

Edited by

NUNZIA BORRELLI AND PATRICK NDAKIDEMI

# **SMALL FARMERS FOR A FOOD SYSTEM TRANSITION: EVIDENCE FROM KENYA AND TANZANIA**





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FOR A FOOD SYSTEM  
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## SUMMARY

<b>INTRODUCTION</b> Nunzia Borrelli, Patrick Ndakidemi .....	<b>7</b>
<b>SMALL FARMERS AND SUSTAINABLE FOOD SYSTEM</b>	
<b>TRANSITION: THE THEORETICAL FRAMEWORK</b> Nunzia Borrelli, Maura Benegiamo, Giulia Mura, Chiara Caterina Razzano .....	<b>11</b>
The transition of food systems .....	<b>11</b>
Small farmers in Developing Countries .....	<b>13</b>
Small Farmers in Sub-Saharan Africa .....	<b>16</b>
Kenya: A brief introduction to the research area .....	<b>17</b>
Tanzania: a brief introduction to the research area.....	<b>20</b>
References .....	<b>23</b>
<b>SMALL FARMERS' DIFFERENTIATION AND THEIR</b>	
<b>DEVELOPMENT STRATEGIES IN GILGIL KENYA</b> Maura Benegiamo	<b>29</b>
Food system sustainable transition, what is needed .....	<b>29</b>
The small farmer sector in Kenya .....	<b>31</b>
Small farmers in Gilgil: between "farm and sell" and "farm to sell" ....	<b>33</b>
The "farm to sell" sector .....	<b>37</b>
Conclusions .....	<b>39</b>
References .....	<b>42</b>
<b>MAIN CHARACTERISTICS AND POTENTIALITIES OF SMALL</b>	
<b>FARMERS IN KENYA: EVIDENCE FROM A SURVEY IN GILGIL</b> Giulia Corti, Nunzia Borrelli .....	<b>45</b>
Description of the sample .....	<b>45</b>
Main characteristics of small farmers .....	<b>51</b>
Use of extension advice.....	<b>51</b>
Waste management .....	<b>52</b>
Women's role and gender dynamics.....	<b>55</b>
Discussion and conclusions .....	<b>56</b>
References .....	<b>58</b>
<b>WHAT POTENTIAL FOR SMALL-SCALE FARMERS IN TANZANIA?</b>	
<b>EVIDENCE FROM ARUMERU</b> Chiara Caterina Razzano, Giulia Mura, Nunzia Borrelli .....	<b>59</b>
Research design and methodology .....	<b>60</b>

<b>Arumeru small farmers, a marginalized community in a well-endowed area.....</b>	<b>61</b>
Financing Agriculture and Access to Credit on behalf of peasants .....	63
Access to Inputs .....	64
Markets Access, Accessibility Infrastructure and Price Volatility .....	65
Agricultural Extension and Innovation .....	67
<b>Discussion and conclusion.....</b>	<b>69</b>
<b>References .....</b>	<b>75</b>

<b>SMALL FARMING POTENTIAL FOR TERRITORIAL INNOVATION: EVIDENCE FROM ARUMERU, TANZANIA Giulia Mura, Chiara</b>	
<b>Caterina Razzano, Nunzia Borrelli .....</b>	<b>77</b>
<b>The research methodology .....</b>	<b>77</b>
The research hypothesis.....	77
The questionnaire.....	78
The data collection and analysis.....	79
<b>The sample.....</b>	<b>80</b>
<b>Main results .....</b>	<b>83</b>
Crop production and commercialization .....	83
Indigenous Vegetables.....	84
Farming techniques and sustainability.....	85
Waste management .....	86
Gender dynamics.....	87
<b>Discussion and conclusions .....</b>	<b>89</b>
<b>References .....</b>	<b>92</b>
<b>CONCLUSIONS Nunzia Borrelli, Chiara Caterina Razzano .....</b>	
<b>References .....</b>	<b>99</b>
<b>AUTHORS.....</b>	<b>102</b>



# INTRODUCTION

Nunzia Borrelli, Patrick Ndakidemi

This book aims at being a first rendering of the research conducted on the coattails of the SASS Project (Sustainable Agrifood Systems Strategies).

The SASS Project was financed by the Ministry of Education, University and Research (MIUR), and it engaged a multidisciplinary team of agronomists, microbiologists, botanists, economists, sociologists and anthropologists. The purpose of the research was to map and to analyse the local nutritional systems of three East African areas – the Arusha's and the Iringa's in Tanzania and the Lake Naivasha's in Kenya – with an interdisciplinary, synergic and interactive approach.

The project intends to investigate the agro-nutritional systems both from a techno-scientific and a socio-politic point of view, in order to provide a full overview of the situation by integrating the different results from all the disciplinary fields involved.

Because of the complexity of the task, the sociology team of the Bicocca University decided to focus on a particular element of the food system – the production and distribution mechanisms – while overlooking the consumption issues, as they are part of the study and analysis area of nutritionists and doctors.

In order to contribute to the studies on the dimension of production and distribution, the researchers decided to focus on a small analysis unit: the small farmer. By focusing mostly on the Indigenous Vegetables, the research aimed at evaluating if and in what quantities the small farmers could contribute to a hypothetical transition toward a sustainable production and distribution system. And most of all, the aim was to understand if forms of collectivism were already present between small farmers, and if those were oriented toward an even more sustainable production system.

As predictable, the hypothesis around which the research had to develop was if the small-scale farm systems could play a pivotal role in stimulating sustainable place-based rural development practices; and that the development of forms of social-collective action or social organizations could become a good chance for helping the small farmers in tackling the problems connected with the production and distribution of their local products.



From this point of view, our research tried to investigate as deeply as possible the small farmers' world in its whole, concentrating on two of the three areas of the SASS Project: Arusha's area in Tanzania and Lake Naivasha's area in Kenya.

To meet the demands of our research's needs, we decided to apply qualitative and quantitative research methods. More precisely, we carried out qualitative investigations supported by outlines of semi-structured interviews both in Tanzania and in Kenya (respectively by Chiara Cateriana Razzano and Maura Benegiamo); instead, some surveys were made with the support of a questionnaire both in Tanzania (with the help of three local enumerators) and in Kenya (again with the support of three local enumerators). The survey in the territories we intended to analyse was carried out with the aid of a similar questionnaire – with small variations – focusing on these themes: Land & Plots, Crop Production and Farming Practices, Commercialization, Crop Consumption, Gender Dynamics, Social Organizations and waste management.

Although the Bicocca's sociologists wanted to focus both on the profiling of the main aspects of small farmers and on the role of those that were later called social organizations, in this volume (that, we hope, will be followed by a second one) we focus mainly on the description of the small farmer, and on how much he could contribute to the sustainability of production and commercialization in the food system.

In this respect, the text is organized in 6 chapters. The first chapter contextualizes the theme of the small farmer in the food system sustainable transition, then in developing countries, and finally in the territorial areas on which our observations focus: Kenya and Tanzania.

The second chapter focuses on farmers' development strategies in the Kenyan context, with a special focus on the Gilgil Sub-County area. The chapter introduces the main features and constraints of the small farmer sector in Kenya. The third, fourth and fifth sections of the chapter focus on the Gilgil Sub County. They present the principal results of one-month fieldwork conducted in February 2018, during which two focus group (with women engaged in small farmer agriculture and with the members of a farmer group) and 40 semi-structured interviews were conducted with small farmers, government representative and other stakeholders of the food systems (e.g. seed-companies, NGOs etc.).

Chapter three is dedicated to the presentation of the quantitative data collected in Kenya in February 2018 as part of the SASS project. The research, stemming from the international debate on the role of small farmers in developing countries, submitted a pen and paper questionnaire to 100 small farmers in Gilgil Sub-County to provide a snapshot of small farmers' life and work, a necessary base for policy recommendation proposals. The research

was developed in partnership with the Seed Savers Network (see <https://seedsaverskenya.org/>) and Naivasha Basin Sustainability Initiative (ONG). The data collection aims to describe the experience of small farmers in the area, both at a personal level and in the reconstruction of the chain of food production, sale and consumption and associated challenges.

The main aim of the fourth chapter is the discussion of peasants' conditions and challenges in Arumeru, Tanzania. The research, conducted in 2017 and 2019, aims at investigating actors' discourse and practices within the food system and their role towards sustainability transition. Then it is highlighted what emerged in regard of farmers' challenges and what they would need in order to contribute to the sustainability of the food system. The chapter attempts to answer to the following questions: can farmers overcome their difficulties and stimulate sustainability practices in the food system? How can they do it? Does it turn into enhanced sustainability of the system?

Chapter five is dedicated to the presentation of the quantitative data collected in Tanzania in May 2019 as part of the SASS project. The research, stemming from the international debate on the role of small farmers in developing countries, submitted a pen and paper questionnaire to 100 small farmers in Arumeru District to provide a snapshot of small farmers' life and work, a necessary base for policy recommendation proposals. The research was developed in partnership with the Nelson Mandela African Institute of Science and Technology, based in Arusha, and the hypothesis guiding the work focused on the assessment of relevant variables such as the diffusion of sustainable practices in small farm agriculture and the impact that various NGOs are having in the area. The data collection was intended to provide a realistic and very detailed description of the experience of small farmers in the area, both at a personal level and in the reconstruction of the chain of food production, sale and consumption and associated challenges. The chapter presents the questionnaire tool and the selected sample, while it illustrates the main findings in the last paragraph.

And last, the conclusions highlight the points of strength and the points of weakness found in the two small farmers' systems, in the African context object of our analysis.



