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Food security and climate change in Mozambique: A farming-system approach to assess vulnerability

Worldwide, population is projected to increase to 9 billion people by 2050 and, it is projected that 87% of that population will live in the developing world (Dobermann et al, 2013). By 2050 global food production will have to increase by 60% from 2005-2007 level. However, producing this extra food will place additional stress on land, water and biodiversity, which are already scarce and showing worrying signs of degradation (FAO, 2014). Mozambique is one of the poorest countries in the world, being located in the South Eastern coast of Africa, and extremely vulnerable to climate change, due to the high dependence of livelihoods on natural resources (land, water, forestry, etc.) and limited adaptive capacity to cope with the impacts. The agricultural sector is the largest contributor to GDP (about 23%), being a major source of employment (about 70% of the population), subsistence and income (Abbas, 2015). The sector is dominated by smallholders – family farms – which account for 99% of total farms (INE, 2011); 98% of the farmers have rain-fed systems. According to FAO (2014) family farms manage the majority of the world’s agricultural land and are responsible for most of the world’s food; therefore, are very important to ensure food security, to protect the environment and to end poverty. There is a consensus that farming systems play an important role in decreasing farmers vulnerability to climate change and also in increasing food security and alleviate poverty (Stephens, Jones & Parsons, 2018). In general, climate-related disasters are among the main drivers of food insecurity in developing countries, being droughts the major driver. Studies have shown that many already-vulnerable regions in Mozambique are likely to be adversely affected by climate change (Marques et al, 2009). It is also expected that there will a decrease in yields in major crops in Mozambique (Brito & Holman, 2012; Warner et al, 2016; World Bank, 2010). Overall, projected future changes in climate will affect crop productivity and yields significantly, having a negative impact on farming systems, and therefore on food security. It is, thus, important to analyze farming systems existing in Mozambique, in order to understand how they contribute to food security in the country and how vulnerable are they to climate change. This paper aims to identify the main farming systems in Mozambique and assess their vulnerability to changes in precipitation.

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Urban food security in Bangalore: A baseline study

This paper presents findings from a city-wide household survey on food security in Bangalore. This is the first study of urban food security at a city scale in India that focuses on food access and diet using experiential measures. We find that 16.7% of households in Bangalore experience food insecurity. Households which are faced with other forms of deprivation like lack of access to adequate infrastructure, vulnerable housing conditions, informal work and lower educational

attainment are more likely to experience food insecurity. Although household income estimates play a central role in the targeting of food subsidies in India, we find that income is very weakly correlated to food security and has very limited influence on the diversity of foods consumed by households. Our analysis implies that experiential metrics may be crucial for measuring food security and to identify beneficiaries for social safety nets. It also suggests that there are other vulnerable groups that are not being captured by income or consumption alone. Through this work, we provide baseline evidence on the status of food security in Bengaluru, and lay the foundation for a future research agenda on urban food security in India.

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Abrahamo, Ezequiel Alfeu ¹

An approach to Urban Food Insecurity in the City of Maputo: a case study of KaNyaka Island

This study is based on data collected on KaNyaka Island in September 2018 as part of my ongoing PhD research on Urban Food Insecurity in the City of Maputo, taking the KaNyaka Municipal district as a case study. The objective of this study is to analyse and understand the determinants and levels of household food insecurity in KaNyaka Municipal district in light of the approaches and studies that have previously been done on urban food insecurity in the city of Maputo.

The research used mixed methods which allowed the triangulation and systematic integration of quantitative and qualitative methods in a single study, i.e. the use of questionnaires, interviews and observations for data collection. There were 123 households randomly selected to whom questionnaires were administered. For 60 households qualitative methodology based on participant observation was applied. The observation lasted for 12 days and consisted of observing the type of food that the households cooked. Usually the observation occurred in the afternoon after members of the household returned from the farm.

The paper presents the results of the analysis (using SPSS v.20), and interpretation of the data indicating the Household Food Insecurity Access Scale (HFIAS) which gives a measure of the degree of food insecurity during the month prior to the survey; the Household Food Insecurity Access Prevalence (HFIAP) indicator and Household Dietary Diversity Score (HDDS) that allows counting the diversified food groups consumed by households in the last 24 hours prior to the survey; and the Months of Adequate Household Food Provisioning (MAHFP) indicator that captures changes in households' ability to ensure that food is available during the year and above a minimum level.

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Bahule, Jorge Fernando¹

Good practices and Challenges of horticultural production in Maputo City: the experience of the Agricultural and Livestock Association 10 November

The study seeks to understand and explain good practices and the challenges from vegetable production in Maputo city. The debate reflects the analysis of recommendations and the empirical reality observed in the 10 November farming association of the Kamubukwana municipal district. The analysis focuses on aspects related to the assimilation of techniques and technologies

recommended by the extensionists of the Maputo Municipal Council and the Maputo City Directorate of Agriculture through the Fields of Demonstration of Results. The study used qualitative methods, bibliographic and documentary analysis, intensive observation and semi-structured interviews with producers of the above mentioned association and extension workers allocated to that association. The cross-checking of data showed that there are actions aimed at disseminating good practices in agricultural production. Among the disseminated good practices is the diversification of production, organic production, intercropping of crops and reduction of the use of pesticides in production. We conclude that few producers assimilate and put into practice the widespread teachings, due to the fact that they are used to empirical methods inherited from their predecessors and the attempt to produce with good quality and timeliness to meet the demands of intermediaries, commonly called "maguevas". But also the extensionist/producer ratio and the reduced time spent in the associations do not facilitate the follow-up and monitoring of the disseminated practices, which means that in the first obstacle, the producer decides to return to the old practices.

