

Transformative Engagement Network

(TEN)

Building Resilience against hunger and climate change in smallholder farming
Communities through transformative engagement

banda chikondi butao banda stanislaus richard bonger
tenkir chinonge khumbi chipeta gabriel chipoya clara
chirwa esther chomba chansa daura moses downes
martin fiedler rachel gaveta elias grummell bernie imaan
treeza chosadziwa kadingi crissencia kamtambo vincent
kanduza ackson marko kalonga esther siyumbwa kaunda
jean kunkhuli mbewe simeon lewanika mwananyanda
mbiskusita lichilo idani lipalile kawana luhanga major
lungo francis luwe chiwaula gift masenga kabange
matamula swithern mate litumelo mataya bennet mbukwa
pauline misheck samakao mpolomoka daniel lupiya
msiska fred mtonga melina mtonga rita mudenda
cheelo hamulinda

RESEARCH PRESENTATIONS

mudenda glibert mukwita
judith kalaluka munthali chimuleke munthali chakufwa
kaulanda munthali kabenuka munthali wellings
murphy conor musanje kelvin
musenge henry museta norah
musweu jimmy mwango amideus mwale joseph mwale
masautso ndoba fidelis chibuye ndopu christine
nkoloma helen noone maggie nyambe godfridah
nyirongo chizamsoka phiri adrian ryan anne sakwata
everson bernard samayuwa chilala sangambo judith
sibalwa david sichilima francis silengo mitulo simfukwe
paul singini wales tembo mavuto watson jembo
hanyaya yerokun olusegun

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Dear Participant,

Welcome to the Research Presentations of the Transformative Engagement Network (TEN) project.

This project, between four universities, two in Zambia, one in Malawi and one in Ireland, aims to transform the nature of the engagement between the various stakeholders impacted by or concerned with climate change and food supply. The project is particularly focused on exploring ways to insert the voice and concerns of the most vulnerable food producers into climate change debates.

We know from existing research conducted by the International Commission on Climate change and Development (2009) and the United Nations Development Programme that knowledge about adapting to climate change and food security is failing to reach the smallholder farmers who need it most. They also note that the rapid impact of climate change renders many development responses inappropriate and makes the capacity for adaptability the central challenge of our time. The TEN project is firmly located within the context of these pressing and interlinked social and environmental challenges.

By way of addressing these challenges, the TEN project prioritises the inclusion of perspectives from different players concerned with climate change and hunger, in particular the perspectives of those living and working at the local community level. Combining the western socio-scientific knowledge found in universities, development agencies and government bodies with the lived knowledge of small-holder farmers, who are among the world's most excluded but most critical to adaptive success, is a major challenge that the project attempts to address.

The perspectives TEN seeks to bring together are not easy bed fellows. Communities are likely to favour ways of knowing the world that privilege holism and connectedness while universities privilege discipline-specific empirical research. The project's goal is to explore the possibilities of some kind of philosophical and practical meeting of these different positions, mainly through an adjustment on the part of the universities to a more contextualized understanding of the world. The direct importance of this goal is to ensure that as solutions are sought to the challenges of climate change, the knowledge of local communities and cultures can be drawn on to inform decision-making at national and international levels. The aim is to initiate exchanges of knowledge and expertise between rural communities, the agencies and organisations that work with these communities, and between national and international bodies concerned with climate change.

Research was undertaken on the TEN project as part of the Masters in Transformative Community Development. The Masters programme specifically recruited community practitioners, policy-makers and decision-makers who were already in positions of influence

within organisations, agencies and institutions that work directly with communities experiencing food insecurity, nutritional challenges and climate change. Abstracts summarising the research conducted by thirty-five students are presented here. We also include a brief report on Community Engagement in Malawi and Zambia based on research conducted among the students and the organisations where they work. The research provides insights into the nature of the relationships between frontline agencies and the smallholder communities with whom they work and in so doing it provides pointers to the kind of changes in discourses and actions that are possible and necessary.

On behalf of the project partners we would like to thank most sincerely the many people who contributed their time, expertise and enthusiasm to ensure the success of this project.



Bennet Mataya
Principal Investigator,
Mzuzu University



Anne Ryan
Principal Investigator,
Maynooth University



Olusegun A. Yerokun
Principal Investigator,
Mulungushi University



David Sibalwa
Principal Investigator,
Zambian Open University



Contents

Transformative Engagement Network Partners.....	5
Abstracts - Masters in Transformative Community Engagement Research Projects.....	6
Mulungushi University, Zambia	6
Mzuzu University, Malawi	16
Zambian Open University, Zambia.....	27
Community Engagement in Malawi and Zambia.....	35

Transformative Engagement Network Partners

Mzuzu University	Zambia Open University	Mulungushi University
TEN Team members	TEN Team members	TEN Team members
Principal Investigator – MATAYA Bennet	Principal Investigator – SIBALWA David	Principal Investigator – YEROKUN Olusegun
Project Manager – TEMBO Mavuto	Project Manager – CHIPETA Gabriel	Project Manager – MWALE Joseph
Masters Coordinator – KASULO Victor	Masters Coordinators – Our much respected departed colleague Mwananyanda Mbikusita Lewanika (2012-2014) MPOLOMOKA Daniel Lupiya (2015)	Masters Coordinator – DAURA Moses
Students:	Students:	Students:
BANDA Chikondi Butao	CHIPOYA Clara	KADINGI Crissencia
BANDA Stanislaus Richard	JEMBO Hanyaya Watson	KAMTAMBO Vincent
CHIRWA Esther	KALONGA Esther Siyumbwa	MATE Litumelo
GAVETA Elias	LIPALILE Kawana	MISHECK Samakao
IMAAN Treeza Chosadziwa	MASENGA Kabange	MUDENDA Cheelo Hamulinda
LUHANGA Major	MTONGA Rita	MUKWITA Judith Kalaluka
LUWE Chiwaula Gift	MUNTHALI Kabenuka	MUSETA Norah
MBUKWA Pauline	MWANGO Amideus	MUSWEU Jimmy
MTONGA Melina	NDOPU Christine	NDOBA Fidelis Chibuye
MUNTHALI Chakufwa Kaulanda	NKOLOMA Helen	NYAMBE Godfridah
MUNTHALI Wellings		SAMAYUWA Chilala
NYIRONGO Chizamsoka	Supervisors:	SANGAMBO Judith
SAKWATA Everson Bernard	CHINONGE Khumbi	
	SIBALWA David	Supervisors:
Supervisors:	KANDUZA Ackson Marko	BONGER Tenkir
FIEDLER Rachel	KUNKHULI Simeon Mbewe	CHOMBA Chansa
KASULO Victor	MUSENGE Henry	DAURA Moses
KAUNDA Jean	MUDENDA Gilbert	LICHILO Idani
MATAMULA Swithern		LUNGO Francis
MATAYA Bennet		MALUNGA Mwape
MSISKA Fred	Maynooth University	MUNSANJE Kelvin
MUNTHALI Chimuleke	TEN Team members	MWALE Joseph
SINGINI Wales	Principal Investigator – RYAN Anne	MWALE Masautso
TEMBO Mavuto	Project Manager – NOONE Maggie	PHIRI Adrian
	Masters Coordinator – MURPHY Conor	SICHILIMA Francis
	Project Coordinator – GRUMMELL Bernie	SILENGO Mitulo
	Project Chief Tánaiste Mzee – DOWNES Martin	SIMFUKWE Paul
		YEROKUN Olusegun

Abstracts - Masters in Transformative Community Engagement Research Projects

Mulungushi University, Zambia

Diversifying food production to achieve food security using a transformative approach: the role of traditional leaders in Mulungushi Farming Block

Crissencia Chinyama Kadingi, Mulungushi University

The aim of this work was to assess the role of traditional leaders in the quest for food security and diversification of food production in Mulungushi Farming Block. This Block is made up of camps manned by agricultural extension officers and further divided into agricultural zones for administrative purposes. In each camp there are 10 to 25 community level organized groups in form of clubs and cooperatives, jointly initiated by agricultural extension officers, or community development officers, and members of the community, in pursuit of livelihoods through collective ventures. Most ventures are agricultural, based on crop and livestock production. Mixed methods were used, which involved qualitative and quantitative research approaches. In this view, data collection included a survey questionnaire, unstructured face-to-face interviews, observation, and informal meetings. Purposive and systematic sampling methods were used of which two Chiefs, ten headmen and 115 farmers selected for the study.

The farmers had various forms of land tenure. Overall, close to half of respondents (48.7%) reported that they did not have sufficient income at all to cover basic needs for household members such as food, medicines, clothes, shelter, although 56.5% of the farmers indicated that food was available the whole year. In one Chiefdom, 80% of respondents indicated that they were food secure and more farmers of this Chiefdom considered they had high incomes; this contrasted the second Chiefdom where only 30% of farmers reported that they were food secure. No association was found between food security and the gender of the head of household ($p = 0.844$). Maize was the predominant crop with sweet-potato grown by 92%, cassava by 88%, groundnut by 50%, and vegetables by 69% of farmers. More than three quarters of the farmers (88.7%) were in agreement that they had adapted new farming practices which included changes in cultivation and application of integrated farming systems. The headmen and chiefs noted that implementation and operation of transformative approaches included: (1) gaining a more critical understanding of themselves as farmers and leaders of change and situations that impact them; (2) insight into the interests of others; and (3) selecting the best communication strategies and methods.

The interview data from one Chiefdom, where the Chief was particularly active in farming, showed the farmers to be harnessing a transformative approach to learning and teaching, such as implementing what the chief had learnt from interacting with extension officers and

cooperating partners in this farming community. Learning and teaching occurred through a variety of biodiversity and food security activities, particularly giving directions to subjects, counselling and making decisions. The other Chief contributed more on the business front. The paper explores the approaches and views of these chiefs and their headmen. It was concluded that traditional leaders are playing a transformative role and that the degree of commitment and involvement of a traditional leader is factor for diversifying food production to achieve food security in improving nutrition and food security. The finding of this study reinforces the significance of transformative learning in agriculture as an engine to economic growth of households particularly in addressing food insecurity. It is felt that if transformative learning can be enhanced and coupled with political action, the agriculture sector is likely to be able to reduce poverty more quickly than other sectors can.