## Chapter 1

# SMALL FARMERS AND SUSTAINABLE FOOD SYSTEM TRANSITION: THE THEORETICAL FRAMEWORK

Nunzia Borrelli, Maura Benegiamo, Giulia Mura, Chiara Caterina Razzano

## The transition of food systems

Literature has come to agree that if effectively managed, agri-food systems can indeed guarantee sustainability. The need to implement a sustainable transition of the food system is a "natural" consequence of the 4F crisis (*fuel, food, fiscal and financial*) (Marsden, 2016)<sup>1</sup>.

The need for a sustainable transition in the regulation of the food system accelerated considerably in around 2007/2008, when simultaneously with the 4F crisis, the characteristics of what was later defined by Morgan and Sonnino (2010) as the *new food equation*<sup>2</sup> first emerged.

The main elements which led to the definition of the *new food equation* can be summarised as follows: A rise in prices in 2007/2008, due to the onset of the global financial crisis, plummeting more than two billion people into a state of food insecurity.

The need to pay closer attention to food quality, in the wake of food scandals during the last 15 years (mad cow disease, avian flu).

Greater awareness of the effects of the *food system* on climate change (indeed there first began to be talk of low and high CO<sub>2</sub> emission food).

Lastly, land use conflicts which resulted in the progressive loss of arable terrain.

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<sup>1</sup>This text focuses on the transition of the food system: please refer to Rifkin (2014) e Sachs (2015) on fuel and Marsden (2016) for further details on the fiscal and financial crisis.

<sup>2</sup>For further information see Borrelli, Mela 2017.

All these factors resulted in a pressing need for an alternative vision to manage a food system which had come to be envisioned as *place-based and sustainable*. In other words, awareness had ripened on how food system governance should start from knowledge and the effective management of local resources (tangible and intangible), underpinned by activating the local network of actors. This type of food system governance focuses on controlling food quality, promoting local production, so as to limit shipment costs (and thus reduce carbon emissions), organising campaigns to raise awareness on healthy eating and low environmental impact foods and lastly, enabling the regular use of lands.

The food system crisis, coupled with a need to define a governance path for this type of food system, stimulated the development of an *eco-economy* paradigm, grounded in conditions which enable agri-food systems to achieve sustainability targets.

The eco-economy paradigm transcends *bio-economy*<sup>3</sup> and focuses on the need to acknowledge how the sustainable transition of food systems is achievable via three changes which need to take root and flourish: *reflexive governance, distributed and translocalist place-based systems and re-financialization* (Marsden, 2016).

*Reflexive governance* implies that agri-food networks must be managed by a network of local actors which recognise endogenous resources of the territory and are able to effectively exploit them by adopting a reflective stance, reflective in the sense that they "reflect" on acquired knowledge and perhaps bring about changes to it. Thus, actors involved are required to work in a mature and aware manner so as to enact the reflection phase and increase the effectiveness and efficiency of sharing, participation and action strategy definition phases.

With reference to *distributed and translocalist place-based systems*, what Marsden and Morley (2014) and Marsden (2016) have highlighted can be summarised as follows. Even though the local dimension continues to be important, for the purposes of enabling actual food system sustainability, connecting different 'locals' as well as local levels with different levels becomes fundamental (Borrelli, Marsden, 2018). This means ensuring that the so-called *place-based system* is both horizontally (with other 'locals') and vertically connected with different territorial levels. To this effect, Marsden and Morley write "*in this context, the 'local' becomes a creative place not just of resistance but for doing things differently, in being socially and economically creative and connected in and across different spaces*" (Marsden and Morley, 2014, p.219). Therefore, the expression *distributed and translocalist place-based systems* refers to the fact that a *place-based system* is based on relations between local actors as well as between local actors

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<sup>3</sup>For a definition of bio-economy, see Goven and Pavone 2014.

and local resources, and that it also needs to be connected to the outside world, be it at another local or higher level.

In view of the aforementioned, new forms of funding (*re-financialization*), based on leveraging public-private cooperation, are of particular significance. They ripen jointly in urban and rural areas and see the involvement of actors from civil society, university, the state and the world of business (Marsden, 2016).

Therefore, new forms of funding reflect the form of *distributed and translocalist place-based systems and express themselves in what* Van Der Ploeg and Marsden (2008) refer to as “unfolding webs”; networks of actors and resources connected in different ways according to contexts and conditions at hand.

In this type of framework, even peasants play an important part, indeed, in their capacity as depositories of local knowledge, they can enter these networks and leverage their own knowledge and skills to propose production systems which reduce waste and pollution (in this sense, Marsden 2016 speaks of *eco/circular economy*), while also embracing their role as “guardians of the territory”, ensuring appropriate exploitation, and lastly, ensuring that minimum food security margins are met.

## Small farmers in Developing Countries

Small farmers are commonly referred to as small-scale farms based predominantly on family-labour and producing goods and services for both markets and subsistence. Land size is often used as a primary indicator to give a definition of small farmers. The FAO and the WB generally adopt a threshold size of 2 hectares as a broad measure of a small farm (Khalil C.A. *et al.*, 2017).

The international debate on the role of small farmers in developing countries gravitates around two major stances.

The first proposes the adoption of an agriculture development paradigm, based on the liberalisation of agricultural trade, development programmes which aim to bolster small farm productivity by modernising production systems, and the integration of agricultural producers within the global market. Documents like the *Comprehensive Framework for Action (CFA)* reflect this stance. The latter is the outcome of a debate which first started in April 2008 by a United Nations *Task Force* and the *World Development Report 2008: Agriculture for development* of the World Bank. With reference to Africa, a new version of the Green Revolution was proposed by the *Alliance for a Green Revolution in Africa (AGRA)*, promoted by the Rockefeller Foundation and Bill

& Melinda Gates. Even though AGRA recognises the importance of small local producers for undertaking sustainability paths in rural contexts, it still continues to promote the liberalisation of trade and agriculture in a profit-based mind-set.

The second position is the one upheld by supporters of the *Food Sovereignty principle* (which should be distinguished from the principle of food security), claiming that "the self-determination of populations in the production, distribution and consumption of foodstuffs contrasts the homogenisation of the agro-industrial complex, reinforces the diversity of production methods and respect for single types of crops" (Cavazzani, 2008).

Strategies for affirming food sovereignty are particularly laden with significance in Sub-Saharan Africa, where the majority of people inhabit rural areas and engage in traditional farming practices which have not disappeared despite widespread destruction suffered during the colonial and post-colonial ages (Silvini, 2006). To this effect, the Via Campesina movement plays a particularly significant role and is one of the most important examples of a movement, not only in terms of the right to food, but also for the protection of farmers' work. This widespread movement has achieved international fame over time and spread the concept of "food sovereignty" at the 1996 *World Food Summit*. On this occasion, the movement voiced its opposition to the current food trade regime, in favour of local economies and markets, defending the work of small farmers and their right to make decisions. It also considered the consumer's right to transparent trade, freedom and control of their own nourishment<sup>4</sup> (on Via Campesina please also see Desmarais, 2009; Roiatti, 2010).

The Via Campesina Movement is also committed to expanding potential spaces for cooperation between existing farmers' associations such as ROPPA (Network of Peasant Organizations and Agricultural Producers in West Africa) and PROPAC (a central African based farmers' and peasants' platform). Both organisations work at a political-institutional level, with the aim of addressing farming and trade policies and orienting them in favour of family farming.

The Mali forum was an important milestone for the affirmation of an idea of rural development centred around the role of family farming. It inspired the 2007 "*Declaration of Nyéléni*" which was adopted by more than 80 countries. Six key points of food sovereignty were identified on the occasion of the Forum<sup>5</sup>: everyone has the right to sufficient food; every worker involved in the production of food must be protected; producers and consumers must be

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<sup>4</sup>See Via Campesina websites <https://viacampesina.org/en/>, Via Campesina European coordination <http://www.eurovia.org/?lang=it> (consulted on 31.08.18).

<sup>5</sup><https://nyeleni.org/spip.php?article334> (consulted on 31.10.18).

placed at the centre of decision-making processes; conservation of the territory's organic and cultural diversity as well as its natural resources is necessary and should respect local communities, helping them to resolve possible conflicts with other realities and bodies; there is a need to develop suitable research systems to preserve local knowledge and favour the exchange of information; working with nature is necessary: processing methods which respect nature should be favoured and those which may damage the ecosystem should be avoided.

The United Nations *Millennium Goals* and COP21 are also examples of international documents which emphasize the need to reinforce family farming. Indeed, family farming features as a target to be reached for ensuring sustainability in the new millennium.

With the *Millennium Goals*, the United Nations recognises the dual role of agriculture and family farming in particular. Indeed, agriculture responds to socio-economic requirements by satisfying primary needs, as well as ecological-environmental requirements, by favouring biodiversity conservation.

Issues regarding the protection of small farmers were also addressed in COP21, where it was highlighted how small farmers are key players, on the front line in the battle against climate change. Within the scope of COP 21, the need for initiatives to face up to problems linked to drought, flooding, storms and other catastrophes which can be expected to negatively alter the life conditions of small farmers, was highlighted. Negative effects on the latter would have ripple effects one of the main food security practices in developing countries.

Van Der Ploeg (2009) provides a particularly authoritative contribution to the discussion on the conditions of small farmers. According to the academic, the peasant's condition is not synonymous with backwardness, nor is it intrinsically adverse to development, on the contrary: the peasant world is characterised by a strong innovative spirit and consequently, a markedly agency-oriented dimension. In other words, Van Der Ploeg (2009) recognises that small farmers have the ability to undertake territorial conservation and promotion practices, in virtue of their knowledge of the natural and physical territory, coupled with technical knowledge on how to farm the land, the use of natural pesticides and autonomous seed production.