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Rural Livelihoods and Food Security: Long-Term Insights From Sierra Leone's Eastern Province

Sierra Leone is one of the world's poorest countries, which in the last two decades has suffered from a devastating civil war and more recently an epidemic of the deadly Ebola disease. Both economy and livelihoods have suffered considerably, and the government and local communities are now working hard to re-build these. Food insecurity has been a longstanding issue among Sierra Leone's rural households. This paper considers some of the main parameters in the food security debate, and then examines food security in the context of the country's rural development policies. Using data collected from field-based research undertaken in two Eastern Province communities in the 1970s, and more recently in 2014, a valuable long-term perspective is provided in relation to seasonal and intra-household food insecurity and the impact of certain shocks in exacerbating the situation. The paper concludes that further rural extension support, increasing cash crop production and community education programmes could help to raise awareness of food insecurity issues and possibly lead to an improvement in nutritional levels both within communities and individual households.

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Spatial Characteristics of Consumer Confidence and Food (In)security in Secondary Cities of Southern Africa

Measuring urban food (in)security in Southern Africa (SA) is an important challenge due to rapid urbanization and a lack of established urban food security indicators. As a result, empirical studies often use rural designed metrics that may not accurately reflect urban food (in)security. We aim to 1) create a measure of food security for urban SA, and 2) to understand the relationship between

urbanization and food security in secondary cities of SA. We develop an urban consumer confidence index comprised of three livelihood-related questions. We compare our index with the widely used Household Food Insecurity Access Scale using survey data collected from 219 households in Monze, Zambia. We use spatial statistics to identify relationships between household characteristics, urbanization, and both metrics. We then map predicted values to determine areas of high (low) food security using SaTScan cluster identification techniques. This research identifies the importance of frequent employment and maintaining rural ties in the attainment of household food security. We find clustering of low food security ($p < 0.01$), and clear links between urbanization and poor food security outcomes. Our research highlights the importance of frequent employment opportunities and rural agricultural ties for residents in secondary cities, and the geographic heterogeneity of urban food security. Identifying areas at greatest risk for food insecurity in urban SA settings will help direct targeted interventions. Improving the quality and access to food in these areas will help alleviate chronic nutrition-related challenges, such as malnutrition and stunting.

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Cau, Boaventura M.¹ and Victor Agadjanian²

Labor migration, agricultural resources and food security in rural Mozambique

Connections between labor migration and food security are still poorly understood (Crush, 2009; Crush et al., 2017). This issue is particularly important for Mozambique, a country where migration is very common (Muanamoha and Raimundo, 2018) and food security is a major concern. A study of food security in 20 districts across Mozambique found that about 60% of interviewed households have some form of food insecurity (Ministry of Agriculture and Food Security of Mozambique, 2017:3). Furthermore, the 2011 Demographic and Health Survey in Mozambique reported that about 43% of children under five years of age are malnourished in the country (MISAU et al., 2013). In this study we examine how remittances and agricultural resources mediate the links between labor migration and food security in four districts of Gaza province in southern Mozambique. Furthermore, assessments of the mediating role of agricultural resources on the association between labor migration and food security remain scarce. Agricultural resources may mediate the relationship between labor migration and food security in multiple ways.

The study uses data from a household survey in 56 villages of Gaza province of Mozambique (N=1720). The outcome is whether or not a household is food secure, a measure based on respondent's responses to a battery of corresponding questions. Multilevel logistic regression is used for analysis. The paper will expand the background contextualization of the study and fine-tune our statistical analysis, by including additional controls for possible confounding factors. We will also consider respondent's reported protein intake as a second study outcome.

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Crush, Jonathan ¹

The Migration-Food Security Nexus in the Global South (MiFood)

In 2018, the UN Special Representative for International Migration, Louise Arbour, referred to the 'virtuous circle' of migration as 'overwhelmingly positive for migrants and their communities, both origin and destination (and) a potent motor of development.' However, limited research attention has been paid to the food security challenges confronting the rapidly growing numbers of migrants from and within the South. Does Arbour's 'virtuous circle' of migration extend to food security? Does migration lead to better food security and related outcomes for migrant populations and migrant-sending communities? And, if not, what evidence-based interventions and practices might help to mitigate migrant food insecurity? The Hungry Cities Partnership's new initiative on the Migration-Food Security Nexus in the Global South (MiFood Project) seeks to answer these questions through a major research collaboration between researchers in Canada and twelve different countries across the Global South. The Project has five inter-disciplinary research modules focused primarily on migrants in cities and their broader internal and international connections: Cities, Corridors, Connections, Chains and Controls. The diverse character and broad geographical reach of the MiFood Project will deliver a unique, inter-disciplinary collaborative learning experience on migration and food security for researchers in the Global South and North.