Factors affecting the adoption of conservation farming practices by smallholder farmers in Lukanda Camp, Zambia

Vincent Kamtambo, Mulungushi University, Zambia

This study investigated the factors governing the adoption of Conservation Farming (CF) Practices in Lukanda camp of Mulungushi Block. The specific objectives were to investigate the level of adoption of conservation farming and also to identify the determining factors of adoption of conservation farming. Specifically, the following factors were investigated for relevance in affecting the rate of adoption: Age group of household head; sex of household head; marital status; education level; household size; length of stay in area; land size; land ownership; labour availability; capital ownership; labour affordability and bank loan access. Data was collected through administering of structured questionnaires and semi-structured interviews with those who had adopted conservation agriculture. Results show that education level and access to loans are the two factors that most significantly affected farmer's adoption of CF in Lukanda camp. This suggests that the more educated a farmer was, the more likely they are to adopt CF.

The findings have significant implications on the promotion of CF in rural areas where most people have no formal education. Educated farmers are better able to appreciate the advantages of the farming practices or are more amenable to changing farming practices than uneducated farmers. Providing micro loan facilities and encouraging basic education for farmers may be a viable policy option that would benefit the scaling-up of CF in rural communities.

Transforming Subsistence Agriculture on an Uneven Landscape of Access to Agricultural Credit and Inputs: Contribution of Contract Farming to Cotton and Maize Production Amongst Chang'ondo Farmers

Litumelo Mate, Mulungushi University

Contract farming is seen as a system for increasing productivity of smallholder farming through provision of credits, inputs and technical support by agribusiness. This system is viewed as an ideal arrangement for bringing rural communities into economic activity, thereby contributing towards rural development. The main objective of this study was to determine whether contract farming has influenced cotton and maize production amongst Chang'ondo farmers in the Kapiri Mposhi district. A sample of 336 contract farmers consisting of 78 females and 258 males, was selected by stratified sampling and subjected to questionnaire, interview and focus group discussion. All these farmers were engaged in cotton production between the 2009/2010 and 2013/2014 farming seasons and all were interviewed. The sample included farmers with small farms (typically 0.5 - 9 ha), emergent farms (typically 10-20 ha), medium scale farms (typically 20-60 ha) and large scale farms (>60 ha). The distribution of men across these 4 categories differed from that of women ($p = 0.008$). This was because a significantly greater proportion of the farms of women than of men fell in the small category and a significantly greater proportion of the farms of men than of women fell in the medium category. While greater proportions of the farms of men than of women fell in both emergent and large scale categories, the differences were not significant.

Overall, land availability was not a constraint amongst Chango'ndo farmers; the total area of land owned by respondents was much less than the land cultivated in each of the 5 seasons to 2013/4. None of the farmers, not even those with the least land, identified land availability as a constraint. This partly counters the fear that cash crop production affects food crop production negatively, increasing the exposure of rural communities to hunger. The yields of cotton per hectare produced did not differ between men and women. More land was allocated for maize than for cotton production; currently, maize production is the more profitable of the two. Nonetheless farmers continue to produce cotton even though their yields of this per hectare were well below the expected. They considered cotton contributed positively to maize production: how this could be is discussed, as are possibilities for improving food security.

Income Diversification as a means of building resilience against climate change: A case study of Mulungushi Farm Block

Samakao Misheck, Mulungushi University

The aim of the study was to establish if income diversification is a means of building resilience to climate change among smallholder maize farmers. Two farming camps were

chosen purposefully from the six such camps in the Mulungushi Farm Block situated in Kapiri Mposhi District, Central Province, Zambia. One of the chosen camps lay along the Great North Road and one was far away from any main road, for comparison purposes. Open ended questionnaires were administered to 70 randomly selected maize farmers in each camp; in addition five key informants were purposefully chosen, one Agriculture Extension Officer from each of the two camps, two village Headmen and one District Agricultural Officer; these key informants were interviewed.

This study revealed that only 2% of all the farmers of the study said they were unaware of climate change while 98% were aware and they perceived it as principally reduced rainfall. Seventy nine percent (79%) of smallholder farmers had diversified their income from the growing of maize into other income sources; of these, 77% had gone for off-farm diversification, 21% for on-farm diversification, and 2% had gone for both. While the maize harvests of diversified and non-diversified farmers were similar, those who had diversified their incomes reported increased food levels, incomes and savings; the diversified farmers were therefore considered to be more resilient to climate and economic shocks. Further, farmers who had transformed their income sources by diversifying into off-farm activities recorded an increase in food accessibility at household level. Forms of diversification are discussed and recommendations made for strengthening this element of food and livelihood security.

An assessment of the scaling-up of conservation farming in Mulungushi Agricultural Block

Cheelo Hamulinda Mudenda, Mulungushi University

Zambia has subscribed to international agreements/goals e.g. MDG number one and domestic policy like Vision 2030 and the National Agricultural Policy which commit the country to poverty alleviation and improving people's livelihoods through increased income. Conservation farming (CF) is one of the avenues used to attain these goals through increased agricultural productivity. This research assesses the potential for scaling-up CF and ascertains the impact of some of the components of CF on crop productivity among small-scale farmers. Based on this case study, insight is provided as to the feasibility of realising the objective of the Conservation Agriculture Programme II (CAPII) programme of having at least about 30% of Zambian farm and rangelands under CF by year 2015. A structured questionnaire was administered to 90 randomly selected lead farmers. Epidata data management software was used for database designing and questionnaire data entry and validation. Stata 10.0 (StataCorp, 2008) was employed for all quantitative data analysis.

Using linear regression we predict that under current conditions the percentage of land owned that is under CF will increase at a rate of 0.76% annually. Therefore, we conclude that the target of 30% land under CF for Mulungushi agricultural block will be attained in 2019 should funding of the projects that promote CF continue. Results show that all the

components of CF are being practiced to an appreciable degree with minimum tillage and crop rotation being practiced among 85% and 95% of respondents respectively. On average each lead farmer recruited 16.3 farmers into CF in 2014 compared to 6.3 in 2009 giving a total of about 1437 participating farmers adopting CF in 2014 in the block. Weed management was the most frequently reported challenge of CF. Lack of subsidies and pest infestations were also identified as challenges to implementation. These results suggest that if solutions can be found for labour problems, CF can become an attractive option for all farmers.

Gender Differentials in the Production and Marketing of Maize in Kakulu Camp, Zambia.

Judith Kalaluka Mukwita, Mulungushi University

In Africa there are still disparities between men and women farmers where cash crop participation in farming and benefits is concerned. In Zambia most male small holder farmers participate in producing maize as a commercial cash crop while the women farm the lower status subsistence crops such as groundnuts and sweet potatoes. The purpose of this study was to explore the impact and influence of gender on maize production and marketing in Kakulu Camp, Zambia. Data were collected from November 2014 to March 2015 in ten villages from a sample of 202 male and female farmers using a structured questionnaire and focus group discussions.

Findings showed that gender was not a significant factor in most domains of maize farming life. However, significant differences were seen when it came to marketing of the crop. These differences came out more clearly during the analysis of the qualitative data from focus group discussions. More male farmers were found to market their crop than their female counterparts. There were also statistically significant associations between gender and education and land ownership in this setting. Though there were some variations at micro levels as shown in the focus groups, in the ability of the male and female maize farmers to access production resources and support services with men being more favourably disposed to agricultural inputs than women, however, this was not a pattern that was very frequent.

A significant finding for this study is that, even with a large randomized sample using a robust questionnaire, some farming dynamic activities, particularly those in which both men and women are more likely to engage, are “invisible” (cannot be captured) until a mixed methods is applied. This is significantly true when household family dynamics are at play. Although there was a mixed representation of maize subsistence farmers, this study showed that maize is a viable economic opportunity in Kakulu camp and particularly for women. We conclude that there was no gender gap or marked gender difference in this study. Sustaining gender equality is not only good for women; it is also good for agricultural development given the high participation levels of women. Land ownership is a critical issue in agriculture

because access to other productive resources such as water, irrigation systems, and forest products are tied to land tenure. Therefore policy should address gender disparities in land ownership and security of tenure for women in areas presided over by traditional leadership.

Use of Indigenous Knowledge for Climate Change Adaptation by Small Scale Farmers in Mulungushi block - Kapiri Mposhi

Norah Museta, Mulungushi University

The use of indigenous knowledge for climate change adaptation by small scale farmers in Mulungushi block was investigated. The study specifically identified indigenous knowledge that exist in the block, its application in climate change adaptation, challenges faced by small scale farmers in using it and similarities between indigenous knowledge and scientific knowledge in climate change adaptation. Data was collected using structured questionnaires and focus group discussions from small scale farmers, elders and headmen. Semi-structured questionnaires were used to collect data from key stake holders in the community. Quantitative data was analysed using stata and qualitative data was analysed using quick impressionist summary, thematic analysis and content analysis.

Findings show that small scale farmers use indigenous knowledge in climate change adaptation. The moon, sun, plants/ fruits, insects, birds, wind direction, wind intensity, rainfall intensity and temperature are used to predict the coming of extreme weather events. Challenges experienced in applying indigenous knowledge include lack of documentation, lack of support from government and scientists, lack of explanation and dosages in its application, and perceptions of it being viewed as backward by the elite generation. Similarities between scientific knowledge and indigenous knowledge include use of wind direction and temperature to predict the coming of extreme weather events, methods of cultivation, fertilisation methods and the crops grown in various scenarios of climate change.

The research can bring transformation to Mulungushi block if well utilised. Small scale farmers can build resilience against hunger if the indigenous early warning systems translate into farmer preparedness for the coming of extreme weather events by engaging into adaptive activities in order to avoid devastating effects of climate variability. The adaptation methods includes growing crops which are tolerant to different weather extremes, using appropriate traditional methods of food storage and employing conservation farming. This will improve their standards of living through increased yields and income.

Comparative Maize Biomass Yields between Minimum Tillage and Conventional Tillage Methods in Mulungushi Agricultural Block

Jimmy Musweu, Mulungushi University

This comparative study of maize biomass yields between minimum tillage and conventional tillage was conducted in the Mulungushi Agricultural Block in the Central Province of Zambia between September 2014 and May 2015. Maize is an important crop in Zambia for staple food requirements and processing of various other consumables. It is grown in all the three agro-ecological zones of Zambia mostly by smallholder farmers who rely on rain-fed agriculture for its production. With the growing debate on climate change and the need to adopt and build resilience among communities, researchers have examined different tillage methods particularly in the production of maize influence yields. The two common tillage methods that have been under investigation are minimum tillage and conventional tillage, with many studies favouring minimum tillage to cope with *inter alia* drought and rising temperature and to improve productivity. This study compared maize biomass yields between minimum tillage and conventional tillage and quantified the differences. The comparison was done by comparing fresh and dry weights of maize plant samples grown under the two different tillage methods and the resultant data subjected to statistical tests to determine any significant difference in the sample means. Excel (2010) software was used where F-tests were conducted to determine whether sample variances were equal and t-Tests were conducted to determine whether sample means were significantly different.