Focus on small farmers and on how their practices could guide a sustainable transition in rural systems intersects with another important area of research, also frequently cited by Van Der Ploeg. Agri-ecology has matured within the cradle of hard sciences and one of its major exponents is the entomologist Altieri. It avails itself of ecological principles for the design and management of sustainable agri-ecosystems, with the addition of less external chemical products, sometimes partly replaced by natural processes, such as



natural soil fertiliser and biological pest control (Altieri, 1995)<sup>6</sup>. "Therefore, agroecology aims to lead industrial agriculture towards an alternative paradigm, one which encourages local/national food production by small, family farms, based on the introduction of innovative solutions, locally available resources and solar energy. This implies that peasants have access to land, seeds, water, credit and local markets, also through the creation of economic support policies, financial incentives and market opportunities (...). Agroecological systems are grounded in the ecological foundations of traditional, small scale agriculture, which has a long history of successful agricultural systems, characterised by a remarkable diversity of crops and domesticated animals, maintained and reinforced by means of a truly ingenious management of the land, water and biodiversity, as well as the implementation of complex systems of traditional knowledge." (Altieri, 2015, p.15). Altieri (2015) also claims that understanding the true essence of agroecology may be easier if we think in terms of differences and highlight the reasons for which agroecology distinguishes itself from organic agriculture. In overall terms, it is possible to affirm that organic agriculture is a production system which supports agricultural productivity in avoiding or reducing the use of synthetic fertilisers. Therefore, monoculturally organised organic farming systems which are still dependent on external inputs (regardless of the fact that they are organic), are not based on agroecological principles. As Rosset and Altieri explained back in 1997, the organic approach requires the simple replacement of inputs, substantially follows the conventional agriculture paradigm and aims to overcome limitations by working on organic/alternative inputs. However, all too often these inputs result in farmers' dependency on suppliers, undermining food sovereignty which in contrast, is the very cornerstone of agro-ecology.

## Small Farmers in Sub-Saharan Africa

Small farmers constitute the dominant production model in Sub-Saharan rural areas, accounting for up to the 80-90% of all farms (Grain 2014). They make up most of the active rural population (IAASTD, 2009) and include more than half of all economically active African women (Fao, 2010).

Indeed, despite the fact that small farmers are the largest production category in SSA and are chiefly responsible for feeding very large numbers of people, they are among the most marginalised and food-insecure components of rural society. They occupy less than 15% of total arable land in Africa

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<sup>6</sup>Please also see Pisanelli 2015 for more on the concept of agroecology.

(Grain, 2014) and the average plot size has shrunk over the last fifty years, while the population of households engaged in agriculture has increased (Lowder et al., 2016). Processes such as the rise of small-scale industrial farms, sprawling urbanization and demographic land pressure in rural contexts are among the main reasons underpinning the trend in the reduction of small farm sizes (Jayne et al., 2014).

Small farmers are also the most vulnerable group to climate change impacts and environmental degradation as well as crises and shocks in the food and economic system (IFAD, 2013). Shrinking farm sizes tend to force people towards intensified agrarian production, that increases the unsustainable nature of farming practices (Tittonell and Giller, 2013). Agriculture intensification results in soil degradation, which in turn reduces fertility rates and is directly correlated with food insecurity and nutrient depletion (ELD-UNEP, 2015). Scholars have also pointed out that poverty patterns tend to reduce the bargaining power and force small farmers to sell their product immediately after the harvest and at lower prices (Woolverton and Neven, 2014). Moreover, below a certain plot size, labour returns per person are too low, forcing people to exit agriculture and migrate to cities or compensate with diversification of income through rural non-farm employment (Haggblade, et al. 2010).

Despite limited access to land and the tendency to prioritize self-consumption, small farming systems are still the main food suppliers in SSA Countries, where they provide approximately 70% of the food produced (IAASTD, 2009): it means that this sector is a very relevant contributor to national food security.

Small farmers are primarily food consumption oriented and they privilege the national, regional and local markets when trying to sell their surplus. They follow distinctive production and market logics which markedly sets them apart from the corporate controlled agribusiness sector, focused on privileging non-food commodities and principally export-oriented (Van der Ploeg, 2009).

## Kenya: A brief introduction to the research area

Situated on the equator on the East African East Coast, Kenya is among the fastest growing economies in Sub-Saharan Africa, with gross domestic product growth rates above 5% for most of the past decade (World Bank, 2017). The last years have seen improvements in terms of life expectancy,

access to education and health care<sup>7</sup> (World Bank, 2017). Nevertheless, in 2013, the Gini coefficient stood at 47.4, placing Kenya in 147th place on the world inequalities ranking (World Bank, 2013). Data for 2015/2016 shows that 36.1% of Kenyans still lived below the international poverty line (US\$1.90 per day in 2011 PPP) (46.8% in 2005/06). Poverty presents strong spatial and gender patterns, with the majority of the poorest population living in rural areas, especially in the north-eastern parts of the country (Musangi, 2017), coupled with strong gender inequality. According to the HDI 2015, the Country was ranked 135 out of 159 countries on the Gender Inequality Index (GII value of 0.565).

The Country covers a total land area of 569,140 Km<sup>2</sup> <sup>8</sup> with an estimated population of 51,016,679 (the median age is 19.2 years)<sup>9</sup>. Despite substantial *urban* growth over the last few decades (Cira et al., 2016), Kenya predominantly remains a rural country with over 80% of its population living in rural areas and depending directly or indirectly on agriculture (Alila and Atieno, 2006). Agriculture is the backbone of the Kenyan economy. The agricultural sector accounts for 65% of national exports and more than 60% of informal employment in rural Kenya, directly amounting to 24 percent of annual GDP and another 27 percent indirectly (GoK, 2010). However, the agrarian sector is characterized by low diversification, with only a restricted range of commodities entering in commercial and export chains (Alila and Atieno, 2006). These are the so-called cash crops, with tea being the country's main cash crop, and horticulture products, especially fresh-cut flowers. According to the World Bank, Kenya is the second largest horticultural exporter in Sub-Saharan Africa (after South Africa), the second largest developing-country exporter of flowers in the world (after Colombia), and the second largest developing country supplier of vegetables to the European Union (after Morocco) (English et al., 2004). The sector is seen as a success story in agrarian development due to the large numbers of small farmers involved in production, but it is difficult to make definitive statements about this contribution towards the reduction of poverty and improving of livelihood (Minot and Ngigi, 2004)

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<sup>7</sup>According to the Kenya's Human Development Index value for 2015, the country ranks mid-level in terms of human development 146th out of 188 countries and territories, with a medium to low equality in HDI achievements between women and men. Source: (UNDP, 2016).

<sup>8</sup>Source: <https://data.worldbank.org/indicator/AG.LND.TOTL.K2?locations=KE> Last access: 10/09/2018

<sup>9</sup>According to estimates and projections in the United Nations 2017 Revision of World Population Prospects, drawn up by the Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat. (Medium-fertility variant). Source: <https://esa.un.org/unpd/wpp/>. According to the 2009 Kenya population and housing census, 38,610,097 people were living in the country at that date. Source: <https://www.knbs.or.ke/>.

Finally, the agrarian sector is affected by structural constraints. With an average rainfall of 400 mm, Kenya is considered as one of the water-deficient countries in the world (GoK, 2010). Only about the 20% of the country's land is classed as high and medium potential and the rest is mainly arid or semi-arid land (World Bank, 2008). High and medium potential lands have high population densities and it is where most intensive crop and dairy production takes place. In addition to this, in the past three decades, droughts and floods have increased in frequency and intensity, resulting in high crop failure and livestock deaths (Alila and Atieno, 2006).

The Gilgil Sub-County (area of interest for our research) is one of the 11 sub-counties forming part of the Nakuru County<sup>10</sup>. It is located in the south-eastern part of the Rift Valley Province. The siege of the constituency, located in Gilgil town, is 120 km from Nairobi. The Gilgil Sub-County covers an area of 1348.4 km<sup>2</sup> (GSBC, 2018)<sup>11</sup>, and it borders the sub-counties of Naivasha to the South East, Nyandarua to the East, Subukia and Nakuru to the North, Narok to the West and Njoro to the North West. Under the administration of the County Government the Gilgil Sub-County is further divided into 5 wards (Gilgil, Elementaita, Mbaruk/Eburu, Malewa West and Murindat); while in the jurisdiction of the National Government the 3 divisions, 8 locations and 24 sub-location.

The majority of the Gilgil Sub-County population is composed of small farmers cultivating an average size plot of less than three acres, disposed in a sparse settlement pattern between remote rural areas and the outskirts of Gilgil city (see also WWF, 2017). Small farmers in Gilgil rely mostly on small-scale integrated multi-crop-livestock systems, with various degrees of subsistence and commercial production. The major staple food crops grown are maize, beans, Irish potatoes and wheat (GSBC, 2018)<sup>12</sup>. Main horticulture crops are tomatoes, cabbages and kales, and there is some fruit production such as watermelons, pawpaw (asiminier trilobé), passion fruits, avocados and citrus. Livestock provides an important alternative-income resource through the selling of milk, in addition to supplying a key input through the recycling of livestock manure. Small farmers tend to reduce the use of external inputs, such as improved seeds and agrochemicals, because of their cost. The large majority of the farms are based on rain-fed irrigation system. Other than the practice of multi-cropping agriculture, farmers use to adopt other

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<sup>10</sup>Under the administration of the County Government, Nakuru County is divided into 11 sub-counties and 55 wards, while in the jurisdiction of the National Government the county curved up in 31 Divisions, 124 Locations and 280 Sub-Locations

<sup>11</sup>GSBC (2018), Gilgil Sub County Profile, private document shared by Mr. D.M Mutuku, *State Court Administrative Office*, Gilgil Agriculture Officer in Gilgil, date 14/02/2018

<sup>12</sup>GSBC (2018), Gilgil Sub County Profile, private document shared by Mr. D.M Mutuku, *State Court Administrative Office*, Gilgil Agriculture Officer in Gilgil, date 14/02/2018

agroecological techniques principles, the most performed being the employment of organic manure. Seed saving is also a common practice, and it is mostly performed by women. (Onwonga et al., 2007).