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Understanding urban food security in heterogenous cities of sub-Saharan Africa

Urban food security (UFS) is one of sub-Saharan Africa's (SSA) core developmental challenges. However, food insecurity has commonly been perceived as a rural, production-based problem and not enough is known about how UFS plays out in the heterogenous cities and towns of SSA. Among the scholars who have studied food security in urban contexts, most have focused on large, primary cities. Yet, secondary and tertiary urban areas are growing rapidly and are often where under-resourced governments need the most support. Many scholars have promoted urban agriculture as a key solution to hunger, poverty and community development in cities. In SSA, however, there are a multitude of barriers to urban agriculture. We present results from household surveys conducted in 2017 and 2018 with over 1800 low- to middle-income households across Monze and Lusaka (Zambia), Rumuruti (Kenya) and Accra (Ghana). We find that the majority of urban households purchase their food rather than produce it; that households in smaller urban areas experience significant levels of food insecurity; and that low food consumption, food access and dietary diversity scores are linked to a lack of formal employment. Our research highlights the importance of including secondary and tertiary urban places in food security assessments and emphasizes the need to recognize that UFS in SSA is tied closely to poverty and food access, rather than to the availability of food. We argue that future UFS research should focus on ruralurban food system linkages and test novel food security metrics that are better suited to urban contexts

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Investing in Urban Food Security: Achieving the SDGs and Decision-Making Tools

The Hungry Cities Partnership research demonstrates that food and nutrition insecurity is a major development challenge in cities of the Global South. The research also shows that addressing food insecurity is not simply a matter of increasing food production and supply; access to that food is of central concern. These findings are from cities with strained resources and for which meeting the Sustainable Development Goals (SDGs) represents significant development challenges. Therefore, the question that these findings raise is how best to target urban investment with high-value outcomes for food insecure populations? Drawing from household survey data collected in Maputo, Mexico City, Nairobi, Nanjing and Kingston by the HCP, the analysis explores the relationships between household food insecurity and inconsistent access to a range of urban resources, with the aim of understanding how best to invest in urban development to reduce urban hunger.

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Time-Use Analysis Of Women Activities In A Rural And Peri-Urban Agrarian Society In Kano State, Nigeria

One of the major changes taking place worldwide is the feminization of agriculture especially where the rural economy is characterized by small holder system oriented towards production for subsistence or for local markets. The role of women in agricultural production is indispensable considering their labor input specifically in crop production, processing and marketing. Indeed, majority of women in Africa are said to be peasants and they are the potential workforce in developing countries, producing 35-45% of the Gross National Product. Despite their contributions for a long time, their role has been largely ignored and grossly underrepresented. This paper examines the nature of women's daily time-use in an agricultural society in Kura Local Government Area of Kano State by uncovering the nature of their activities and time spent on these activities as well as their access to production resources. One hundred women were interviewed using the Participatory Rural Appraisal (PRA) Technique in four wards of the study area. Of their daily hours, more than five hours were spent on farm produce processing and food cooking, more than an hour each for farm work, cleaning the house and child care, and only about an hour for resting. The farming activities women participate in include planting, weeding, harvesting and processing. Less than 30% of the respondents are involved in each of these activities except farm produce processing in which more than half of the respondents are involved. Their time budget was seen to be affected by the nature of their activities as they claim to lack time for leisure, recreational activities and schooling. They were also found to face a range of difficulties with regard to access to agricultural production resources. Land accessibility through means other than inheritance proves very difficult for the women, thus about two - thirds of the respondents inherited farmlands. More than 70% of the women carry out their processing activities manually using local tools which eventually results in taking up much of their time and making their work difficult. About 18% have access to use of modern rice milling machines and other modern food processing technologies either through their husbands, other relatives, or by being members of women cooperatives. In order to motivate and enhance women's performance for sustainable agricultural development, the study recommends Government provides women with agricultural inputs such as fertilizer and formal credit in good time and at affordable prices because of their poverty level, and the procedure for obtaining credit

should be made as simple as possible because of the high illiteracy rate among rural women. There is also the need for Government and other NGOs to provide and improve their access to appropriate food processing technology/tools so as to reduce the drudgery in their daily lives.

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Haysom, Gareth ¹

Embracing positionality to engage wicked problems – food as a lens to identify levers for urban change

The global economic crises of 2007 and resultant food crises refocused attention on the food system. Divergent and contradictory perspectives have since emerged. Food insecurity levels remain stubbornly high, despite significant development and economic -oriented initiatives designed to address this. The food system is also a major contributor to global environmental change. One of the surest ways to grasp the scale and consequence of global inequality is through a food systems lens. More recently there has been a rapid increase in *urban food system studies*, mostly originating in the Global North. These studies are providing new concepts and approaches for engaging in urban food systems questions. The urban and wider food systems challenge has been described as a wicked problem. This presentation describes a collaborative research project between four different urban food system research units, two European and two African. The purpose of the work was to seek out universal insights, and perhaps solutions to what lay across and perhaps between the different approaches applied in both the understanding of the food system challenges in the respective cities, but also, how these needed to be resolved. Earlier processes designed to address the wicked problems associated with the food system used skilled facilitators, who sought out “stretch spaces”, places where all participants expanded their own views and values, seeking out that space beyond their own positions. This presentation will describe a collaboration between academics. One where skilful holding of safe spaces was absent. The presentation draws on earlier work by Nicolescu on the “universities’ responsibility to knowledge”, detailing associated challenges and what this means for knowledge production and for responding to such wicked problems. Three distinct factors constrained efforts engage across disciplines. Contextual differences and immediate perceived needs resulted in very different views on what was required, particularly between Northern and Southern partners. Value positions of individuals and those of disciplinary “enclaves” or “collectives” presented further disciplinary and value boundaries. The presentation argues that the identification of novel approaches to such wicked problems is contingent of these differences being brought to the fore, being part of the conversation, as levers through which common positions can be identified, where spaces are created for the release of new perspectives, axioms, but also, where difference is celebrated as opposed to censored. Such prior identification of value positions is an essential part of wider engagement processes designed to facilitate urban food system change, within academia, in the policy environment but also in civil society – as well as across these different sectors.