The study and statistical tests revealed differences in biomass yields in favour of minimum tillage where the dry weight for maize cobs was 0.27kg ($t = -7496.1402$) to 0.17kg ($t = -11513.904$) under conventional tillage. Therefore, the study concluded that there was a significant difference between the two tillage methods and there was a real need for transformation among smallholder farmers towards adopting practices like minimum tillage whose benefits provide better opportunities for food security and resilience in the long term. Further knowledge is required to put minimum tillage in the context of not only improving productivity but also a tool for environmental sustainability and resilience to climate change.

Climate Change Perceptions and Farmers' Coping Strategies: A case of smallholder farmers in Kakulu Agricultural Camp, Kapiri Mposhi District

Fidelis Chibuye Ndobu, Mulungushi University

Climate change adversely affects the Zambian economy due to the country's heavy reliance on rain-fed agriculture. Frequent droughts, occasional floods and storms have had adverse effects on food security despite the occasional surpluses the country records during good crop years. The impacts of these hazards have included widespread crop failure, outbreaks of animal diseases, dislocation of human populations, and destruction of property and infrastructure. This study was conducted to establish farmers' perceptions of climate change and coping strategies employed in dealing with the negative impacts of climate change in

Kakulu Agricultural Camp of Kapiri Mposhi District in Zambia. A cross sectional household survey was carried out using a structured questionnaire and the study applied both qualitative and quantitative methods of data collection and analysis. A total of 156 smallholder farmers and 10 key informants were interviewed in this survey.

Results of the study revealed that most of respondents had observed changes in climate in the last 10 years. Respondents perceived frequent droughts, increased temperatures and decrease in rainfall as the main climate related hazards which were occurring frequently and adversely affecting production. Coping strategies adopted by local farmers were crop diversification, conservation farming, crop and livestock farming, charcoal selling, relief food, and food rationing. Age of household head, farm income, education and farmers' experience were factors which positively and significantly influenced the choice of coping strategies to climate change in Kakulu Camp. Although farmers were practicing coping strategies, they were far from mitigating climatic shocks.

There is, thus, strong need to encourage smallholder farmers to raise the level of coping strategies based on longterm perspectives such as crop diversification, crop and livestock production, and conservation farming which would make them more resilient to climate change.

Assessing Impact of Subsidized Support Programs of Maize on Productivity and Livelihood in Kapiri Mposhi - Zambia

Godfridah Nyambe, Mulungushi University

The Zambian state intervention in the Maize economy through the Farmer Input Support Program (FISP) and the Food Reserve Agency (FRA) has continued to be used as a policy instrument to fight poverty and hunger in Zambia, with massive expenditures of an average of 30% and 28% of total agricultural sector expenditures, on the FISP and the FRA respectively, nearly 50% of total spending on agricultural sector Poverty reduction Programs every year. Yet poverty among the rural small-scale farmers has remained high, with household incomes inadequate to meet the cost of basic food basket and essential non-food items. These input (FISP) and output (FRA) support programs seem not to lift the standards of living for the intended beneficiaries.

This study aimed to assess the impact of the input and output support programs on productivity and improvement of livelihoods by describing the impact of FSP/FRA on maize production and marketing practices of FSP beneficiaries.

The households of the majority of respondents were male headed (57.4%) and the majority of heads had primary, followed by junior secondary education. As expected, the primary attraction of the FISP is the low/ subsidized prices of both fertilizer and seed. Both seed and fertilizer purchased by respondents under FSP increased from 2010 to 2013 but not in 2014 when farmers reported that they were only allowed to purchase less than 40% of their

fertilizer needs under this scheme. Both land under cultivation and grain harvested showed similar patterns. The lack of increases between 2012 and 2014 could be explained by the inadequacy of the FISP program at that time. The amount of maize sold to FRA, per farmer, fell between joining the scheme in 2010 and 2013, with the most dramatic drop occurring in the last year. At the same time the amount sold to the private sector in those years rose rapidly.

While all the respondents were FISP beneficiaries 70% sold their maize grain to FRA while 89% sold it to private buyers. As reasons for not selling maize to FRA, 41.4% of respondents cited late payments, 31% subsistence harvests, 17.2% selling points too far and 3.5% late collection; 6.9% gave no reason. The reasons they gave for selling to the private sector were payments in cash (91.2%), buying early (19.1%), collection at farm (11.8%) and good price (5.9%). Clearly, the main problems with selling to FRA were late payments and transporting the grain to the intake points. The private buyers gave farmers access to money early and reduced the need to store the grain.

There was a steady increase in livestock and farm assets between 2010 and 2014. The only significant asset that did not show improvement was tractor ownership. And 79% of the farmers attributed the increase in asset and livestock ownership to the FISP/FRA program. In addition most of the farmers indicated that the earnings due to the FISP program helped them in the education of their children and medical bills.

Clearly the scheme has had a very positive impact on household production, income, asset acquisition and livelihood, but the increases have not reduced the severity of poverty adequately. Suggestions are made about how the opportunities and challenges presented here may be approached.

Farmers Perceptions of and adaptive strategies to changing rainfall patterns in Mulungushi Agricultural Block

Chilala Samayuwa, Mulungushi University

Farmers' perceptions to changes in rainfall are important in understanding the measures taken to create adaptive responses that mitigate the threat of food insecurity. This research creates knowledge flows between farmers and experts in policy formulation and extension through identifying farmers' perceptions of onset, duration and cessation of rainfall seasons. These are then compared to meteorological trends. Changes in management practices in crop and livestock production adapted by farmers' to mitigate changing rain pattern are also identified. Interviews (including open and closed-ended questions) were used to capture the perceptions of changes in rainfall held by smallholder farmers in Luansimba, Imansa and Lukanda camps of Mulungushi Agricultural Block in Kapiri Mposhi district of Zambia. Perceived changes were compared with the actual daily rainfall trends

from local rainfall stations over the period 1980-2011 to determine the correlation of seasonal onset, duration and cessation.

The findings suggest that the perception of delayed onset and early cessation of rainfall coincided with the daily rainfall trends. This creates an opportunity for policy makers, scientists, and extension agents to engage with and appreciate what farmers' perceive and adapt to in order to create initiatives that are relevant to building resilience against hunger in transforming the farming community.

Community responses to child stunting: A case study of Kambosha farming block in Kapiri Mposhi, Zambia

Judith Sangambo, Mulungushi University

Child malnutrition can lead to poor developmental start for children, yet this situation can be avoided. Zambia has reported a prevalence of this condition which is a cause for concern. Therefore a study was conducted at Kambosha Farming Block of Kapiri Mposhi District in central Zambia to examine how the community has responded to reduce the incidence of child malnutrition among children aged 1-5 years. A sample size of one hundred persons, consisting of ninety seven smallholder farmers who are heads of households with children under five years old, one Headman, one Nurse and one Extension Officer were interviewed using structured questionnaires as well as Focus Group Discussion in order to obtain relevant information. The levels of malnutrition, causes of malnutrition and strategies that could prevent malnutrition were identified.

The results suggested that malnutrition was common in the community and the cause was inadequate food intake due to poor farming yields caused by lack of farming inputs, floods and droughts as well as lack of knowledge on proper nutrition. Farmers indicated that they depended on social networks as a method of coping with malnutrition though the coping strategy was not sustainable. The community identified crop diversification, easy access to farming input, easy access to medical services and educating people on importance of nutrition as cardinal in preventing malnutrition.

The influence of traditional cultural beliefs and modern religious values on the adaptive capacity of smallholder farmers in Bolero, Malawi.

Chikondi Butao Banda, Mzuzu University

This research aims at determining the influence of traditional cultural beliefs and modern religious values on adaptive capacity to climate change in Bolero. Specifically, the study maps out traditional cultural practices and modern religious values and demonstrates their influence on adaptive capacity to climate change. The research draws on participant observation, focus group discussions, in-depth interviews, survey questionnaires, document reviews and key informant interviews to collect data where key themes emerged inductively and open coding was employed to analyzing the data.

Results reveal that in adapting to climate variability and change, respondents apply both modern religious values and traditional cultural beliefs and practices, though with varied magnitude. Traditional cultural practices and beliefs regarding wife inheritance, production and consumption, hygiene, birth and death rituals and taboos are found to have negative influence on entitlement rights, livelihood decisions and moral capital of women and widows in Bolero. Intergenerational gaps between the elderly and youth were found to create tensions in validating, accepting and applying modern religious values and traditional cultural belief systems.

This research strongly suggests that transformative community engagements between the elders, traditional and religious leaders, witch doctors on the one hand and, development partners on the other hand as an alternative approach in promoting both structural and attitudinal changes necessary to uproot the locally perceived bad traditional cultural beliefs, practices, taboos and modern religious values in the area.

Assessment of Conservation Agriculture Adoption in Bolero EPA in Rumphi District of Malawi

Stanislaus Richard Yangazu Banda, Mzuzu University

The study assessed factors that influence farmers' adoption of Conservation Agriculture and the challenges that farmers face in implementing Conservation Agriculture in Bolero Extension Planning Area (EPA). Data was collected from one hundred and twenty (120) respondents using a pre-tested structured questionnaire and a stratified random sampling technique was used to identify respondents based on two categories that included non-doers/non-adopters and doers/adopters. The binary logistic regression model was used to examine factors that influence farmers' adoption of Conservation Agriculture and challenges that farmers face. An open-ended questionnaire was also used to support interviews with

fifteen (15) Agricultural Extension Development Officers working in the selected EPA. Secondary data were obtained from published and unpublished documents. Analysis of findings reveal that the goodness of fit Hosmer and Lemeshow (H-L) test of the model shows 0.047 that is lower than 0.05, suggesting that the model fitted to the data well. The overall analysis of factors showed that out of eight (8) predictor variables, five(5) variables (Gender, marital status, education, income and land ownership) were significant predictors of farmer's adoption ($P < 0.05$). Out of the five significant predictor variables, three had positive significant coefficient (Gender, education and income). The research also found out that the following factors were the main challenges that farmers face to adopt CA: a strong culture of ridge based cultivation, Stover mining, livestock problem and multiplicity of maize Stover usage, scarcity of CA implements and herbicides, long break-even points of CA benefits and lack of clear guidelines for a specific CA practice. Perceptions of non-adopters are that CA is generally labour intensive especially when it comes to soil cover where at least 30% cover is the minimum requirement.