## Tanzania: a brief introduction to the research area

Tanzania is a country located in the Eastern African region, with a total surface of 945,000 km<sup>2</sup>. The Great Rift Valley runs through the country shaping its morphology. Tanzania is mountainous in the northeast, where Kilimanjaro, Africa's highest peak, is located. To the north and west are important lakes such as Lake Victoria (Africa's largest lake) and Lake Tanganyika (Africa's deepest lake); to the southwest lies Lake Nyasa. Northern and southern regions are characterized by highlands: the Fipa Plateau in the southern highlands and The Usambara, Pare, Meru, Kilimanjaro, Ngorongoro Crater and the Oldonyo Lengai form the northern highlands. Tanzania is therefore endowed with a variability of climate and rainfalls regimes, that vary according to latitude and altitude. Generally speaking, Tanzania has a tropical climate and two major rainfall regions: one is unimodal (December – April is the rainy season) and the other is bimodal, namely two rainy seasons, one from October to December and one from March to May. The latter is found in the northern region, where Arumeru, the study area, is located. (<https://www.tanzania.go.tz>)

Tanzania has a fast-growing population of 44.5 million According to the last available census (2012). Projections<sup>13</sup> estimate it at around 55 million in 2016. Over the 2002-2012 period, the population of Tanzania has increased from 34.4 million to 44.9 (increase of 30%). Current population growth rate is around 2.5% and fertility rate is 5.5% (URT, 2013<sup>14</sup>). Approximately 26% (2018) of Tanzania's population is poor, living under the basic need poverty line<sup>15</sup> (poverty incidence allegedly reducing, compared to 2007 rate at 34.1%)

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<sup>13</sup> <https://www.worldbank.org/en/country/tanzania/overview>

<sup>14</sup> United Republic of Tanzania – National Bureau of Statistics, Ministry of Finance and Office of Chief Government Statistician, President's Office, Finance, Economy and Development Planning (Zanzibar), (2013), *Population and Housing Census (PHC) 2012: Population Distribution by Administrative Areas*, on [http://www.tzdp.gov.or.tz/2012\\_Census\\_General\\_Report.pdf](http://www.tzdp.gov.or.tz/2012_Census_General_Report.pdf)

<sup>15</sup> Basic needs poverty defines the minimum resources necessary for physical well-being, in terms of consumption of goods. The consumption aggregate comprises food, including food produced by the households themselves, and expenditures on a range of other goods and services (e.g., clothing, utilities, transportation, communication, health, and education). It excludes rent and other housing-related expenditures as well as spending on exceptional events (e.g., marriages, funerals) and larger consumer durable items (cars, TVs, etc.). Poverty lines are then defined as the amount of income required to satisfy those needs. The national threshold is set at TZS 49,320 per adult per month, based on the 2017-18 Household Budget Survey (HBS) (URT, 2019)

Poverty is more prevalent in rural areas: over 80% of the country's poor live in rural areas (2018). The trend shows a reduction compared to 2011/2012, when 84% of total poor were rural. Besides urban-rural dynamics, poverty incidence is also affected by gender: poverty affects a higher percentage of female-headed households, compared to male-headed ones (respectively 27.4% against 26%) (URT, 2019<sup>16</sup>).

Tanzania is administratively divided into 30 administrative regions, 20 in Tanzania mainland and 5 in the Archipelago of Zanzibar. Regions are divided into administrative district councils which are in turn divided in wards (the administrative unit just above the village) (URT, 2013). The study area is located in Arusha region where Arusha town (third major urban centre of the country) is the regional capital. Arusha town and the rural surrounding districts of Meru and Arusha constitute the area of investigation (the area is also known as Arumeru).

Smallholders are the main producers of food crops in Tanzania. About 70% of Tanzanian households are rural and are engaged in agrarian activities (Faostat<sup>17</sup>). Agriculture accounts for about 75% of the labour force (Salami et.al, 2010). Women account for nearly half of the workforce, producing more than 70% of the food (URT, 2015<sup>18</sup>), and approximately 7.2 million youth depend on agriculture. The rural population is relatively young, with about 44% being below 15 years of age. The average plot size is about around 2 hectares, but vary widely across regions. In Arusha Region it is around 1 ha and around 0.9 ha in the study districts of Arumeru (URT, 2012<sup>19</sup>), well below the national average.

Smallholder farmers in Tanzania face a range of challenges, including obtaining and paying for quality seeds, fertilizer, and pesticide, and transporting goods to market along run down road networks. Compounding this is a lack of post-harvest storage facilities for crops and, if available, their prohibitive cost. In addition, a number of crop diseases have increased in incidence, including coffee wilt, batobato (African Mosaic) in cassava, banana xanthomonas, elihuka, cassava mosaic, cassava root rot, maize streak and maize fall armyworm.

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<sup>16</sup> United Republic of Tanzania- Ministry of Finance and Planning - Poverty Eradication Division (MoFP- PED) [Tanzania Mainland] and National Bureau of Statistics (NBS), (2019), *Tanzania Mainland Household Budget Survey 2017-18, Key Indicators Report*. Dodoma, Tanzania

<sup>17</sup><http://www.fao.org/faostat/en/#country/215>

<sup>18</sup> United Republic of Tanzania- Ministry of Labour and Employment and National Bureau of Statistics, (2015), *INTEGRATED LABOUR FORCE SURVEY 2014*, on [nbs.go.tz](http://nbs.go.tz).

<sup>19</sup>United Republic of Tanzania-Ministry of Agriculture, Food Security and Cooperatives, Ministry of Livestock Development and Fisheries, et al., (2012). *National Sample Census Of Agriculture 2007/2008 Regional Report: Arusha Region Volume* available at <http://www.nbs.go.tz/>

Arumeru is made up of Arusha City Council (Arusha urban district); Arusha District Council (Arusha rural district) and Meru District Council (Meru rural district) The district is located within Arusha Region, in the northeast of the country, close to the Kenyan border. The total population of the area is 1,007,776<sup>20</sup> and the total surface area is 2,986 square km<sup>21</sup>.

Population density in the urban district of Arusha is 1531 per square km; in Meru District it is 211,5 per square km, and in the rural district of Arusha it is 227 per square km<sup>22</sup>. The national average population density is 51 per square km (URT, 2013) and all the districts subject to this study are well above the national average. The Arusha Region's population density is in line with the national average: 49 people per square km. (URT, 2013).

Overall, Arumeru farming system is characterized by strengths and weaknesses. The main strengths are about the varieties of food produced (maize, pulses varieties of indigenous beans and peas; rice; bananas, a permanent crop, often intercropped). The most important horticultural products are tomatoes, cabbages and onions. Local farming practices are characterized by crop rotation and intercropping (Costa S. et al., 2013; URT, 2012<sup>23</sup>). Other strengths are about the favourable climate and volcanic soils that allow the production of surplus food every harvest, except during droughts and in semi-arid areas where the economic activity is agro-pastoralism (i.e. oldonyo sambu – Ngorongoro)

(Istituto Oikos, 2011). One of the main weakness is about the land scarcity: in both Arusha rural district and Arumeru district farm size is below the national average of 2 ha: 1 ha of land in the Arusha Region and 1.3 ha in Arumeru (SVL for Solidarid, 2016)<sup>24</sup>. Another weakness is about the food distribution and retail. The bad condition of roads, the absence of public infrastructure and the lack of private transportation means do not let small farmers bring their products to the markets.

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<sup>20</sup> Data collected by Population and Housing Census (PHC), 2012

<sup>21</sup>Data Collected by Meru strategic Plan 2021; Arusha strategic Plan 2021; Arusha masterplan 2035.

<sup>22</sup>*Ibid*

<sup>23</sup>United Republic of Tanzania-Ministry of Agriculture, Food Security and Cooperatives, Ministry of Livestock Development and Fisheries, et al. *National Sample Census Of Agriculture 2007/2008 Regional Report: Arusha Region Volume Vb*, available at <http://www.nbs.go.tz/>.

<sup>24</sup>These data were collected by the *Report Of Solidaridad, Baseline/Feasibility Study for Healthy Fruits and Vegetables in Africa – Tanzania Country Report*, published in 2016.

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Chapter 2

# **SMALL FARMERS' DIFFERENTIATION AND THEIR DEVELOPMENT STRATEGIES IN GILGIL KENYA.**

**Maura Benegiamo**

## Food system sustainable transition, what is needed

The promotion of a sustainable food system is strategic to cope with multiple and interdependent economic, ecological and social challenges. To achieve this goal globally, it is necessary to build inclusive and accessible paths for small farmers, who make up the vast majority of food producers on the planet. This is even more crucial in low-income countries, where the small farmer sector plays a central role in ensuring food security. Here, moreover, farm-based activities remain the main source of income and the first livelihood strategy for the large majority of the population.

Recently, the importance to sustain small farmer development has been also recognized by the international community. Principal donors and global organisations agree on the importance of the agrarian sector, and family farming in particular, for achieving the Millennium Development Goals and fulfilling the UN's zero-hunger goal (World Bank, 2007; FAO, 2012).

Sub-Saharan Africa is strongly subject to the challenges that an unsustainable food system poses: though the majority of its population depends on small farming agricultures (OECD-FAO, 2016), the Continent hosts the highest percentage of undernourished population (FAO, 2017) and is strongly dependent on cereal and staple-food importation (FAOSTAT<sup>1</sup>, Rakotoarisoa et.al., 2011). Recent crises of the food system, resulting in the sudden peak in primary food commodities prices, have made evident the need

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<sup>1</sup> <http://www.fao.org/faostat/en/#home>

for states to rely on forms of food self-sufficiency to combine in a more balanced way domestic production and international trade.