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Southern urban food governance perspectives?

In the current urban transition conversation taking place on cities of the South, food has been absent. Globally different perspectives and needs have resulted in a wide variety of efforts seeking to urbanise the food “question”. Increasingly cities are seen as launchpads to challenge wider food system related issues and concerns. A key area where engagements between understanding, and then acting on, food within the city has been through the notion of urban food system governance. Urban Food System Governance, as a concept, encompasses multiple framings of both the food system and governance. However, the vast majority of urban food system governance interventions have emerged from actions taken in the Global North. A predominant governance typology or approach applied in most urban food system governance structures in the “North” is broadly described as pluralistic urban food governance - governance structures where the state and society collaborate to ensure specific food system outcomes at the city scale. These urban food governance actions sit within a growing body of urban food related research and positions and these are being rapidly mainstreamed. These governance views and arguments travel and are often uncritically imposed (or adopted) on other cities and regions. This presentation uses the food system of a number of African cities as a lens to question the urban food governance needs and to consider the associated governance needs against the emerging pluralistic governance approaches. The presentation draws on recent Hungry Cities Partnership survey data to ask might be required in order to respond to wider food system changes, challenges and observable negative outcomes at the urban scale in the surveyed African cities? The presentation offers a justification for why pluralistic urban food governance processes may not gain traction in the South. Evidence from the urban food system surveys in Cape Town, Maputo and Nairobi are used to provoke specific urban food governance questions, questions specific to infrastructure deficits and factors external to the food system. These non-food specific questions provide insight into the challenges faced by urban residents in their attempts to access affordable, safe and nutritious food. The presentation concludes arguing that focusing on infrastructure, both food system infrastructure and the wider urban infrastructure outcomes, and the role that appropriate infrastructures could play in delivering positive urban food system outcomes is *the* urban food governance challenge in African (and Southern) cities. Assumptions about agency and pluralistic governance borrowed from other contexts will not deliver on the food security or developmental challenges faced in African cities.

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Food for Beer?: Gender and nutrition politics in a cassava “value chain” scheme

This paper presents findings on the nutritional impact of an ongoing cassava commercialization project in Zavala district (Inhambane province), Mozambique. In the context of stubbornly elevated chronic malnutrition rates in rural communities, donor-funded agricultural “value chain” schemes have emerged as a leading instrument for enhancing smallholder farmer incomes and diets. This approach, an integral component of the “New Green Revolution for Africa” development model, seeks to commercialize strategic crops through provision of “improved” seed varieties, chemical inputs, and farmer training, using “public-private partnerships” to strengthen market infrastructure and enact “enabling” policies. In Mozambique, a value-chain partnership joining DADTCO (Dutch

Agricultural Development & Trading Company), South African beverage giant SABMiller and its subsidiary Cervejas de Moçambique (CDM), and an assortment of state and local NGO partners, has been working since 2011 to turn cassava, a major food staple, into a cash crop for the production of Impala, the world's first cassava-based commercial beer. Although the initiative enjoyed early success in the northern province of Nampula, it has struggled since expanding into Inhambane province in the south, where female farmers have dominated the cassava sector since adopting the American root crop—as a dual-purpose food staple and food commodity—in the mid-18th century. Ignoring the complexity of Zavala's agrarian food system and women's deep agricultural expertise, value chain partners not only angered female cassava growers; they also failed to understand the environmental and dietary consequences of the specific form of "development" they sought to achieve. Using survey data from 2017-19, ethnographic fieldwork, and archival research, this co-authored paper analyzes Zavala women farmers' perspectives on the dietary costs and benefits of a project that encourages them to turn their staple food into a raw material for industrial beer, with little regard for the gendered impact of changes in cropping, consumption, and nutritional well-being that would result.

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Utilization of solid waste in the leather industry: From Waste to Food

In Nigeria, the leather industry was once well known as a major employer before a decline in the number of leather factories in the country. It played an important role in the economy providing employment, income generation, and general livelihood and as well a source of food. While there exist significant number of researches in the sector, not much attention has been given to the sector as a source of food. Thus, this paper seeks to assess the sources of solid waste in the leather industry specifically in the raw skins section and its utilization as food. Data for the study was obtained from interviews and questionnaires administered to the key players in the sector. The study describes the sourcing, marketing and processing of the skins otherwise known as 'Raw skin trimmings'. The findings revealed that the raw skin trimmings that would have otherwise go into the industry waste stream are directly used as a source of food with minimal processing. The revenue generated and final market for the trimmings was also described. Based on the findings of the research, it was recommended that further investigations be carried out in the area to investigate the health and nutritional implications of the use of raw skin trimmings as food.