On other hand, adopters cited reasons for sustaining CA as the benefit achieved through reduction in labour requirements; availability of labour for other livelihood activities; increase in yield arising from strict management regime of CA (even in years with erratic rainfall) and noticeable reduction in the loss of the fertile top soil.

This paper shows that adaptation to climate change involves changes in agricultural management practices in response to changes in climate conditions. Adaptation often involves a combination of various individual responses at the farm-level and assumes that farmers have access to alternative practices and technologies available in the area. This is key to transformative community development where local communities become active participants in influencing responses to climate change for local food production, gender equality, livelihood, health and nutrition.

Climate Variability: How it Affects Women's Adaptive Capacity on Food, Water and Energy needs

Esther Stone Chirwa, Mzuzu University

Food, water and energy are critical necessities that sustain life and drive the daily livelihoods of a household. There is linkage between food, water and energy since households depend on cooked food and water and energy are vital resources that support food preparation. Climate variability is affecting the availability of these vital resources. Women are responsible for sourcing and utilizing food, water and energy in the home due to defined gender roles, yet they have little control over decision making due to power imbalances between males and females.

This study was conducted in Bolero, Rumphi district, focusing on assessing the stretching adaptive capacity of women to effects of climate variability on food, water and energy

needs. Mixed data collection methods were used to collect data from 111 respondents. Data were analyzed using content analysis to identify themes and discourses on food, water and energy needs. The findings established that women have continuously ensured provision and governance of these resources in their households. Findings have also established that households rely on maize for food which may affect their coping capabilities. Furthermore, increasing water and energy needs with no alternatives to firewood impacts on food consumption at household level. The results emphasize the need to change people's attitudes about food and to advocate environmentally friendly technologies that would reduce women's workload in meeting food, water and energy needs. Improving women's access to resources and promoting equality will enhance their adaptive capacity to effects of climate variability.

Crop Yield Responses to temperature and Rainfall Variability in Bolero, Malawi

Elias Gaveta, Mzuzu University

The intensity and distribution of rainfall and temperature affect crop yield output and as such households dependent on rain fed agriculture are vulnerable to climate change and variability. In Bolero, up to 87% of the households experience food shortage especially in the months of January, February, March and April (Mataya et al., 2014). Understanding the nature of temperature and rainfall variability equips farmers to plan ahead and adapt accordingly. This study which was conducted in Bolero, Malawi, aimed to analyze rainfall and temperature trends, examine the relationship with four main food crops (maize, cassava, millet and groundnuts) and characterize farming practices with a view to establishing to what extent farmers have utilized farming practices that respond to temperature and rainfall variability.

In order to assess the variability, sixty years of rainfall data, 32 years of temperature data and 18 years of crop production data were analysed. Rainfall and temperature data was supplied by the Department of Climate Change and Meteorological Services, Bolero Meteorological Station. The rainfall data available for this study was collected from 1954 to 2013, while temperature data were collected between 1982 and 2013. The Ministry of Agriculture through the planning department of Rumphi Agriculture District Office provided data on crop production gathered between 1996/97 and 2013/14 farming seasons.

In addition to the statistical data household questionnaires were administered to 120 lead farmers from four sections (Bolero, Bata, Chozoli and Luviri), representing 37% of lead farmers and 30% of the sections. Lead farmers were targeted because of their role in agriculture extension delivery whereby they facilitate knowledge sharing and farmer to farmer learning.

The findings of this study imply that Bolero will most likely become drier and warmer in future. They also showed that total annual rainfall has minimal influence on crop yield as compared to monthly rainfall variations. Ground nuts and maize are more sensitive to climate variability as compared to cassava and millet. The increasing temperature trend displayed the potential for reducing land productivity. However, there are opportunities for transforming food production and these include; (i) most of the farmers own the land they cultivate which favours the adoption of conservation agriculture and agro-forestry and (ii) farmers are aware that cassava and millet are resilient crops. Despite this awareness, however, cassava and millet are not popular as staple foods. There is a need to undertake interventions that (i) focus on the reasons why these foods remain unpopular (ii) make good quality seeds available and (iii) provide information on how to prepare and cook these foods. Crop diversification should also be promoted to spread climate risk at farm level and to promote nutrition and income source diversity. Findings also highlighted the need to provide seasonal weather forecasts to farmers.

Traditional knowledge in early warning of dry spells in Bolero communities, Malawi

Treeza Chosadziwa Imaan, Mzuzu University

This research aimed to assess the use of traditional early warning systems as adaptation to dry spells in Bolero, Malawi. The existence and use of traditional early warning systems in Bolero were explored as was the role of the government in promotion of these systems. Fifteen villages in the territories of five Group Village Headmen were chosen purposively because they were the areas subject to significant dry spells. The research was carried out using focus group discussions, key informant interviews, and document review. On average, the group discussions were conducted with forty percent women, twenty percent youth and forty percent male.

It was found that there are traditional early warning systems in the area but these are not documented and nor are they supported by government except in five villages where Action AID in partnership with the government is active. Signs identified by community members are listed, together with their meanings.

Scientific early warning systems are also not very accessible to the people of Bolero and of the six villages that knew about scientific early warning systems, only two confirmed that they used them; in contrast, all the communities used traditional knowledge in predicting dry spells.

It is recommended that the communities be supported to combine their knowledge with scientific knowledge in coping with shifting weather patterns.

The influence of farmer perception and project implementation process on uptake of rainwater harvesting tanks for food security in Bolero, Malawi

Luhanga Chimukwayaya Major, Mzuzu University

This study explored the influence of farmer perception and project implementation process on adoption of rainwater harvesting (RWH) tanks for food security in Bolero, Malawi. Data was collected from 10 purposefully selected villages using semi-structured interviews, focus group discussions and direct observations involving 68 respondents comprising extension workers, project participants and non-participants. Data collected was analysed using descriptive content analysis.

Study results show that unsuitable above ground RWH tank size was promoted for backyard irrigation. The 10m³ tanks could not irrigate crops to maturity and farmers could not realize attractive benefits from the produce. Results also reveal inappropriate approach used during technology introduction. Project introduction lacked publicity and community involvement in planning and participant selection. Participant selection was biased towards village heads hence RWH tanks were widely perceived as meant for village heads only. The study concludes that RWH tank size and poor implementation processes created a negative community perception towards RWH tank technology thus resulting in low uptake. To enhance technology adoption, this study recommends improvement in tank size and implementation approach. Above ground RWH tanks with a capacity of 30m³ and above should be promoted in arid areas with increased effort in community involvement in introducing technology.

Institutional Arrangements and Adaptation of Climate Change Mitigation Practices in Bolero-Malawi

Gift Chiwaula Luwe, Mzuzu University

This year (2015) in Malawi as a result of adverse impacts of extreme weather and climate variability floods affected one million people from 15 of the country's 28 districts; 230,000 people got displaced, 106 people got killed and 172 others were reported missing (The Nation, May 2015). The Malawi Vulnerability Assessment Committee reports a 30.2% drop in maize production from last year's 3,978,123 to 2,776,277, (MVAC, July 2015). The report further indicates that the country's population of 16,310,431 has been left with a maize deficit of 223,723MT from a projected national consumption estimated at 3,000,000 MT of the staple crop. A population of 2,833,212 will require humanitarian assistance for a period of 3 to 6 months from October 2015 to March 2016 according to the report. Late onset of rains, dry spells in February and March and early cessation of rains are recorded as having brought about the food shortage situation the country is currently grappling with. Drought remains a serious problem. Over the past 15 years there have been not less than 6 episodes of drought affecting agricultural production according to a scoping study by Christian Aid.

Data from the metrological office in Bolero, where this study is located, shows that the area is receiving less and less rainfall. Sometimes very heavy rains fall over a short period of time and dry off well before crops mature leading to low harvests and therefore food insecurity and malnutrition for most households.

The TEN Baseline Study shows that 58% of the population understands that the irregular rainfall or dry spells being experienced in the area is a consequence of climate change and that the food insecurity situation is directly linked to this phenomenon. Nevertheless, knowledge in climate change mitigation practices acquired overtime by the community members is not significantly transforming the Bolero community and not enabling them to effectively cope with the adverse effects of climate change.

This study set out to understand the reasons why smallholder farmers in Bolero fail to uptake expert advice from institutions in mitigating the adverse effects of climate change. The study also attempted to understand the reasons for local institutions failure to enhance local people's adoption of climate change practices and to coordinate communities' efforts in climate change mitigation. Thus, the study revolved around research issues such as; what are the reasons for communities and farmers failure to adopt climate change mitigation practices, why do farmers relapse into their old farming practices after projects phase out. Other research issues explored in this study included how local institutions engage with and facilitate local people's efforts in climate change mitigation in Bolero.

The study used a household survey to gauge farmers understanding of climate change and its effects on livelihoods, and what they do to mitigate the adverse effects. Key informant interviews were conducted with experts in climate change mitigation in the district. Focus Group discussions were organized to triangulate information obtained through household survey and key informant interviews. Data from the study suggest that although smallholder farmers in Bolero are engaged in a number of climate change mitigation initiatives, adoption of mitigation practices has remained elusive, rendering farmers vulnerable to adverse effects of climate change. Climate change mitigation efforts in this area remain uncoordinated with existing local institutions failing to properly engage with other structures of the local government at district level to bring about sustainable transformation of livelihoods. The paper acknowledges that significant resources have been channeled towards climate change mitigation initiatives including building the capacity of local institutions to coordinate communities' climate change mitigation efforts in Bolero. The study found out that despite these investments in climate change mitigation projects; climate continues to have a serious negative toll on the livelihoods of many farmers in the area and communities have remained food insecure, poor and widely malnourished. The study notes that local institutions instituted to accelerate communities adoption of climate change practice, coordinate and sustain community climate change mitigation efforts have remained largely ineffective in fulfillment of their role as demonstrated by their failure to engage with local communities and effectively linking them to local government structures for continuity of climate change efforts after projects phase out.

Uncertainties in changing temperature patterns, ultra violet radiation levels, and rainfall and wind patterns continue posing major challenges to livelihoods for the rural poor in Bolero. The study concludes that unless smallholder farmers uptake advice from institutions on climate change adaptation and local institutions are capacitated to enhance community level adoption of climate change practices, coordinate and sustain communities' climate change initiative, communities in Bolero will continue living under perpetual states of poverty, hunger and acute malnutrition.