Yet, to be sustainable, food production should also be less resource-consuming. This involves a necessary re-localisation of food systems, and their integration with agro-ecological principles and crop diversification to maintain soil fertility, preserve water and ensure landscape biodiversity. However, as the food-sovereignty debate points out, to effectively reach sustainable goals, agroecology should also match with equal resource access and deep democratization of the food system (Holt-Giménez and Altieri, 2013). Poverty-trap dynamics, agribusiness competition, value chain integration, as well as imbalances in agricultural supply chains and land-reduction trends, can lead small farmers toward an unsustainable agrarian intensification, engendering environmental degradation and increasing small farmers' vulnerability. Enforcing agroecology is then intended to enhance small farmer autonomy at the local scale and within the food system and to restore the economic viability of small farmers' agriculture.

To better understand the challenges and opportunities that are posed to small farmers in the context of a sustainable food-system transition, this chapter focuses on farmers' development strategies in the Kenyan context, with a special focus on the Gilgil Sub-county area. The next section introduces the main features and constraints of the small farmer sector in Kenya. The third, fourth and fifth sections focus on the Gilgil Sub County. They present the main results of one-month fieldwork conducted in February 2018. Though the fieldwork also involved the delivery of 100 survey questionnaires to a selected representative sample of small farmers, this chapter only focuses on the qualitative aspect of the research. This involved two focus groups (with women engaged in small farmer agriculture and with the members of a farmer group) and 40 semi-structured interviews conducted with small farmers, government representative and other stakeholders of the food systems (e.g. seed-companies, NGOs etc.).

The research fieldwork enables to highlight important differences within the small farmer sector in Gilgil, attesting for various degrees of integration between subsistence and commercial production where the type, quantity and quality of farm products dictate the nature and function of market-access and vice versa. Accordingly, two macro-categories of farmers within the small farmer sector have been identified, distinguishing small farmers through a predominant "farm and sell" or "farm to sell" orientation. For each category the main challenges and development strategies are described. These are then discussed in the conclusive section, which addresses the main constraints posed to a sustainable food system transition for each of the two categories outlined and, on this basis, provides policy recommendation to make a sustainable food system transition more likely to be achieved.

## The small farmer sector in Kenya

We can subdivide the Kenya agrarian sector into two main categories. One dominated by large-scale agro-industrial companies, principally export-driven, characterised by a low diversification with only a restricted range of commodities entering in commercial and export chains. These are predominantly based on horticulture production: cut-flowers, fresh beans, sweet potatoes, coffee and tea are among the main exported crops. The other category is constituted by the large number of small farmers that constitutes the dominant group in Kenyan agrarian sector, which involves more than half of Kenyan rural inhabitants and two-thirds of active rural woman (Alila and Atieno, 2006). Women represent the dominant workforce in Kenya's agriculture and are more involved than men in subsistence small-farming activities (Rapsomanikis, 2015) while providing the 75% of the labour force in small-scale agriculture (Alila and Atieno, 2006). Despite this, women land's rights are often ignored and they rarely own or inherit a land title. They also have more difficulties in accessing inputs and financial service (Musangi, 2017).

Small farmer systems are commonly referred to as small-scale farms based predominantly on family-labour and producing goods and services for both markets and subsistence. Land size is often employed as a primary indicator to define small farmers (Khalil et.al, 2017). The FAO and the World Bank generally adopt a threshold size of 2 hectares as a broad measure of a small farm (World Bank, 2003). However, this data may vary depending on the national context and different institutional definitions exist (Khalil et.al, 2017). For the Kenyan context, the FAO smallholder data-portrait<sup>2</sup> indicated an average farm-size ranging from 0.53 and 2.25 hectares. Moreover, according to data collected in 2003 by Jayne et al. (2003, 2010), differences in Kenyan small farmers' land tenure (rented land included) varied between 5.91 and 0.58 hectares respectively for the top and the bottom land quartiles, with around the 25% being nearly landlessness managing less than 0.11 hectares (Jayne et al. 2010). Moreover, farm sizes are shrinking and the ratio of arable land to the agricultural population has been halved since the 1960s (Jayne et al. 2010).

Kenya's small farmers mostly rely on forms of integrated crops and livestock farming, they are principally subsistence-driven and seldom involved

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<sup>2</sup><http://www.fao.org/economic/esa/esaactivities/esa-smallholders/dataportrait/farm-size/en/>



in export activities. At the same time, the Kenyan small farmer sector is the principal supplier of Kenyan local and regional markets (Woolverton and Neven, 2014), and plays a key role in ensuring national food security. Smallholder's production is responsible for around 80% of Kenya horticulture products (USAID, 2012) and around 70% of maize, Kenya's principal staple crop (GoK, 2010). Despite this, the majority of small farmers and rural habitants are poor and highly exposed to food insecurity and live in houses without internal running water and sanitary facilities (Kristjanson et al., 2009). According to the FAO, the income of a smallholding family in Kenya is about \$2.527 per year (measured in 2009 prices), which is less than two dollars per day per person in a family size of five persons (Rapsomanikis, 2015). A large proportion of rural income comes from non-farming activities and from migrant remittance of remittances.

The underdevelopment of Kenyan agriculture, and especially of the small farmer sector, is attributable to different structural and political constraints, and the strong inequalities characterizing the whole sector. According to the Kenyan Government (GoK, 2010), the sector is affected by i) inadequate budgetary allocation; ii) reduced effectiveness of extension services; iii) low absorption of modern technology; iv) high cost and increased adulteration of key inputs; v) limited capital and access to affordable credit (especially for small scale farmers and women) ; vi) pre and post-harvesting crop losses; vii) low and declining soil fertility; viii) inappropriate legal and regulatory framework; ix) lack of coherent land policy; xi) inadequate infrastructure including xii) insufficient water storage infrastructure; xii) inadequate storage and processing facilities; xiii) inadequate markets and marketing infrastructure.

All these factors contribute to the declining performance of the sector in terms of growth. Structural constraints in small farming systems result in low productivity and barriers to commercialization. Low productivity, reflected in low yields, constitutes a primary source of vulnerability in Kenya and necessitates high unit production costs to overpass it (Alila and Atieno, 2006). However, inputs have become increasingly unaffordable to the small farmers while the possibility to access credit has lowered (Alila and Atieno, 2006).

Furthermore, with an average rainfall of 400 mm, Kenya is considered as one of the water-deficient countries in the world (GoK, 2010). Only about 20% of the country's land is classed as high and medium potential and the rest is mainly arid or semi-arid land (World Bank, 2008). In the past three decades droughts and floods have increased in frequency and intensity, resulting in high crop failure and livestock deaths (Alila and Atieno, 2006). The irrigation system is underdeveloped and only covers the 7% of the total cropped land, being more concentrated in high-value and export crops farming, such as coffee and horticulture (Alila and Atieno, 2006). According

to Kenya Government, 'large commercial farms account for 40% of irrigated land, while the smallholder farmers and government-managed schemes account for 42 % and 18% of irrigated land, respectively' (GoK, 2010, p. 14).

## Small farmers in Gilgil: between "farm and sell" and "farm to sell"

The Gilgil Sub-County falls into the category of semi-arid areas, marked by a dipole rain pattern, added to which are a limited water resources and undeveloped irrigation system. Located in the south-eastern part of the Rift Valley Province it occupies the lower catchment of the Lake Naivasha and is one of the 11 sub-counties forming part of the Nakuru County<sup>3</sup>.

The majority of Gilgil Sub-County population is composed by small farmers cultivating an average size plot of less than three acres, in a sparse settlement pattern between remote rural areas and the outskirts of Gilgil city (see also WWF, 2017). Small farmers in Gilgil rely mostly on small-scale integrated multi-crop-livestock systems, with various degrees of subsistence and commercial production. The major staple food crops grown are maize, beans, Irish potatoes and wheat (GSBC, 2018)<sup>4</sup>. Main horticulture crops are tomatoes, cabbages and kales, and there are some fruits products such as watermelons, pawpaw (asiminier trilobé), passion fruits, avocados and citrus (GSBC, 2018).

Farmers' vulnerability in Gilgil Sub-County is particularly linked to water scarcity. Rainfed agriculture is predominant and only a limited number of households count with irrigation or some systems of water storage. As a consequence, agrarian production is seasonal and, due to rain uncertainty, a high-risk venture. Livestock provides an important alternative income resource, in addition to supplying a key input-resource through the recycle of livestock manure.

The cooperative sector is relatively undeveloped and other attempts to form commodity-specific marketing groups to organize collective sales to bypass intermediaries are particularly difficult and struggle to succeed. Among

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<sup>3</sup> Under the administration of the County Government, Nakuru County is divided into 11 sub-counties and 55 wards, while in the jurisdiction of the National Government the county curved up in 31 Divisions, 124 Locations and 280 Sub-Locations.

<sup>4</sup> GSBC (2018), Gilgil Sub County Profile, a private document shared by Mr D.M Mutuku, State Court Administrative Office, Gilgil Agriculture Officer in Gilgil, date 14/02/2018

the main reasons for the cooperative sector's underdevelopment there is the relative absence of established cash crops chains. The main, and almost sole, cash crop farmed in Gilgil is the pyrethrum flower. In the last years, the increasing retard in payment by the Pyrethrum Board of Kenya, the principal purchaser, have pushed many smallholders to abandon the production and the sector experienced a steady decline. The dairy sector is the only other sector where an active and developed cooperative movement is found. Here cooperatives collect member's milk in bulk to sell it to processors. The purchasing of milk for processing and then reselling is mostly done at the level of processors and co-operatives and there is little value added for the producer. There are no cooperatives for other products cultivated by small farmers. Reasons are different and vary according to the type of crop. For example, maize has an already well-established market as it is principally bought by government boards and Millers Market. Therefore, the rising of a cooperative organization to increase the marketability of maize would be of little use. For the vegetable sectors, the low production rate and the lack of adequate production infrastructure – from irrigation to storage – as well as of financial support obstacle collective marketing.