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Climate Change, Agricultural Production And Food Insecurity In Rural Katsina State, Nigeria

Climate change is considered as posing a major threat to agriculture and food security in the 21st century, particularly in the poor, agriculture-based countries in sub-Saharan Africa (SSA) where their capacities to effectively cope are low. This paper investigates the nexus of the relationship among

climate change, agricultural production and food insecurity in rural areas of Katsina state, Nigeria. A study approach was adopted which involved the stratification into three rainfall zones (north, central and south) from which of which three Local Government Areas (LGAs) were selected and from every LGA three political wards were selected. In every ward, structured questionnaires, interviews and Focused Group Discussions (FGDs) were conducted involving a total of 450 farming households across the state. Findings show that unreliability and inconsistency in the temporal and spatial distribution of annual rainfall, coupled with recurrent droughts and rapid population growth, all combine to constrain agricultural production in the study area. In particular, utilization of simple, low-input technology in farming result in low-output per land unit. Dry spell episodes (0 to 0.3mm) for average of nine consecutive days per year has been affecting the farmers, causing the need for replanting within the cropping season thereby adding to the cost of production for farmers. The farmers' low literacy resource-base and literacy levels make them to remain at the mercy of harvest failure. It was also established that reliance on rainfed crop production by 70% to 80% of the farmers make them largely food insecure in the light of challenging climate change conditions which make them to remain below the so-called poverty line. In recent times, government's policy of reducing the import of food items has increased the local food production levels. Recommendations were made towards strengthening human and institutional capacities, especially in terms of early warning systems and awareness raising.

Growing Old and Hungry? A Snapshot of Food Security among Senior Citizens in Kingston Jamaica

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Jardine-Comrie, Adonna¹

Growing Old and Hungry? A Snapshot of Food Security among Senior Citizens in Kingston Jamaica

Senior citizens have been described as the "hidden hungry" and various studies on food security among seniors have been carried out in developed countries around the world. However, no specific research has been done in Jamaica. This paper seeks to address this knowledge gap by presenting the results obtained when the data from a household food security survey conducted in Kingston, Jamaica, by the Hungry Cities Partnership (HCP) and analyzed by age structure. Accordingly, it provides a snapshot view of the prevalence and nature of food insecurity among senior citizens and their households in this city. Comparisons of the food security measures used in the survey for senior citizens households with the rest of the population in the data sets are used to determine specific intervention programmes and policy measures that may be needed to address the problem of food insecurity among senior citizens in Kingston. Suggestions for further research work are also outlined.

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Kanosvamhira, Tinashe ¹

Urban agriculture uptake in African Cities: Bottom-up approach perspectives from Cape Flats (Cape Town) urban farmers

It is widely accepted that urban agriculture is an important coping strategy amongst the poorest urban households for food security and income generation in developing countries. In South Africa, urban agriculture has been promoted as a strategy for household food security and income generation. However, the practice is largely characterized by limited engagement from the greater population. This paper presents results from a case study examining urban farmer's perspectives on how the uptake of urban agriculture activities can be improved especially among the youthful generation. A random sampling technique was used in the selection of the 60 respondents for a questionnaire survey. Purposive sampling was employed to select the key informant respondents which included knowledgeable urban farmers, Non-Governmental Organization officials and a Provincial Department of Agriculture official. Key results show that urban agriculture needs to be driven alongside its associated social and environmental benefits. Consequently, some of the proposed innovative ideas by the respondents need to be incorporated by relevant development practitioners who continue supporting urban agriculture initiatives in Cape Town.

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Manhiça, Cândido Armando ¹

Evaluation of Soil Sustainability in Crops Rotation of Maize, Sorghum, Cow Pea, and Soya: The Case of the District of Boane

The soil use regardless to nutrients dynamics leads into destruction of agricultural chemical quality properties and makes the socio-economical conditions even worse, thus putting the natural resources under pressure. What's more, phosphate and nitrogen are the most responsible for the eutrophication and fish death by suffocation. The macronutrients play an important role in agriculture and they can be kept in soil by rotating crops from season to season. The general aim was to study the soil sustainability by use of Primary and Secondary macronutrients, CTC, Carbon and Organic-Matter, basing on crops rotation of maize, sorghum, cow pea and soya, with the aim of protecting the soil and restoring the production equilibrium. To achieve this goal, a field at Estação Agrária de Umbeluzi was randomly selected and from there soil was collected at a depth of about 20 cm, and after a research on it was carried out at UEM laboratory premises, before the seeds were sown and after the crops have ripened. The seed planting took place by means of conventional method, and due to the aforementioned crops plantation, the results proved to have been a chemical change on the soil when compared to the witness sample. Both maize and sorghum retained huge quantities of nitrogen, but the maize returns back to the soil lots of organic matter, absolutely crucial to the fertilization of the soil, which makes it be highly recommendable in the rotation. Both soya and cow pea provide soil sustainability as they add nutrients to it. Last but not the least; the soya extract a large amount of phosphate, bivalent-ions and potassium. Bare lands spoil the soil. Key-words: Macronutrients; Soil sustainability; Crops rotation; Organic matter and Carbon.

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Food production and Land degradation in some Nigerian Forests

This paper aimed at determining the contribution of agricultural activities to deforestation of some Nigerian forests through investigations of the crops commonly grown, management practices, impact on the environment and providing sustainable agricultural practices that farmers could adopt. Landsat images of the selected forests for the period 1990 to 2018 were used to classify the forests using the maximum likelihood supervised classification technique, field measurements and observations at the forest. From the results 1,420.92ha, 2,741.4ha, 1,273.68ha and 11,332.8ha of forest land were lost to agriculture at Dukku forest reserve for the years 1990, 2000, 2013 and 2018 respectively. Similarly, 47,020.41ha, 12,648.33ha, 9,632.07ha and 2,952ha of forest land were lost to agriculture for the years 1990, 2000, 2010 and 2018. From a 60 by 60m quadrat an estimate of 95 trees were lost on farmlands compared to 47 lost in woodland in Dukku forest reserve and 42 trees lost on farmlands against 6 trees on woodland in Falgore Game reserve. There also is evidence of erosion and conversion of forest land to woodland as a result of the tree loss. The activities common to both forests include farming, animal rearing and fuelwood collection. Crops usually grown are maize, millet and guinea corn. It is recommended that more sustainable agricultural practices be employed such as Agroforestry, planting cover crops and reduction or elimination of tillage should be employed to curb the effects of degradation.

