resources that would be better managed at the national level to enable Kenya achieve its goal of improving food supplies faster?
5. Do smallholder farmers in Kenya have adequate access to science and knowledge to inform their responses to the impacts of climate change?

   Although the Kenya Meteorological Services (KMS) regularly issues seasonal climate forecast such as this year's prediction of El Nino, rarely is climate forecast meaningfully integrated in decision-making despite its great utility in sensitive sectors of the economy such as agriculture. Coelho and Costa (2010) attribute this partly to climate science used in production of seasonal climate forecasts 1-6 months at coarse spatial resolution (100–200 km). They also attribute it to system science which investigates impacts of climate and decision-making. Effort to improve the quality of forecast by using regional climate models is a step in the right direction. However, we need to improve decision-making in a way that gives smallholder farmers more confidence in the accuracy of weather forecasts. We must at all costs minimize politics in seasonal climate forecasts where politicians use climate forecast to lobby for relief food or money that is later used for unintended purposes rather than using the available scarce resources to improve agriculture.

6. Are we conducting adequate and appropriate research to understand regional and local variations in Kenya's climate and sharing this information with those who need it most?

I hope by the time your leave this Conference you will have gained something useful that you can use to bring about the much needed transformation of Kenya's smallholder agriculture.

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