Investigating the influence of Communication Channels on Adoption of Climate Smart Agriculture in Bolero, Rumphi District in Malawi

Pauline Kalumikiza Mbukwa, Mzuzu University

Many agricultural technologies are being promoted in Malawi to encourage smallholder farmers to adapt to climate change effects. One such technology is Climate Smart Agriculture technologies (CSAs), which in this context, refers to an integration of several technologies such as conservation agriculture, agroforestry, irrigation, compost manure making, construction of marker ridges, integrated soil fertility management, intercropping, pit planting, and small scale livestock keeping. However, uptake of these new agricultural technologies remains low and lack of information is presumed to be one of the major causes for low adoption rates.

This study was conducted in Rumphi district in Northern Malawi to investigate whether communication channels influence the adoption of CSA so as to inform CSA promotion programmes. The study was conducted in three villages Jalira section of Bolero EPA, purposively sampled due to low adoption of CSA technologies. One hundred and four farm households were randomly sampled to participate in addition with two focus group discussions and key informants interviews (KIIs).

Study findings revealed that the communication channel preferences of the small holder farmers were as follows: extension staff 69.2%; followed by radio 17.3%; and lead farmers 12.5%. The current dominant communication channels being used for CSA technology promotion are extension officers and lead farmers. These findings highlight the potential of using radio for CSA messages which would enhance the reach of CSA messages in areas not reached by extension staff. The study also revealed that the CSA messages are communicated in a top-bottom approach hence necessitating the need for a more transformative engagement approach in which the farmers would not be merely passive recipients of information. Finally, there is poor coordination among the different agencies and bodies who disseminate CSA information which leads to confusion among farmers. These findings are of great significance at both local level and national level, because they inform key stakeholders in the agricultural sector of some of the problems that inhibit the adoption of CSA technologies.

Cultural barriers to adequate dietary intake in drought prone areas of Bolero, Malawi

Melina Portia Mtonga, Mzuzu University

Cultural barriers shape dietary behavior and influence adaptive capacity of rural communities living in climate change prone regions of Sub Saharan Africa. This study was conducted to assess the role of cultural barriers on dietary intake among households living in drought prone areas of Bolero, Malawi. The study involved 100 respondents (37 men & 63 women) selected purposively from six villages in Lundu and eleven villages in Bolero-A Sections. More women were targeted because preparation of meals was generally women's responsibility. Mixed methods of community dialogue workshops, desk review, participant's observations, focus group discussions and key informant interviews were used to collect qualitative data. Data was analyzed by thematic content analysis and descriptive statistics.

The study found that food taboos persist in both study sites with more taboo adherence reported in Lundu than Bolero-A. Overall, women were most affected by food taboos due to gender dimensions of obedience, dependency and submissiveness which deterred women from making independent decisions on food and livestock production and food consumption. Food taboos might reduce women's adaptive capacity to climate variability and might contribute to consumption of low nutrient diets, leading to under nutrition, especially, in pregnant women who had a range of tabooed foods. Although coping strategies to food taboos were in place, they were insufficient to guarantee access to adequate diets and improved adaptive capacity. Respondents campaigned against harmful food taboos and negotiated for reconstruction of gender contracts. Traditional leaders advocated for elimination of harmful taboos while Government Extension staff re designed project activities and extension messages based on prevailing food taboos for attainment of balanced diets.

Smallholder farmers perceptions of climate change and adaptation in Bolero community, Malawi

Chakufwa Kaulanda Munthali, Mzuzu University

Smallholder farmers' perceptions of climate change are important for determining the uptake of adaptation strategies. This study assessed perceptions of climate change among smallholder farmers in Bolero Community, Malawi. Data was collected through application of a knowledge, attitude and practices (KAP) survey and focus group discussions and analysed using standard qualitative and quantitative techniques.

Findings reveal that the majority (74%) of respondents perceived that rainfall amounts had decreased over the past ten years, however, such perceptions are not supported by data collected for Bolero by the Malawi Meteorological Services. The study revealed that access

to climate change information, access to loans, access to water, access to markets supports smallholder farmers in developing and undertaking climate change adaptation strategies. In order to increase adaptation rate of smallholder farmers to climate change, this research recommends that climate change projects should not only focus on technical approaches but should also consider social aspects such as perceptions, attitudes and motivating factors. Communication based interventions need to be promoted, going beyond merely sharing information and spreading awareness on climate change issues to promoting specific behavioural practices that are socially and economically feasible for the population of Bolero Community to implement.

Adaptive capacity of cattle farmers to climate change in Bolero Extension Planning Area, Malawi

Wellings Chiling'oma Munthali , Mzuzu University

This study which assesses the adaptive capacity of cattle farmers to climate change was conducted in Bolero Extension planning Area in Rumphi district of Malawi in 2014/2015. Reports show that there has been rapid drying up of pastures and drying of water bodies due to decreased rainfall. Land holding for cattle grazing is also diminishing in Bolero due to expansion of crop cultivation and human population growth. The aims of this research were to: (1) characterize the pasture and water availability for cattle in Bolero; (2) assess how cattle farmers respond to the drying up of pastures in Bolero; and (3) assess how cattle farmers respond to drying up of water bodies in Bolero.

Bolero has 12 agricultural sections with 2,726 cattle and 321 cattle farm household population. The study purposively sampled 128 (40 %) cattle keepers. These were proportionally representative of the population size of cattle farmers in all the 12 sections. Data were collected through a survey questionnaire, focus group discussions and consultations with key informants and were analysed using Statistical Package for Social Sciences.

The study results confirmed earlier reports that cattle production is being impacted by rainfall variability through diminishing grazing land, limited water points resulting in increased distances to fetch water and find suitable pastures during the dry season.

The study found that majority of cattle keepers said they practice: (i) mobility when it comes to fetching water and seeking pasture during scarcity and found that cattle farmers are felt the impact of pasture and water variability differently in the study area – this impacts less on those cattle farmers who are close to the Rukuru and Lunyina rivers and more on those residing in sections very far from the rivers; (ii) livelihood diversification including growing crops such as tobacco, selling surplus food crops and keeping other types of livestock such as goats, pigs and chickens; and (iii) greater cooperation among cattle farmers who share resources such as communal grazing land and who allow cattle to feed on crop residues communally without restriction to owners of the crop fields. The study has also found that

the impacts of climate change vary across the area. It was found that the cattle farmers who grow maize and other food crops more than tobacco stand a better chance of having crop residues closer to their animals to feed them during pasture scarcity than those who rely on tobacco as their major crop.

Adoption of Renewable Soil Fertility Management Technologies in Bolero Extension Planning Area (EPA), Rumphi, Malawi

Chizamsoka Nyirongo, Mzuzu University

The study explored smallholder farmers' perceptions of soil fertility levels and climate change and analyzed factors affecting the adoption of renewable soil fertility management technologies (RSFMTs), namely agroforestry (fertilizer tree systems), residue management, crop rotation and intercropping with leguminous plants (green manure) in Bolero Extension Planning Area (EPA) in the Rumphi district, Malawi. It further looked at strategies for improvement in the adoption of the technologies. Data on people's adoption was collected from Bolero A, Bumba, Chirambo and Jalira strata covering one hundred and thirteen (113) respondents using a pre-tested structured questionnaire, key informant interviews, focus group discussions and literature reviews. Respondents for the study were selected using a simple random sampling method.

The majority of respondents perceived that the current soil fertility levels were decreasing and that climate change is affecting them negatively. The study used a logistic regression model to analyze the factors affecting adoption. Household head decisions, land ownership, technology attributes, farmers' groups and contact with extension agents were the most important factors influencing adoption of RSFMTs. The study recommends that active participation and involvement of smallholder farmers, improvement to stakeholder collaboration and more awareness and dissemination of information as regards smallholder agriculture are required in the promotion and adoption of agricultural-related technologies in Bolero EPA, if we are to improve smallholder agriculture to reach poverty reduction and food security objectives.

Factors Affecting Adoption of Compost Manure among Farmers in Bolero, Rumphi District, Malawi

Bernard Everson Sakwata, Mzuzu University

Low adoption of soil fertility improvement technologies in Malawi and other countries in Sub Saharan Africa is a major concern in the attainment of sustainable food security in the region. This paper examines factors causing low adoption of compost manure in Malawi, with the Bolero community as a case study. The study interviewed 120 farmers and conducted three focus group discussions. Chi square test was used in the study to establish the effect of different factors on compost manure adoption decisions by farmers.

The study found out that farmers' perception about compost manure (it is too labour demanding, less effective, and for the poor) is unfavourable for its adoption. Compost manure adoption is affected by farmer characteristics (age, education, and gender), household characteristics (labour availability and income source), farm enterprise (maize farming, tobacco farming, and livestock farming), and access to inorganic fertilizers. Contrary to other studies, an increase in education level and increase in household labour availability does not increase adoption among farmers. Furthermore, socio-cultural factors play an important role in compost manure adoption in Bolero, as they influence the adoption factors aforementioned. Socio-cultural practices manifested through gender relations, household power relations, and agricultural practices dictate labour availability, enterprise selection, and access to inorganic fertilizers among others.

The study recommends the integration of indigenous knowledge and experiences with scientific knowledge, increased farmers' awareness about other advantages of compost manure, innovations to reduce labour demands in compost manure utilization, and use of group labour in the promotion of compost manure in Malawi.

Smallholder farmers' understanding of climate change and their mitigation measures: a case of Nteme Farming Block, Monze

Clara Chipoya, Zambian Open University

Changing weather patterns brought about by climate change has had negative effects on the farming community especially in third world countries. The Southern Province of Zambia is one of the areas most affected by climate change. The main purpose of this study was to assess whether small holder farmers in this province are aware about climate change and the available adaptation techniques. The specific objectives of the study were to determine whether small-holder farmers in the study area understand what climate change is, to ascertain what specific strategies they have adopted to counteract negative effects of climate change, determine what factors influence adoption of a particular adaptation method and explore appropriate ways that would be helpful in assisting farmers that have no knowledge about climate change.

The research was conducted in Nteme farming block of Monze in Southern Province. Purposive sampling was used to select respondents. Data was collected using structured questionnaires and focus group discussions. According to 95% of respondents smallholder farming has been significantly affected by climate change. 43% said that there had been a reduction in the harvests over several years while 21% said that animals have been dying due to progressive drying of the grazing areas and water sources as a result of reduction in the rainfall.

87% of the farmers indicated that they had taken steps to mitigate the perceived effects of climate change on their farming practice while 10% said they had not; 3% did not respond on this topic. 56 % said they plant early maturing and drought resistant crops while 16% use ripping methods; 25% say they plant trees and advocate the ending of charcoal burning; again 3% provided no response on this topic. 62% used ripping using draft power as a method for conserving moisture and soil structure; other conservation methods used included water harvesting and crop rotation.