Alongside these general trends, the small farm sector is not homogenous, differences exist between the small farmers attesting for various degrees of integration between subsistence and commercial production. These differences reflect in turn variations in agrarian performance, assets and capabilities between farmers. More precisely, small farms in Gilgil Sub-County fluctuate between two poles. At one extreme, we find farmers whose activities are predominantly subsistence-oriented. They cultivate land with the principal intent of producing food for own consumption and they sell to the market the surplus production. On the opposite side, there are small farmers producing specifically for the market. We define the farmers belonging to this category as market-oriented small farmers to distinguish them from small subsistence farmers. For these farmers, the main objective is not to feed their family with farm produce but to generate profit from agrarian activities. Despite this, they can still be considered as 'small farmers' because of the little assets on which they rely, especially concerning technology and land.

The next sections provide details on the main features of these two groups and the development strategies they predominantly pursue. It is worth to underscore that, despite sharing some common features, these are not strictly homogeneous categories. Variations in agrarian performance, assets and capabilities exist among farmers belonging to the same category.

## **The farm and sell subsistence sector**

Being predominantly subsistence-oriented, farmers under the ‘farm and sell’ category privilege growing maize and beans, the two main sources of staple food in Kenya. However, given that multi-cropping agriculture is a key risk management strategy among small and subsistence farmers, these farmers also rely on a great variety of crops, including roots and tubers, pulses, vegetables and tree-fruits.

In line with Kenyan general trend, also in Gilgil Sub-County, agrarian work is disproportionately performed by women who work the family’s land on their own, land of which they are rarely legal owners. Women normally begin working in the husband’s family fields after getting married. However, despite farming activities are predominantly performed by women, the latter are often excluded from the sale of their products and bargaining with buyers. Gender disparities impact heavily on the agrarian performance of the small farmers. For example, they exclude women from receiving adequate training by public and private extension. Furthermore, it is not rare that the work is conducted alone, while other household’s members, especially the husband, are involved in other job occupations. The fact that only a few or just one component of the household is engaged in farm production has contributed to maintaining low production rates.

Other production constraints experienced by this category of small farmers are water scarcity, restricted land size and low inputs access, including financial inputs. Water scarcity, coupled with unreliable rainfall is the main perceived risk. A scarce raining season can damage crop maturation and cause harvest failure. In Gilgil, the upper groundwater is too deep and requires technological investment to be reached. Though the Sub-County is increasing the financing of water ponds and pans, the majority of these farmers practice a rainfed agriculture. Another key experienced constraint is the difficulty in obtaining quality seeds. It is forbidden to commercialize local unregistered seeds, however procuring seeds in the market can be expensive for small farmers, especially for subsistence and semi-subsistence farmers. Inaccessible seed prices are one of the main reasons farmers often cannot afford to buy seeds in time for the beginning of the rains when the planting season starts. The picture is further complicated by the fact that the planting season arrives after long months of drought, during which farmer's incomes are lower and saving reduced.

The reduced production rate is among the principal reason underpinning the weak market linkage that characterizes this typology of farmers. Market connection is also influenced by the poor condition of the Gilgil’s roads. Distance from the main roads as well as non-paved and potholed roads make it hard to access the market place, as travel is more difficult and expensive.

Accordingly, most farmers prefer to sell directly at the farm gate, to the neighbourhoods or middlemen and broker. However, they have little bargaining power and are highly vulnerable to market variations and fluctuating prices. This limits their capacity to invest in new or potentially high-value crops.

The cabbages' market provides a good example for understanding small farmers' vulnerability and related market conservatism. Cabbage is one of the most common vegetables in Kenya, it is grown by small, medium and large-scale farmers. While during the dry-season the production rate allocated to the internal market is low compared to the demand, in the raining season markets abound of this vegetable and farm gate prices offered to farmers can be particularly low. In some cases, farmers prefer not to sell, using the surplus cabbages as feedstock. At the same time, one can wonder why farmers keep producing cabbages, in the likelihood to be confronted each year with the same situation. Responses have to be found in the limited capacity of small farmers to assume risks that made them less capable to react to market variations. Even if it is not always convenient, the cabbage market is an already existing market that gives farmers the assurance they will have buyers. Conversely, adopting a new crop variety with a reduced market-network means taking the risk of not finding adequate market outputs. To face such issues, public advice programs based on crop diversification and marketization objectives provide training on a specific crop and market connections. However, extension services struggle to succeed in addressing farmer's claims, especially in the poorest and more marginal contexts.

In the Gilgil Sub-County, farmers that reside in remote areas or are poor producers struggle to access and receive support from extension services. On the farmer's side, the high costs required to receive specific support is often indicated as the principal obstacle/barrier to attending such services. Despite agricultural extensions being a public service, farmers are supposed to cover or contribute to travel fees and provide with a meal when receiving an agriculture officer on their farm. Agriculture officers have no extra funds for their displacements and are asked to use their resources, thus they ask farmers for a contribution. On the other side, if a farmer decides to join the service on-place, this will require some expenditures such as to afford travel costs.

Due to the seasonality of production, the low production rates and the reduced market access, farm income is often integrated by other sources of income. This may be the salary of another household member (in many cases the husband) or migrant's remittances. Farmers also often carry on occasionally extra farm activities during the dry season such as cutting trees for the charcoal market or working as employees in agribusiness farm. Other forms of financing are mainly provided through communitarian Self-help groups mobilizations. The most widespread form of rural organization in

Gilgil context is composed by Rotating Savings and Credit Associations also known as 'merry-go-rounds' self-help groups. These rural organisations are strongly participated by women who are also often in charge of other informal activities such as the storage and selling of seeds.

Other than enabling some forms of financial access to their members, farmers also join self-help groups to improve their agrarian knowledge and assets. Self-help groups are indeed the principal tool through which rural people try to access strategic knowledge to improve their agrarian performance, particularly since they constitute a common strategy to come into contact and have a chance to be involved in development projects or programs, which may include the possibility for certain groups to gain access to peculiar market niches.

According to the interviews we conducted with some self-help groups' members during the fieldwork, most of them opted for the registration in the attempt to receive extension services or being part of some development project carried out by the different NGOs that operate in the area. Among these, relevant action is provided by agroecological programs aimed at reducing small farmer dependence on the use of external inputs, improve conservation tillage practices and adopted soil fertility and conservation measures. Farmers are encouraged to expand crop diversification by introducing drought-resistant traditional crop varieties and improve mixed cropping techniques. Other agroecological techniques are the employment of organic pesticides and organic manure and on-farm seed saving, which is mostly performed by women. The application of biodynamics principles in the Gilgil area to agriculture has been also documented by other researchers (Onwonga et al., 2007). These programs are strongly participated in and demanded by farmers, and there are examples of successful practices that have allowed some groups to start petty business activities and gain more independence from market supply.

## The “farm to sell” sector

The description provided above allows us to understand the main differences existing between farmers belonging to the ‘cultivate and sell’ group and those that can be referred to as belonging to the ‘cultivate to sell’ category. The latter mostly rely on family work, in addition to which they sometimes hire some day workers. However, unlike primarily subsistence oriented small farmers, they have strong linkages with both input and output markets. They plan what to plant with clear intent to sell. As well as for the previous category, also in this case farming is a mixed combination of crop

and livestock systems. Most of them have cows and regularly sell milk to dairy cooperatives.

According to fieldwork observations and for what concerns the Gilgil Sub-County, these farmers often do not plant maize because they consider it an unprofitable crop. This is mainly due to the length of maturation. By contrast, vegetable farming allows to take advantage of the short rain seasons, hence enabling different harvest cycles a year. They mainly rely on local markets for accessing agro-inputs, especially seeds. The employment of agro-chemical products is limited and adopted sparingly even if pest and diseases are among the principal agrarian constraints perceived.

The target market, as well as the type of buyers, can vary greatly and depend on different factors. Buyers can be either brokers or middlemen, with far-reaching branched market connections, or private individuals reselling the products to nearby hotels and restaurants as well as in the local market. Proximity to the main roads or an urban centre can influence the type of buyers with whom farmers are in contact. For example, farmers whose farms are closer to an urban centre (such as Nakuru city) or located in the proximity of the principal road, are more easily addressed by buyers supplying local markets and nearby food-related activities. Conversely, in the case of less well-connected farmers, middlemen play a crucial role and products enter in extended commodity-chain, as buyers tend to resell directly to retailers in Nairobi. That products are directly delivered to the market by the farmers themselves is less usual. It depends on the conveniences of the prices and on the farmers' ability to be aware of products' final selling prices.

These farmers all rely all on some form of irrigation, water access or water storage, including tap water, which is key to allow them marketing regularly. The second important factor is land availability, which that puts farmers belonging to this second category in the top range of smallholders' land size. A third important factor that differentiates this typology of farmers from the previous one is their personal baggage of skills, necessary to access the appropriate knowledge and to secure market access. A central role is played by access to national education: some interviewees have recounted that they got interested in agriculture by attending the agriculture program during primary school. Finally, yet importantly, all the interviewed farmers began their business with some investment capacity. Start-up capital is pivotal for starting a market-oriented agrarian enterprise. Most of these farmers have become involved in agriculture after doing other work, which allows them to have savings to invest. This enabled them to purchase land and to participate in some Saccos to increase their financial capacities.

Despite these advantages, commercial-oriented small farmers still experience great levels of vulnerability and poverty. They are at the bottom of the food system, occupying a powerless position and receiving only a little

share of the generated value. Moreover, encompassing commercial barriers - including land and inputs access constraints - may not be sufficient to avoid the risks and costs associated with an underdeveloped domestic market context and increasing market globalization (Woolverton and Neven, 2014).