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Building an Institutional and Ideational Architecture for the African Green Revolution

Over the last fifteen years, a widening panoply of transnational actors has launched a concerted effort to transform African agriculture through an African Green Revolution. With the goal of addressing food insecurity on the continent, this effort is based on new agricultural technologies, the integration of smallholders into agricultural value chains, public-private partnerships, and an emphasis on “empowering” women. More recently, an initial focus on enhancing productivity has been supplemented with a concern for improving nutritional outcomes. This paper traces the construction of a transnational ideational and institutional architecture that advances this new common vision of African agricultural development. Using interview data, documentary analysis, and network mapping, we explore the formation of three core knowledge and policy networks that underpin this architecture: a hunger/policy network; a science and technology network; and a multilateral African agencies network. We argue that this architecture and the vision it advances has significant implications for the food security and nutrition of poor African communities. In particular, we suggest that the growing role of private sector actors (especially multinational companies), the effort to get farmers to adopt advanced technologies and other expensive inputs, and the focus on farming as a commercial enterprise is not likely to improve the food and nutritional health of poor farming communities, and may actually reduce it.

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***Mahala*: Challenges and Opportunities of Marketing Agricultural Production in Maputo City**

This article analyses the challenges and opportunities of agricultural marketing of the Kamavota and Kamubukwana municipal districts' associations of agricultural producers in Maputo city (MC). Based on a mixed research approach (qualitative and quantitative), through semi-structured interviews to key informants and surveys to agro-livestock associations' management and producers. The data collection covered a universe of 26 associations and 369 producers from the above referred districts.

The results indicate that 98% of production in the associations is oriented by market demand and income generation. The interconnection between producers and markets is made through *Magwevas*, which are resellers with access to formal and informal markets of the MC. Only 4% of producers resort to other sales modalities, namely: home delivery, institutional sales and participation in fairs. We conclude that this form of marketing brings losses to the producer who often sells his products based on price set by the *Magwevas* taking advantage of the lack of a functional control of supporting institutions in commercialization structures at associations, municipal and state levels. This situation is aggravated by the producer's inability to demand a better price, according to the investments made and the inability to stay with the product for longer as a result of storage and processing shortcomings, especially in times of overproduction. Adding to the aforementioned, poor diversification of production which results in market saturation with the same products (cabbage, lettuce -which are the producers' preferences) force them to sell even at lowest prices. However, this is the type of marketing which is established in the producers' structure. Despite being aware of the "exploitation by the *Magwevas*", they resist in developing a different role in the value chain, other than that of producer, alleging lack of time to stay in the market and knowledge to understand its dynamics. In the producers' view the state should take responsibility for granting them access to the formal, informal or other urban market actors (charities, orphanages) capable of absorbing their production. They argue that their product has a good quality although they recognize the need to avoid risks of contamination due to excessive use of chemical pesticides, but also in the process of products' washing, transporting and storage and in making them available for sale. This process is often carried out without respecting the minimum hygiene and processing standards, posing a danger to public health. These combined factors retract the desire of urban consumers for local products known as made *in Mozambique*.

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Contribution of rural-urban transfers to household food security in secondary cities in Namibia: A case study of Oshakati, Ongwediva and Ondangwa

This paper discusses the contribution of rural-urban food transfer to urban households in secondary cities of Namibia. Based on 853 households surveyed in the three towns of Oshakati, Ongwediva and Ondangwa in northern Namibia, this study investigates the impact of rural- urban food transfer on urban households. Urban households in secondary cities were found to receive food from rural areas every two months. Using the binary logit, the results show that food insecure households are twice more likely to depend on food transfer. The importance of the rural-urban linkages to urban household food security needs to be explored.

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It is not about spinach: The role of local markets for urban farmers within the food system of disadvantage neighbourhoods in Cape Town and Maputo

Sub-Saharan Africa is one of the most rapidly urbanising regions in the world. Achieving food and nutrition security is not only a rural challenge; the access to adequate (in terms of quantity and quality), healthy, nutritious and affordable food is also a growing concern for urban areas. The debate on the contribution of urban agriculture to food and nutrition security is however controversial. Based on a food systems approach, which includes the 'farm-to-fork' processes, pathways and dynamics between interlinked actors who are embedded in a spatial context, this research explores the potential of urban agriculture in two cities, Cape Town in South Africa and Maputo in Mozambique. In Cape Town, main challenges are access to local and external markets, fair pricing and sovereignty in production. In Maputo, adaptation to more agroecological production techniques, combined with a more diverse production, could reduce farmers' main challenges, such as pest pressure, and increase income and diversify diets. Foremost, urban agriculture needs to be embedded in the wider urban food system and urban planning in order to contribute towards more sustainable food systems.