Overall, the most popular single approach to adapting to climate change was what is known as conservation farming, which was understood to maintain moisture in the soil.

It was clear that for those with little knowledge, extension services are cardinal. It is necessary that government assists farmers adjust not only to these specific changes, but to the new uncertainty about future climate and food availability.

Strategic Responses to Climate Change among Smallholder Pastoralists in Baambwe Area of Namwala District

Hanyaya Watson Jembo, Zambian Open University

The paper analysed and assessed strategies that pastoral farmers in the Baambwe community use in coping with climate change and minimising threats to food security. Recent changes in climate seem to have adversely affected pastoralists in the Baambwe community and undermined their food security.

The study analysed effects of ongoing climate change in the area and a variety of adaptive responses from pastoral farmers. The research also assessed roles of stakeholders in transforming communities in the Baambwe area. The study used combined qualitative and quantitative research methods in collecting data from group discussions and through a questionnaire that had structured and open ended questions.

The study revealed that the farmers are aware of climate change effects with their strategies failing to cope with the increasingly unpredictable weather and lack of stakeholders such as government and NGOs in revamping the pastoral sector has also negatively contributed to lack of sufficient information and development in the sector.

An analysis of adaptive strategies by smallholder farmers to climate change in the Nteme area, Monze District, Zambia.

Esther Siyumbwa Kalonga, Zambian Open University

The study analyses adaptive strategies in mitigating climate change variability in Monze's Nteme Area by small holder farmers. It analysed the smallholder farmers' climate change knowledge, farmers' assessment of climate change impacts and strategies they are using to adapt to climate change in the area. The problem of climate change in Nteme has the potential of undermining food security and sustainable agriculture development efforts. Therefore there is need to respond to its adverse consequences.

The study used qualitative and quantitative research including focus group discussions and self-administered structured questionnaires as data collection instruments. It explored the available strategies the rural farmers are using in transforming communities in response to climate change management.

From the results it is evident that the majority of farmers in Nteme are aware of warmer temperatures and changes in rainfall patterns. Although some farmers have adopted crop diversification, soil conservation, irrigation, planting tree crops, as well as switching to non-farm income activities, they still remain food insecure. The research concludes that farmers have not fully adapting to climate change. This is as a result of insufficient information, education and the necessary resources to address them. Therefore, farmers must be

encouraged to use adaptive strategies despite their view that adaptive strategies are labour intensive.

Small holder farmers' adaptations in maize production to the perceived effects of climate change in Mbabala community, Choma District of Zambia **Kawana Lipalile, Zambian Open University**

The paper assesses small holder farmers' adaptations in maize production to the perceived effects of climate change in Mbabala community, Choma District, Zambia. Data was collected using focus group discussions, key informant interviews and observations. Findings revealed that smallholder farmers (SHFs) in Mbabala community have knowledge and understanding of climate change. They relate it to variations and intensity in rainfall as well as extreme temperatures. Thirty six percent of SHFs perceived climate change to be caused by deforestation, 31% associated it to supernatural causes, 15% to conventional agriculture and 18% were not sure of what was causing the change. Rainfall pattern in the last 5 to 10 years has changed. Rainfall no longer commences in October and ends in April as it were historically; instead rainfall commences as late as end of November to early December and ends as early as February in some seasons. This has caused a challenge to smallholder maize farmers who depend entirely on rain-fed agriculture; maize yields have reduced, leading to food insecurity and high poverty levels in Mbabala community. People are no longer able to feed themselves from one harvest to the next; there is loss of income due to poor yields resulting in school drop outs, early marriages and crime.

As a way of adapting, some SHFs have adopted coping strategies. From our study, 34% adopted conservation farming, 9% use early maturing seeds, 16% plant in phases and 41% use anthill soil. The adopted strategies are believed to improve maize crop yields. However, about 23% of the respondents had not adopted any mitigation strategies due to financial and knowledge constraints. These non-adopters were mainly those with low social economic status and low or no education; they experience poor yields and high poverty levels. The policy implications of this study are: there is a need to educate small holder farmers about climate change issues and the promotion of resilience through adaptation and making agricultural equipment and inputs affordable to SHFs. This will discourage agriculture (maize) dependence and instead encourage crop diversification and alternative livelihoods to help communities transform and thrive.

An examination of the role of gender in climate change adaptation in Monze District of the Southern Province of Zambia **Kabange Masenga, Zambian Open University**

Responses of 30 men and 30 women were used to investigate factors that influenced the adoption of climate change adaptation strategies, and the role of gender in this, among

small holder farmers in Nteme Agricultural Camp, in Monze district of Southern Province in Zambia.

No overall significant differences were detected between the frequencies of responses of men and women in relation to a) the forms of climate change they perceived, b) their perceptions of the major causes of climate change or c) the adaptation strategies practiced. However, there was some evidence that more women tended to think of climate change more in terms of availability or shortage of food in the household, while men tended to think of it more in terms of its effects on crops and livestock. Men and women were similar when the frequencies with which they identified manifestations of climate change were placed in descending order: increased drought, increased temperatures, decreased rainfall amounts, and increase in strong winds during the rainy season.

Key informant interviewees and focus group discussions indicated that there was a decrease in the frequency of good years (years in which there were sufficient and well distributed rainfall) in the last 20 years, and an increase in the frequency of bad years (described by both men and women as a year when rainfall for water and pastures was not enough). Fifty % of men and the same proportion of women indicated deforestation was the main cause of climate change; the next most common view was that climate change was natural and normal. The role of women in Zambian agriculture is reviewed.

An assessment of how smallholder farmers view conservation agriculture as an adaptation strategy to climate change in Choma District: A case of Mbabala

Rita Nkandu Mtonga, Zambian Open University

The agriculture sector is the backbone of the economies of most of the developing world, employing about 60 percent of the workforce and contributing an average of 30 percent gross domestic product (GDP) in sub-Saharan Africa (World Bank 2011). Smallholder farmers are the majority in this sector and are the main contributors of domestic food. They mostly rely solely on rain-fed agriculture and have a limited means of coping with adverse weather variability (FAO 2012). The most common type of adaptation strategy available to them is conservation farming. It has been noticed that most small holder farmer's usage of conservation farming as an adaption to climate change is low.

This research aimed at analysing the perceptions of small holder farmers to conservation farming as an adaptation strategy to climate change in Mbabala area, Choma district of Southern Province Zambia. Eighty respondents, 60 males and 20 females, were picked randomly from Agriculture Camp diaries and Conservation Farming Adoption lists. The data were collected using questionnaires and focus group discussions.

The findings of this research show that lack of information, no education and resistance to change influence perceptions of climate change and conservation agriculture among small

holder farmers in Mbabala. Adoption levels for Conservation Farming are low and information on climate change is limited. This research highlights the need for awareness raising and capacity building activities for farmers and extension staff. The intended impact of this research is to help change the mind sets of small holder farmers not practicing conservation farming as well as removing negative perceptions they have in regard to the adaptation strategy. It is also important for development agencies to pay attention to farmers' perception of adaptation to climate change.

An assessment on the role of social protection among small holder farmers in adapting to climate change in Mbabala Community - Choma

Kabenuka Munthali, Zambian Open University

Social protection in Zambia has recently received a lot of attention and is being given considerable prominence in improving the lives of the rural community. However, the expected impacts in reducing the vulnerability of small scale farmers to the effects of climate change are not being realised due to the implementers' failure to critically analyse the way of life of the rural communities, before administering the relevant coping strategies. This study documents the role of social protection in helping farmers adapt to climate change. The data collection was quantitative and randomly done from a sample of 200 respondents from the Mbabala community of Choma in Southern Zambia. The study considered the implications of the concept of adaptive social protection, by situating the vulnerability of rural communities within the context of the impacts of natural phenomena, particularly climate.

The study shows the importance within a social protection programme of incorporating a rights based rationale which embraces equity and social justice in addition to the instrumentalist rationale based on economic viability. Furthermore, while it was held that social protection promises to protect the poor and excluded sections of the rural population against the realities of the changes in weather extremes through adaption and reducing vulnerability in sustainable avenues; this study highlights the need for an in-depth analysis of how to effectively target vulnerability to the multiple shocks and stresses of climate change. It was very evident that considerable knowledge gaps exist on the complex nature of policy formulation process.

Determining the Effects of Diversification on Food Insecurity Caused by Climate Change in Namwala: A Case Study of Baambwe Farming Area

Amideus Mwango, Zambian Open University

Considering the fact that effects of climate change have been experienced the world over and that the most adversely affected people are small holder farmers who depend on rain

fed agriculture, diversification is key in ensuring food security among small holder farmers. The purpose of this research was to determine the effects of diversification on food insecurity. The overall aim of the study was to investigate whether small holder farmers are using crop and other means of diversifications, and how much contribution it is making to food security in the Baambwe farming area of Namwala district in Southern Province of the Republic of Zambia. Among the key objectives of the study were: to examine the effects of diversification on food insecurity in the study area, to establish the mitigation and adaptive measures existing in the rural community of study, to explore available livelihood alternatives in the rural communities, to establish levels of food security in the Community of Practice (CoP) and to assess and analyze the effectiveness of various diversification strategies employed in the CoP. Data was collected using interview guide, questionnaires, focus group discussions and observation from targeted population.

The study revealed that when small holder farmers diversified, thus engaging themselves in various farming activities such as growing other crops apart from maize, keeping livestock and engaging in trading, food would be available throughout the year. Food insecurity has been perpetuated by much reliance on one crop as the only source of food security as well as depending on rain fed agriculture. Food is not available among small holder farmers throughout the year; even during harvest time the majority only manage less than two meals in a day. Effectiveness of diversification was assessed and measured by looking at other sources of livelihood available and how much they contributed to food security.

Diversification levels are very low as farmers grew groundnuts and beans beside the main crop (Maize). Other means of diversification such as selling are done on micro level as a means of survival which also lacks support from government. There is urgent need for government and other stake holders to encourage small holder farmers to begin to grow drought resistant crops such as cassava and sweet potatoes through providing incentives to farmers who are diversifying.

An assessment of the challenges of climate change on farmers in Choma District: a case of Mbabala, Southern Province - Zambia
Christine Ndopu, Zambian Open University

Most studies that addressed the vulnerability of agriculture to climate change have focused on potential impacts without considering adaptation. When adaptation strategies are considered, socio-economic conditions and farm management are often ignored, but these strongly influence current farm performance and are likely to also influence adaptation to future changes.