Recently, to improve their livelihood, Gilgil market-oriented small farmers are also engaging in contract farming with agro-industrial companies or supermarkets, thus participating in agro-value chains. In Kenya, the agribusiness private sector is characterized by the increasing presence of supermarkets (Neven and Reardon, 2004) and commercial enterprises, both developing supply chain relationships. The latter is more founded in high-value export crop sectors, particularly horticulture and fruits (Narrod et al., 2009). However, such dynamics are likely to tilt the balance towards the dominant agro-industrial model of which the social and environmental unsustainability features have been largely discussed in the literature (Horlings and Marsden, 2011). Besides, for farmers to engage in farming or supply agreements can be risky in the absence of necessary support and fair market governance. Competitive pressure from globalization and integration into global value chain networks does not necessarily result in an improvement in the living conditions of small farmers, as shown by the levels of food insecurity experienced by cases of farmers active in the main horticultural and cash crop chains (McCullough et al., 2008). Scholars have also evidenced how threshold barriers are likely to prevent the participation of the poorest farmers, especially those with/on rainfed farms (Neven et al., 2009).

## Conclusions

Small farmer systems are mostly based on short and decentralized circuits of production and consumption and are strongly grounded in local and regional socio-environmental landscapes.

As also evidenced by Van der Plough (2009), the main economic and livelihood strategy guiding peasants and small farmers' behaviour resides in a quest to minimize economic and environmental risks. A strong focus on risk aversion can be indicated as one of the principal features characterising subsistence farmers' from predominantly market-oriented farmers. This is evidenced by differences in entrepreneurship dynamism, which results in a different mix between innovation and conservation. In the case of 'farm and sell' smallholders, strong vulnerability and poverty trap dynamics discourage crop specialization, influence market access strategies and minimize asset investments, such as seeds purchasing. However, the reduction of external inputs, such as fertilizer and herbicides, the adoption of crop diversification,



the improvement of conservation tillage and soil fertility measures are common strategies among farmers of both categories. Yet, farmers struggle to adopt alternative management practices due to the structural and multidimensional poverty under which they operate. Financial and technical support are the main constraints faced by Gilgil small farmers after reduced land and water access.

State action is crucial to enable access to asset-resource, information and capital as well as land redistribution and provide irrigation infrastructures, especially in semi-arid zones. Especially in post-colonial countries, agriculture performance is dependent on continuity in policy and public-sector support. However, compared with the policies of the immediate post-colonial period (roughly from the 1960s through the mid-1980s), the state generally performs poorly, resulting in slower economic growth, rising inequality and increased poverty. This is mirrored by the low performance of extension services, whose tasks and functions are increasingly assumed by private organizations, including non-profit non-governmental organizations and for-profit private companies. Such organisations are directly involved in planning, implementing and managing development programs and humanitarian assistance. However, such actors tend to follow a personal agenda, which is not necessarily set out based on specific needs expressed by farmers. This risks to reproduce a top-down attitude. Besides, small farmers' involvement tends to leverage people's ability to take action. Similarly, the expression of specific needs by small farmers is not a self-evident and immediate task, as farmers may not be able to efficiently make their claims heard. In the case of contract farming, dependence on formal markets deprives farmers of autonomous decisions on farming and drives them to a form of intensive agriculture that undermines economic viability and small farmers' capacity to contribute to diversified landscape and sustainable environment.

An important action can be to improve platforms to promote dialogue and collaboration among all relevant actors in rural and food security development, including public extension advisors, NGOs and farmer's groups. The latter in particular constitute an important channel for dialogue. Though the public sector remains the most appropriate agent to effectively and efficiently carry out key action needed to strengthen small farmers, also NGOs are important interlocutors. They are usually involved in policy dialogue, advocacy, lobbying and campaigning at the domestic and international level to bring about structural or policy change.

Farmers who desire to shift from subsistence to commercial farming also face significant challenges and need to be supported. Encompassing structural barriers may be not sufficient to avoid the risks and costs associated with an underdeveloped domestic market context and increasing market globalization. For such actions to be effective is also crucial that farmers can

access markets that pay a fair price for their produce. Financial assistance is also needed to avoid a short planning horizon, allowing farmers to accept greater risk beyond the short run, and providing an incentive to innovation. Specific education programs, technical assistance as much as target-specific financial arrangements are needed to assist farmer groups, women's organizations and small farmers wishing to develop more commercial oriented farming.

Finally, the strong inequalities affecting rural women, which prevent them from accessing to assets and knowledge, constitutes a huge obstacle to their participation and integration in public development programs and the achievement of sustainable objectives. Though Kenya constitution recognizes women's right to land, these are not in fact implemented, reproducing inequality patterns. Hence, it is then necessary to adopt target measures and to reinforce rural organisation in order to better address women rights' implementation, especially with regards to land and financial access.

All these elements call for a strong, forward looking policy favouring a rebalancing in resource access, including land and inputs access, together with the increase of in-farm productivity and yield. The latter should be driven by redesigning agricultural policies in ways that contribute to reducing distortions in the use and quality of input and water resources. This requires both helping farmers to provide their field with adequate irrigation systems, but also to increase the adoption of indigenous drought-resistant crops and reducing the planting of very water demanding crops. A number of suggestions have been advanced to reinforce a biodiverse and ecologically sustainable seed-system by recognizing indigenous seeds as form of cultural heritage spelled out in Kenya 2010 constitution. Here, article 9.3 outlines farmers' rights to save, use, exchange, and sell farm saved seeds and the propagation materials subject to national law. However, this has not been implemented in the legal framework and the UPOV 1991 framework continues to undermine farmer-managed seed systems. Public sector and institutional change are important to enhance the above suggested policy strategy to reach a more equitable and sustainable food system.

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### Chapter 3

# **MAIN CHARACTERISTICS AND POTENTIALITIES OF SMALL FARMERS IN KENYA: EVIDENCE FROM A SURVEY IN GILGIL**

Giulia Corti, Nunzia Borrelli

This chapter is dedicated to the presentation of the quantitative data collected in Kenya in February 2019 as part of the SASS project. The research was developed in partnership with Seed Savers and Naivasha Basin. The data were collected by three local enumerators. In order to conduct the survey, we obtain research permits (Kenyan research license numbers 23753).

## Description of the sample

The population under study is composed of 100 small farmers (for the farms location see fig. 2) in remote rural areas and in the outskirts of Gilgil Sub-County (Elementiate, Mbruk, Murindat wards) located in Nakuru County, Kenya (Fig.1).

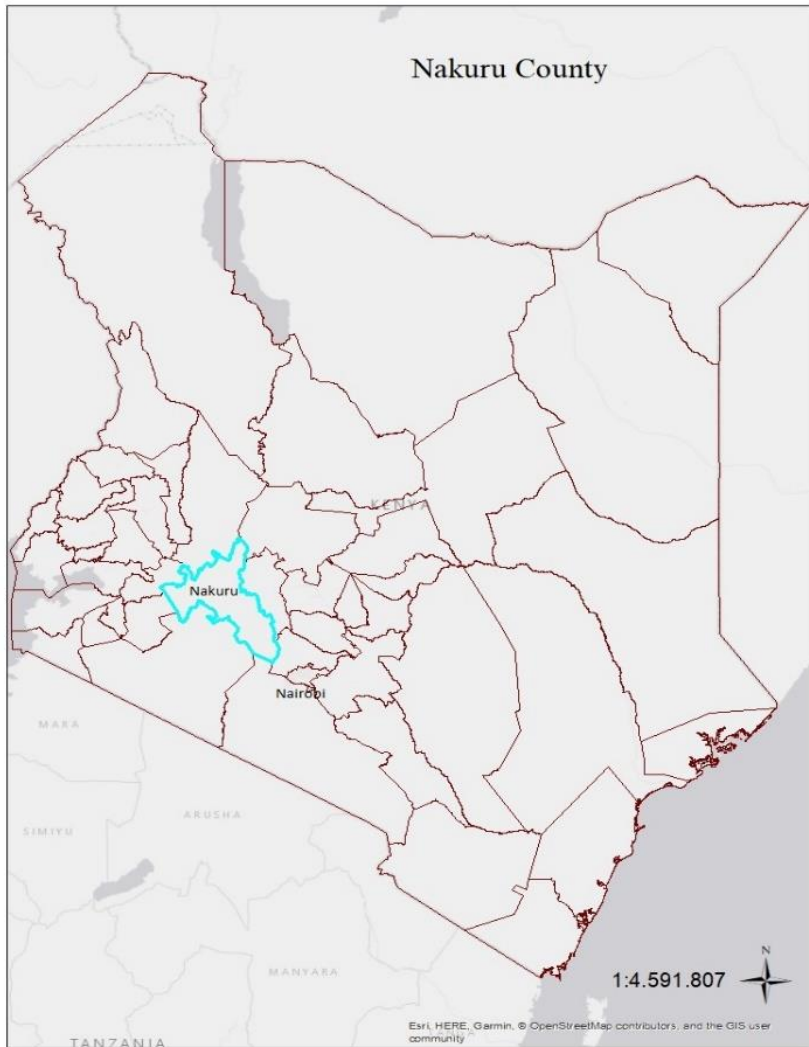
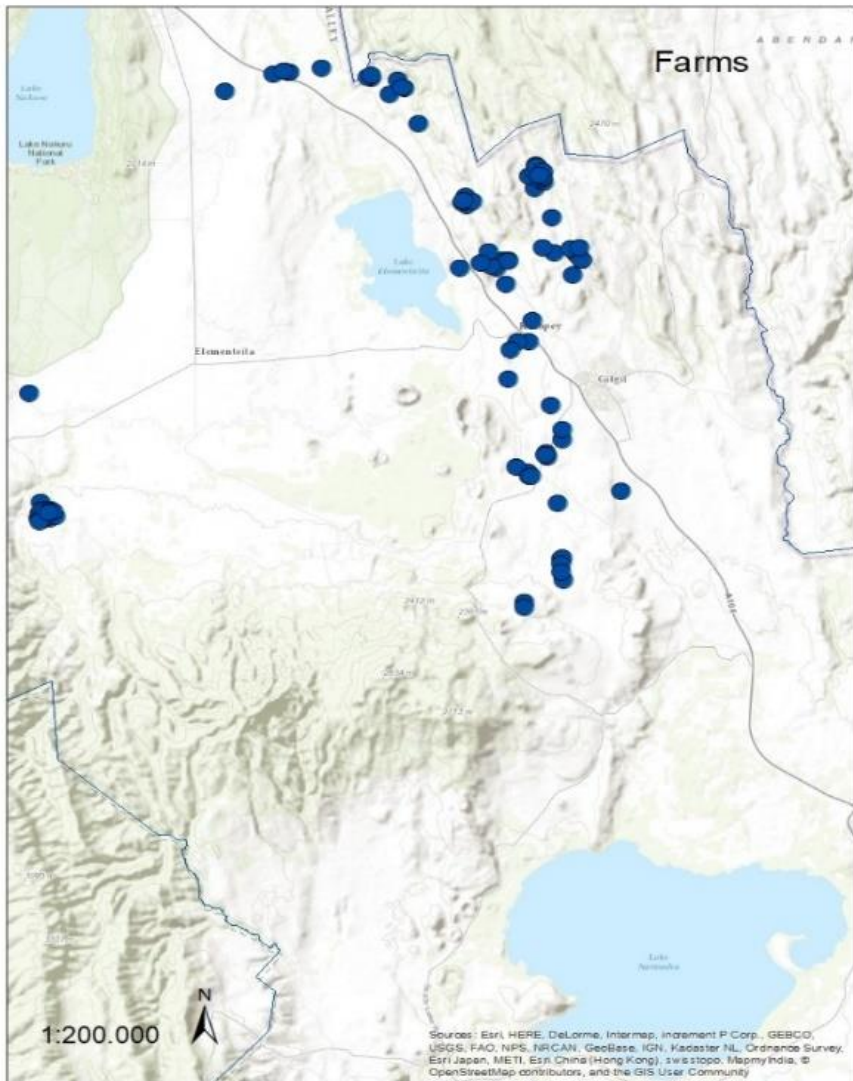