This research has identified marketing as a main challenge of small-scale urban farmers, particularly when approaching local community markets in Cape Town and high-end markets in Maputo. Dependencies on middlemen can lead to ongoing disempowerment, as the example of Cape Town shows through power relation in a small-scale urban agriculture environment. Or it leads to empowerment and increase in income, as the example of Maputo shows. With a participatory approach, farmers have been included in the research to identify good practices like community markets, farmer collectives or addressing niche markets.

Nevertheless, increasing and ongoing urbanisation is a stressor for the food system in the two case areas and underlines the importance of rethinking urban agriculture through multi-stakeholder planning as an alternative or additional source of food. Developing an urban food systems strategy that complements rural food production and global food imports could fill the existing gap in food supplies, which results in urban food deserts. Therefore, while not being a panacea to achieve food security, urban agriculture can contribute to a more diverse diet within disadvantaged communities, where access to food is a daily challenge – even for urban farmers.

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Determinants of Household Food Security in Nairobi, Kenya

Food security is increasingly becoming an urban issue. However, food security situation is rarely understood and prioritized in sub-Saharan African cities. The situation is made worse with the high rates of urbanization, as well as the impacts of global economic and environmental changes. There is no doubt that growth in urban poverty, food insecurity and malnutrition and a shift in their concentration from rural to urban areas will accompany urbanization. Although urban residents have

access to a wider array of foods, their food security largely depends on their income and ability to purchase food products. Based on a representative sample, this paper presents the determinants of household food security in Nairobi, Kenya.

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Spence, Balfour¹

Developing a Standard Audit Instrument (SAI) for Assessing Disaster Risk management (DRM) and Climate Change Adaptation (CCA) in Agriculture: A strategy for Sustainable Food Security in the Caribbean.

There is general consensus that in spite of a large and ever increasing food import bill, domestic food production remains the main pillar of food security and sovereignty in the Caribbean and features prominently in the livelihood profile of the region. However, agriculture is the most vulnerable of all economic sectors, to the impact of especially hydro-meteorological hazards. Recurrent devastation from hurricanes, floods and droughts has cumulatively undermined sustainability of domestic food production and by extension, food security and sovereignty of Caribbean states. The adverse effects of climate change are predicted to exacerbate the impacts of climate-related hazards on agriculture.

Building environmental resilience in agriculture is therefore a strategic priority of the Caribbean Community (CARICOM). However, effectiveness and efficiency of resilience capacity-building interventions must be informed by assessment of current status of DRM/CCA considerations in agriculture and the gaps which exist in resilience capacity. This paper shares the process of developing an SAI for assessing the status of DRM/CCA mainstreaming in Caribbean agriculture and preliminary outcomes from the application of the instrument in CARICOM states. The SAI disaggregated eight (8) thematic pillars which were quantitatively assessed in terms of how they were addressed at all levels of agriculture in the fifteen (15) CARICOM member states. Preliminary results indicate that over 30% of CARICOM states reported little or no progress in the integration of DRM/CCA in agriculture development planning and points to the urgency of addressing gaps in sustainable food security.

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The nature and operations of informal food vendors in Cape Town, South Africa

In South Africa the informal sector, within which food vending exists, is either criminalized or largely ignored. This is despite the fact that it plays an important role in the economy in terms of employment, income generation, food distribution and general livelihoods. This paper assesses the nature, operations, strategies and challenges of the informal food sector in Cape Town. Data was collected through a survey of over 1000 informal food vendors in the city. Survey results indicate most of the enterprises were single-owned businesses, financed from personal savings and started by owners seeking employment, independence and improved financial security for their families. Most businesses had little or no access to finance from government agencies, banks and micro-

finance lenders. Entrepreneurs faced various challenges ranging from insufficient sales, competition, changing consumer food needs and rising stock prices. To survive in a challenging economic environment, entrepreneurs have become innovative and are adopting various strategies: changing the types of foods they sell, increasing food stock variety, monitoring formal food retailing prices and negotiating with supplier's favorable stock prices. While there has been much debate on the effect of supermaketization on small food retailers in the country, results from this survey are inconclusive. Despite the various challenges being experienced, the informal food sector has become an integral and indispensable component of the food system of the city.

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Crisis and urban landscapes of informal food enclaves: The experience of the city of Gweru in Zimbabwe

Recent research on food insecurity in African cities shows that informal food retailers are increasingly becoming a source of affordable food in the Global South and yet too little attention has been given to informal food systems, especially in countries in economic crisis. This paper seeks to locate the geographies of street food in the broader debate on urban informal foods systems by exploring the less understood food networks in urban informal food distribution systems in terms of connecting: producers and consumers; rural and urban spaces; formal and informal sectors; local and transnational spaces; and private and public spaces. The paper, which is based on a survey of informal food retailers in Gweru (Zimbabwe), argues for an approach that allows us to think through the nature of our relationship to food in cities in ways that might help us to imagine an alternative logic about urban space and food in the global South.

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Urban food security and insecurity in Kingston, Jamaica and Maputo, Mozambique: A comparative view of the role of migration remittances

Kingston, Jamaica, and Maputo, Mozambique, are both relatively small cities (Kingston under 1 million and Maputo 1.3 million people) with high levels of poverty. They are cities with cultures and societal structures that reflect a mix of similarities, as well as differences inherent in their contrasting histories and localities. Whereas Maputo is the capital city of a vast country of Southern Africa, Kingston is capital and primate city of a small island state on the edge of the Americas.