This research assesses the challenges of climate change in agriculture and livelihood of Mbabala Area of Choma District in Southern Zambia. Data were collected through field observation methods and a household surveys. Crop production records for Choma District

shows productivity of maize, groundnuts, beans, and millet has increased as an overall trend but in very recent years it has decreased, reportedly due to untimely rainfall in erratic amounts. Of the total respondents in this study, 48% said their overall agricultural production is decreasing, 28% responded increasing and 24 % responded that there has been no change.

Climate change was generally known about: Sixty-seven percent of the 48 households (30 male headed and 18 female headed) interviewed said they had heard of climate change and could explain it; a further 25% said they had heard about it but struggled to explain it.

Seventy-nine percent of respondents considered that agricultural practices have changed; new practices include sowing methods, drought tolerant varieties, crop diversity, as well as use of tools and technique in, for example, watering and weed clearing, to suit the changing weather patterns.

Sixty percent of respondents responded that the summer temperatures have been increasing over the past few years; 35% responded that they believed winter temperatures had increased. Both of these perceptions were more marked among the 31-60 years age group, as was the perception that rainfall is becoming less and untimely. All respondents considered that Mbabala experiences increased drought periods which affect the maize crop seriously.

Importantly, the harvesting period was reported to have decreased for maize, groundnuts, beans, millet and sweet potatoes; this was considered to be mainly due to increased temperatures as a perceived consequence of climate change.

Farmers in Mbabala still use handheld tools and are unable to invest in modern farming technology and technics. This therefore limits their ability to graduate from subsistence farming. They report that livestock diseases have decimated their animals in recent times, a reality well known in Southern Province of which Mbabala is part.

This study will contribute to the formulation of pro-poor agricultural policies by the Government of the Republic of Zambia and Nongovernmental Organizations.

Abandonment of conservation agriculture among smallholder farmers in Baambwe Agricultural Camp, Namwala, Zambia

Helen Kholoma, Zambian Open University

This study examines the reasons for abandonment of Conservation Agriculture (CA) among smallholder farmers in Baambwe Namwala of Southern province Zambia. This is a significant research gap with little previous work exploring why CA is being abandoned despite evidence indicating that farmers have been adversely affected by climate change as well as reductions in both animal and crop production. Questionnaire interviews, focus group discussions, key informant interviews, informal discussions, personal observations and field

assessments were used to collect data among smallholder farmers that explored perceptions of CA, climate change and to identify smallholder farmers' sources of income.

Results indicate high levels of abandonment of CA due to key activities (incl. crop residue retention and basin making) conflicting with socio-cultural practices. Crop rotation was found to be difficult because of non availability of seeds locally for legumes and other crops like cotton, and sunflower. While availability of oxen was not a problem, availability of rippers locally at affordable prices was a challenge. In addition, smallholder farmers face huge challenges with management of weeds as herbicides and equipment were not locally available and they lacked knowledge on herbicide use. The highest source of income among the sampled smallholder farmers was derived from various small businesses out of which fish sales was prominent.

The findings suggested that Baambwe community lacks support from institutions at all levels in supporting CA. It is hoped that this research will offer an opportunity for all stakeholders involved to critically reflect and analyze current farming practices and approaches to CA so that adequate support can be provided to ensure continuous use of CA by small holder farmers in Baambwe.

Community Engagement in Malawi and Zambia

INTRODUCTION

The research presented here was conducted as part of the Transformative Engagement Network (TEN) project¹. This project aims to transform the nature of the engagement between the various stakeholders impacted by or concerned with climate change and food supply. The project is particularly focused on exploring ways to insert the voice and concerns of the most vulnerable food producers into climate change debates.

The purpose of this research was to explore how government ministries and NGOs engage with the communities of smallholder farmers with whom they work in Malawi and Zambia. The data were collected through questionnaires distributed to 35 staff of government ministries or NGOs working directly with smallholder farmers in each of those countries. Interviews were also conducted with representatives of nine of these bodies².

All of the respondents were students on the Masters in Transformative Community Development (2013-2015)³. The Masters was designed to create opportunities where the students as potential 'agents of change' in smallholder farming communities could re-evaluate climate change adaptation strategies (and development in general), and their professional and personal experiences of persistent food insecurity among smallholder farmers.

Information contained in the application forms of the 36 students who registered for this programme is also drawn on in this article.

The research presented here provides insights into the nature of the relationships between frontline agencies and the smallholder communities with whom they work and in so doing it provides pointers to the kind of changes in discourses and actions that are possible and necessary.

RESPONDENT PROFILE

Of the 36 students who were registered for the Masters, there were 19 males and 17 females aged from 27 to 51 years. Students held undergraduate degrees in a wide diversity of disciplinary areas relevant to TEN, with two students holding a masters level award.

¹ The four partner universities are located in Ireland (Maynooth University); Malawi (Mzuzu University); and Zambia (Zambian Open University and Mulungushi University). The project is funded under the Irish Aid and Higher Education Authority Programme for Strategic Cooperation.

² Agencies in Malawi included CADECOM, Mzuzu; Farm Income Diversification Programme (FIDP); Farm Radio Trust; PLAN International, Lilongwe.

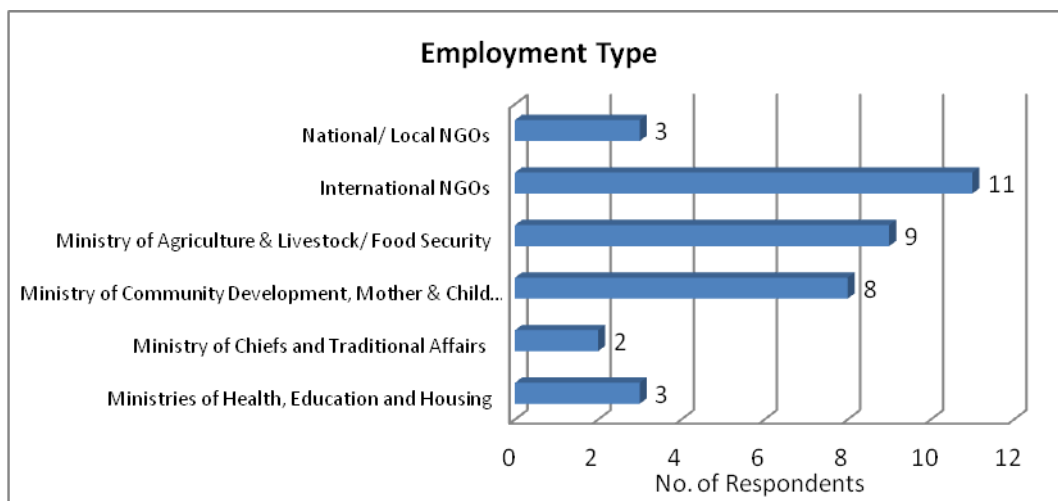
Agencies in Zambia included Department of Community Development and Ministry of Agriculture and Livestock, Kapiri Mposhi; Ministry of Agriculture and Livestock and Ministry of Community Development Mother and Child Health (MCDMCH), Lusaka; Ministry of Chiefs and Traditional Affairs (MOCTA), Kabwe.

³ This Masters programme was jointly accredited by the four partner universities.

All of the students were actively engaged with smallholder communities and employed in a variety of organisations. As figure 1 below indicates, 22 students across the three African universities are employed by government ministries. Their roles within these ministries varied from Director, Senior Officer, Supervisor, District Officer, District Programmes Coordinator, Senior Engineer, Technical Officer, Extension Officer, and Teacher. The majority of students at Mulungushi University and the Zambian Open University were employed by government agencies.

Fourteen students were employed by international or local NGOs (including Concern Worldwide, World Vision, Cadecom, Feed the Children) in roles such as Manager, Coordinator, Support Officer in areas such as Risk, Disaster and Relief, Environmental & Resilience, Programme and Partnership Support. Roles in National and Local NGOs were as Deputy Director and Programme Officer in areas such as agriculture, forestry and broadcasting. The majority of students at Mzuzu University were employed by NGOs.

Figure 1: Employment Type (n=36)

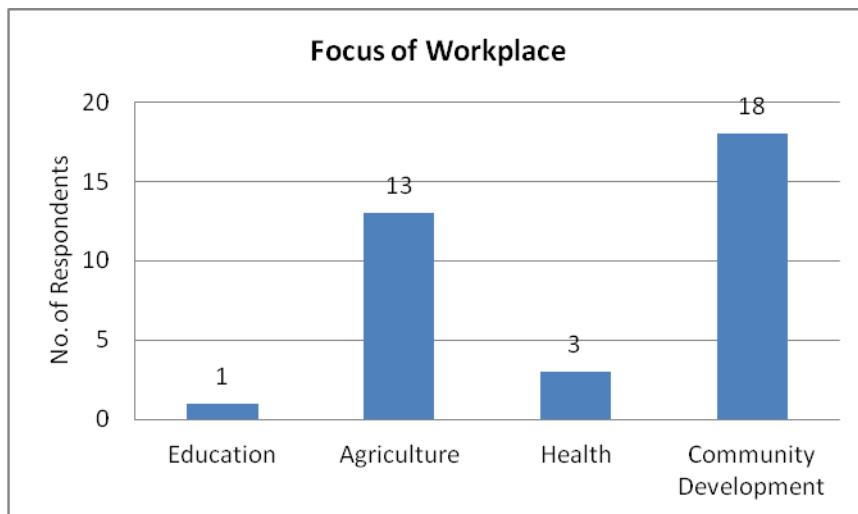


Of the 36 students who were registered for the Masters 35 completed a questionnaire which forms the basis of the data. Not all respondents completed all aspects of all questions. Where this happened it is noted in the text.

Primary Focus of Respondent Employment

Respondents were asked to select from four descriptors the one they thought best described the primary focus of their place of employment. The majority selected community development followed closely by agriculture. Several respondents noted that their work crossed several categories as indicated by their job titles. This sense of interconnectedness was echoed in the agency interviews where respondents emphasised the close links between food security, health, human rights and implementing the law.

Figure 2: Focus of Workplace (n=35)



Twenty-two respondents indicated that they have been employed in their current post for at least five years.

Figure 3: Number of Years in Current Employment (n=33)



Thirteen respondents indicated that they have not experienced promotion in their current jobs. Thirteen people had never been promoted and 11 had been promoted once, 4 people were promoted twice and 3 were promoted on 3 occasions (with no information available from the remaining four participants). There was no obvious correlation between the number of promotions and number of years in current employment.