The Kingston and Maputo household samples, from which the food security/insecurity data were collected as part of the Hungry Cities Partnership research, are outlined in this paper. In light of the contrasting characteristics of these two cities, a comparison of the level and nature of food security and insecurity emphasises some of the persistent realities of the urban condition in the Global South despite significant differences of place. The data from the base-line survey (Maputo 2014; Kingston

2015) conducted highlight the differences and similarities in household structures and educational profiles, food management and consumption patterns, income levels and sources of income. In detail, some interesting differences were observed, and the sources of income recorded by households led to closer examination of the contrasting role of migration, especially the impact of migrant remittances, on food security/insecurity in these two cities. This raised more general questions relating to household migration corridors and connections, and the wider role of migration in urban food security.

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Failed Governance in Cape Town's Informal Food Economy

Cape Town's informal food economy plays a central role in the livelihood strategies of the urban poor. Serving as a crucial source of both income and affordable goods and services in the absence of accessible formal markets and a comprehensive social safety net, its contribution to poverty reduction and urban food security is significant. Its role in the promotion of inclusive development, however, is profoundly limited by systemic governance failures that reflect and reinforce patterns of marginalization that define urban life in the city more generally. This paper highlights two key governance failures that define Cape Town's informal food economy. First, it explores how poor state integration both between levels of government and across government departments has caused informal economic governance to be largely incoherent, ad hoc and unplanned. As different state actors respond to competing incentives, mandates and development targets, informal food vendors experience varying and inconsistent forms of coercion, exclusion and inadequate assistance that harm their livelihood prospects. Second, it illustrates how policies that are in place to govern informal economic activity in the city are poorly designed and based on flawed assumptions about criminality or entrepreneurialism that fail to take into account the structural conditions of poverty, inequality and unemployment that produce and sustain informality. Taken together, these failures limit the ability of the informal food economy to contribute to inclusive development in the city, and as a result, perpetuate the marginalization of the urban poor.

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Strengthening land tenure rights for smallholder women farmers: A case study of Agolas Farming Community.

In many developing countries Nigeria inclusive, women have unequal access to resources such as lands, markets and information. This paper aims at seeking ways to Strengthen land tenure rights for smallholder women farmer with specific objectives to make a strong contribution to meeting the Sustainable Development Goals, including achieving gender equality and the empowerment of women and girls. At Agolas, a farming Community situated in Kura LGA of Kano state, Nigeria, 3,000 farmers were registered through a systematic approach for mapping of agricultural farmlands for the

purpose of documentation. A mix of GIS and Survey were employed. Findings showed 90% of women that owned land lacked proper documentation so their land rights are at stake. It was also observed that interventions meant for them were usually redirected to other beneficiaries. Recommendations proffered include creating awareness as to issues of land rights, and possible ways to improve agriculture through sources.

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Spatial leveling: Geographical solution to urban food affordability in Nanjing, China

Many studies have paid attentions to how to increase food accessibility by optimizing spatial distribution of food markets, especially calling for densifying food retailing markets (called as “spatial densifying” in this research). To our knowledge, there has been very few research paying attention to the policy of “spatial levelling” for urban food affordability. “Spatial levelling” in this research refers to that a deliberate spatial arrangement of food markets stabilizes or levels food price through competition between food markets (for instance, competition between two wholesale markets, between supermarket and wet market) that is called as “competition between groups” and competition between merchants within a wholesale market or vendors within a wet market that is called as “competition within a group”. Take Nanjing as a case, this research examines the policies of spatial governance of food markets. In particular, this study investigates those policies of food market spatial arrangement contributing to level food price, which is called as spatial leveling here. The policy of spatial leveling has been implemented at the level of wholesale markets and the level of retailing markets. The deliberate spatial arrangement of food markets lead to the competition between groups and competition within a group, which in fact help level food price and improve food affordability. At the level of wholesale market, there are more than five wholesale markets in Nanjing. Wholesale markets selling the same kinds of food are located relatively near to each other. The spatial proximity of wholesale markets of the same kind lead to competition between them (competition between groups). The space within a wholesale market is rented out to merchants, which lead to competition among merchants within wholesale market (competition within a group).

At the level of retailing market, there are more than 300 wet markets, about 200 supermarkets with fresh produce zones, more than 200 special price shops of fresh produce or affordable fresh produce shops (15% lower than average market price). There exists competition between those kinds of food retailing markets (type of competition between groups). Moreover, competition between vendors within wet markets (another type of competition within a group) is also common. Those competition within a group and between groups contribute to avoiding monopoly in food sale and price, which thus contributes to food affordability from the supply side.

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Rural-Urban Linkages of Maize Price in Zambia

Maize is a staple across Sub-Saharan Africa and is critical for food security. Agricultural growing season dynamics and rainfall variability causes high volatility in maize prices, impacting the price of food in both rural and urban locations. However, the factors mitigating maize price variability in different urban contexts are not fully understood. We present research investigating the relationship between regional rainfall patterns and maize market prices aggregated at the district-level for 30 towns and cities in Zambia. We hypothesized that urban areas within districts that are less connected to food supply chains are more sensitive to the influence of proximate crop production surpluses and deficits. We find complex interactions between preceding season precipitation and subsequent maize price patterns. By understanding impacts of rainfall dynamics on urban maize price, we are able to discuss the many rural-urban linkages at play in a connected food system, as well as the role of climate changes in urban food security.

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