Types of Activities Undertaken during the Working Day

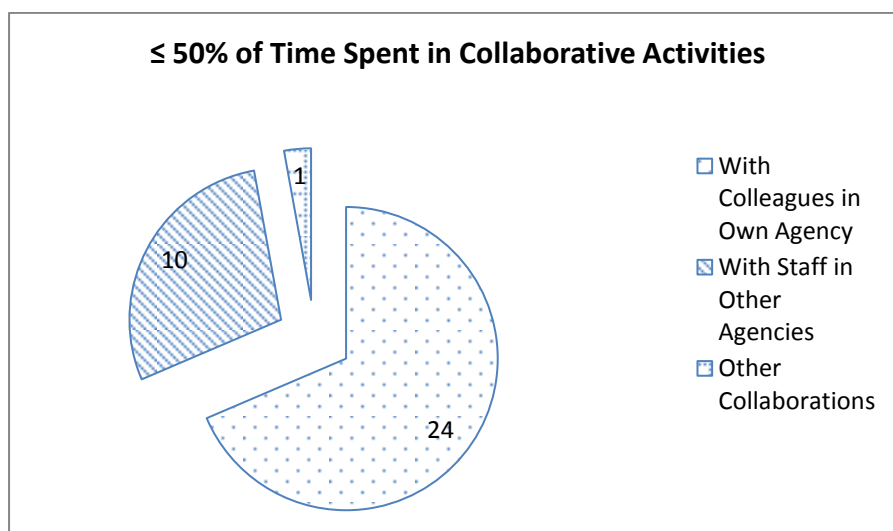
Respondents were asked to estimate the percentage of their working day they spent on different categories of work. Most people noted a variety of tasks completed during their working day. Nine respondents indicated that they spend over 50% of their time on self-

directed work. The tasks that most respondents (27 and 28 people respectively) spend least time on (less than 25%) are following directions from their manager and training. These findings emphasise the potential respondents have to decide how they use their working day and the high degree of control they have within their work.

Collaboration with Colleagues in Workplace and with Staff in Other Agencies

Respondents were asked to estimate the percentage of their working day that is spent collaborating with colleagues within their place of work and with staff in other agencies. For the majority, collaboration with their own work colleagues was a significant aspect of their working day and greatly outnumbered collaboration with staff in other agencies and other collaborations. Twenty-five respondents indicated that they spend 50% or more of their time collaborating with their colleagues. Ten respondents spend 50% or more of their time collaborating with staff in other agencies. Collaborations with community partners, traditional leaders, national agencies and diocesan partners were also listed by respondents but were described as taking up less than 25% of their working day.

Figure 4: ≤ 50% of Time in Different Types of Collaboration in Work (n=35)

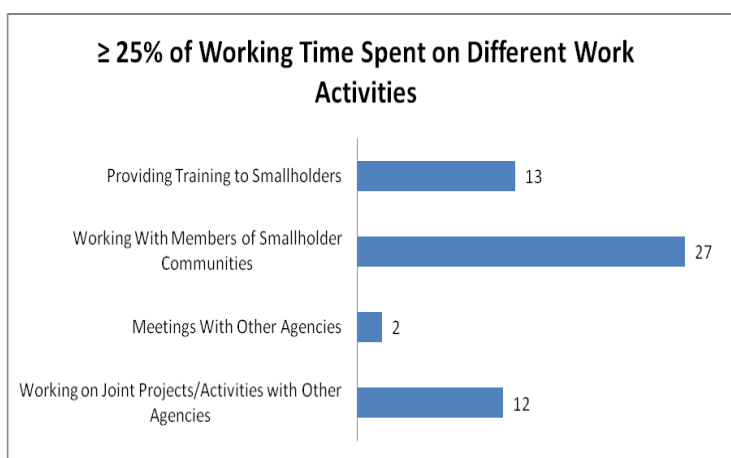


The interviews that were conducted with representatives of government ministries and NGOs also pointed to a similar pattern of collaboration whereby development bodies tend to work separately with a minimum of collaboration with others. Interviews with government ministry representatives highlighted problems caused by this approach which impacts negatively on communities and on the sustainability of government interventions. These representatives noted that communities have to respond to the changing priorities of a number of agencies in terms of what kind of projects the agencies will fund and the outcomes / outputs required. They also noted that in situations where donor funds were made available to enable the on-going implementation of existing government programmes it was a more useful intervention. By contrast donor funds that require implementing through a different or new programme can be problematic.

Time Respondents Spend in Different Types of Work Activities

Respondents were asked to estimate the percentage of working time spent in different types of work activities. Twenty-seven indicated that they spend 25% or more of their time working with members of smallholder communities and thirteen providing training to smallholders (Figure 5). Community involvement was mentioned many times in the agency interviews as a key factor in determining the success of a project and in ensuring long-term impacts beyond the life of the project. Agency respondents also emphasised that projects are more likely to succeed if the project is addressing an issue that is a priority for the community.

Figure 5: $\geq 25\%$ of Working Time Spent on Different Work Activities ($n=35$)

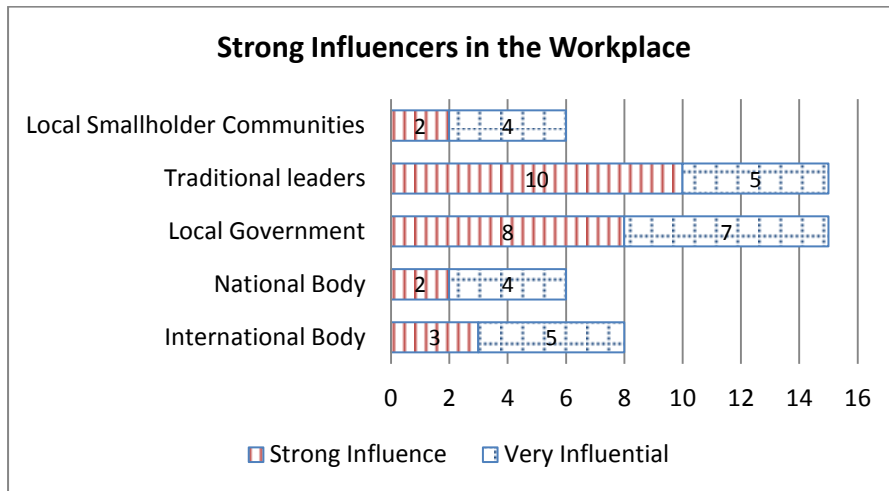


Twenty five respondents spent 50% or more of their time working on joint projects and activities with other agencies. Meetings with other agencies typically accounted for less than 25% of respondents' time. Six respondents also identified working jointly with members of their own organisation and providing training to government departments as the other key activities in which they engage.

Extent of the Influence of Particular Groups on Decision-making in Respondents' Workplaces

Respondents were asked to rate the degree of influence they estimated different groups had in their workplace. The two most influential groups, scoring a total of 15 responses when the ratings of 'strong influence' and 'very influential' are combined, are local government and traditional leaders. The influence of these two groups is rated significantly higher than any of the other groups as figure 6 illustrates.

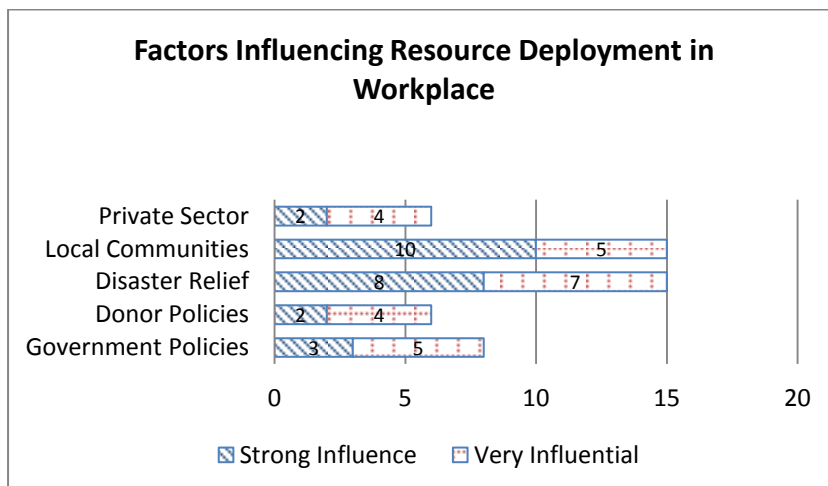
Figure 6: Numbers of Respondents Identifying Different Groups as Strong or Very Strong Influencers in the Workplace (n=35)



Factors that Influence Resource Deployment in the Respondents' Workplace

Respondents were asked to estimate the influence of specific sectors and policies on how resources are deployed in their workplace. The two most influential items, each scoring a total of 15 when the ratings of 'strong influence' and 'very influential' were combined, were local communities and disaster relief.

Figure 7: Numbers of respondents identifying different factors as strong or very strong influencers of resource deployment in workplace (n=35)



Government policies had the highest 'no influence' score (responses of 13/35 respondents).

Lead Organisations in the Sectors where Respondents Work

Respondents were asked to identify and rank the four organisations they estimate to be the most influential in their work sector. Respondents' responses were categorised under the following headings: local entities including churches, local community bodies and

universities; traditional leaders; national and local government ministries and agencies; international organisations; national / local NGOs; private companies; and national organisations including farmers unions, cooperatives, civil society network organisations. Figure 8 summarises the frequency of organisations identified and the positioning of each organisation from first to fourth in terms of its influence. National / local government emerged as a clear leader in both the first and second column with a total of 31. International NGOs are identified as most influential by 18 respondents listing them as first or second in influence, with the FAO and EU also mentioned as influential international organisations.

Figure 8: Numbers of Respondents Identifying Different Organisations in Order of Perceived Influence in his/her Area of Work in the Communities (n=33)

Ranking of organisations as influential in your workplace	1st	2nd	3rd	4th
Local Entities		1	2	5
Traditional leaders		3	1	1
National or Local Government	20	11	8	8
International Organisation	10	12	14	7
National or Local NGO	2	4	6	2
Private Company	1	1		
National Organisation	1	1	1	3

Respondents also indicated that their level of engagement with these influential organisations was weak. This finding was echoed in the agency interviews, where the horizontal links between the agencies and organisations working with vulnerable communities were weaker than the vertical links directly between the organisations and the communities.

Conclusions

This group of diverse respondents (in terms of location, gender, age, disciplinary background, current employment) indicate that they have high levels of discretion in how they undertake their work. They have strong links with smallholder communities and emphasise the importance of active community engagement to ensure success. The respondents show a keen awareness of the diverse factors and players that are influential in their work environment; however, their links with other agencies, including the most influential actors, are very limited: this must in turn limit the transmission of farmer-level judgements to policy-makers. Therefore, it is crucial to explore how to build stronger links between community development officers and those who create the policies that impact on smallholders.