Figure 1. Nakuru county, Kenya



**Figure 2. Geographical distribution of the farms in the sample**

The average age of the farmers is 56 years, with a minimum of 27 and a maximum of 80 years of age. The gender distribution of the respondents is quite unbalanced; indeed, 87 of them are women, while only 13<sup>1</sup> are men. Regarding the household composition, the average size is 5 persons; 5 households are composed of just one person, while the maximum size of 22

<sup>1</sup> This is coherent with the information collected in chapter 2 where we underline that the largest number of small farmers is composed by women



persons is reached just by one case. In the same way, the average number of children by number is 5.61, and, above them, 2.3 of them under the age of 18.

With regards to the plot size, our sample is composed mainly by small farms; indeed, 80 respondents on 100 with one or more plots cultivate less than 2.5 acres of land, and the maximum size registered is 7.5 acres. Moreover, 71 respondents own just one plot, 26 farmers two plots and only 3 have 3 plots. The largest part of them own directly the land, while renting is used in case of a second plot. Looking at the gender distribution of ownership, men prevail over women; indeed, 55% of owners are men, and less than 30% are women.

The agricultural system is based on a diversified production: the most produced staple crop is maize (331 kg produced on average), the most produced vegetables are potatoes (318 kg) and beans (85.4 kg); the most produced fruit is avocado. Moreover, the most produced indigenous vegetables are sukuma (84.5 kg), managu (34.6 kg) and terere (31.7 kg).

*Box 1: unit of measures for crops*

Even though kilos are used as units of measure in the report, originally there were used others in the questionnaire, according to the products and local units of measure. Below are showed the unit of measures used and their conversion in kilos/grams.

- Crate/s = box of 5 kgs
- Bunche/s = 250 gr
- Handful = 200 gr
- Gorogoro = 2,5 kgs
- Debe = 20 kgs
- Number = according to the product

Moreover, some differences can be found among famers' production when considering their tendency towards self-consumption or commercialization. Indeed, it can be found that those who produce for self-consumption have a more diversified production, while those who commercialize sacrifice the production of indigenous vegetables for staple crops like maize, potatoes and beans.

Besides their production, 91% percent of the farmers interviewed would like to grow some other products that are proven to suit climate and environment better. More specifically, terere and managu figure as the most

desired indigenous vegetables, while oranges, avocado and amaranthus are the most mentioned among fruits and crops. Among the reasons that preclude farmers to cultivate them, the difficulty to find seeds is the most popular (57 respondents of 100 provided this answer).

Besides crop production, other aspects regarding the farm organization were investigated in the survey. For instance, issues about irrigation were asked. It emerged that 84% of farms do not do irrigation in their fields. Among those who use irrigation (13 respondents of 100), the most popular sources of water are the surfaces of rivers and springs, the village borehole, rain water and drop-by drop irrigation systems. However, irrigation can be considered an important asset in farming activities: indeed, among those who do not irrigate, its lack is seen as extremely relevant or crucial for more than the 50% of respondents.

Another topic investigated with the survey was livestock keeping. Almost all farmers (93 of 100) own some poultry, and the second most frequent animals owned are cattle (64) and goats (58). For all the animals, the main purpose is to keep them and to sell in case of necessity, followed by self-consumption (especially for poultry) and dairy or derived products for cattle. However, food transformation is not common; indeed, only 5 farmers of 100 do it, and the only answer registered is honey, which is produced rarely and mainly for self-consumption.

With regards to the organization of the farms, with the aim to have a first measure of the degree of the involvement of family members in the production activities, it was asked to the respondent the share of household members working, both regularly and occasionally, on the farm. It was found that 71.43% of the farms investigated have less than the half of their family members that work regularly in the farm. Moreover, occasional work for family members is an even rarer event; indeed, 74.75% of the farms do not have household members that work occasionally in the farm.

An additional topic that was worth investigating was child labour. The framework that emerges from the respondents is that child labour is equally balanced; indeed, in 45% of farms children work, but, on the other hand, it does not happen in 52 cases. However, a difference was found according to the selling activity; among those who do not commercialize, child labour is found in just 34% of respondents, whereas it is much more common in the group of sellers (56.60% of farms).

Since the main distinction between farmers is the selling activity, characteristics of sellers were analysed. Among those who sell their products, 86% of them do it in at least one market that is in a different location from their farm. When they sell outside from their village, the main places for markets (both in the case when farmers brought products by themselves and through the middlemen) are Kiungururia, Gilgil, Kasambara and

Kiptangwany (see figure 3). Looking at the market villages by kinds of products, Gilgil emerges as the most common among farmers (see figure 4). Only a small group of farmers (10) bring themselves the products to the market, and they do it mainly by motorbike or matatu.

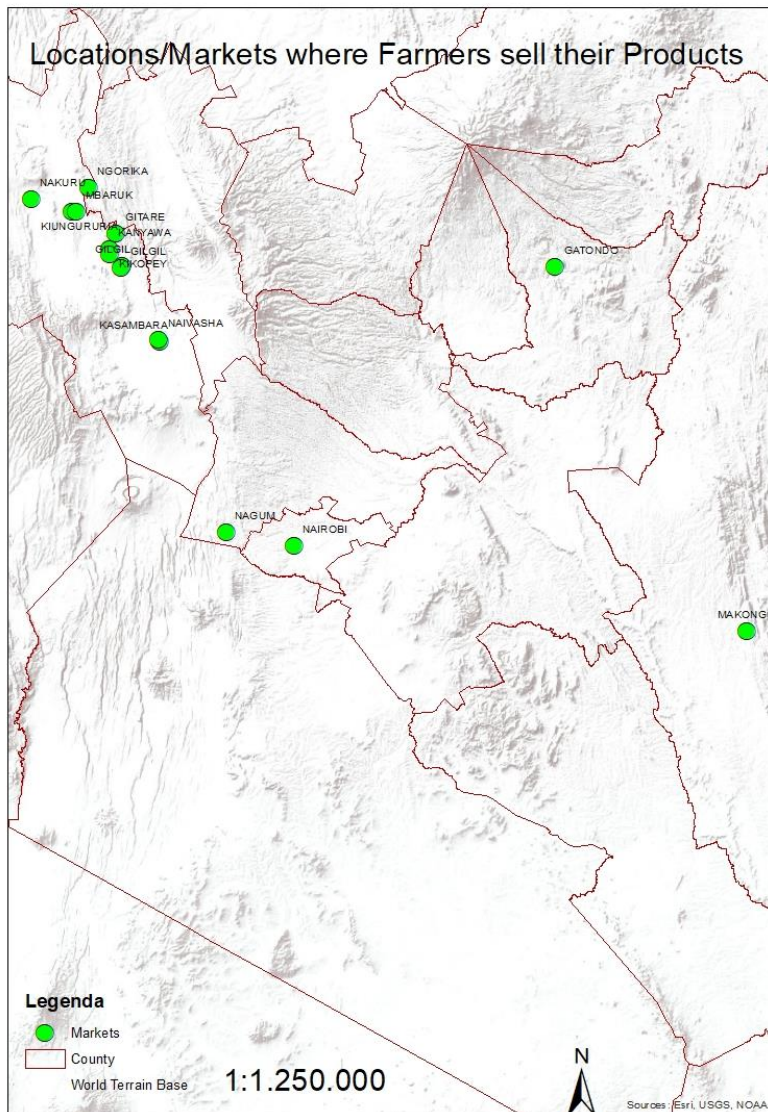
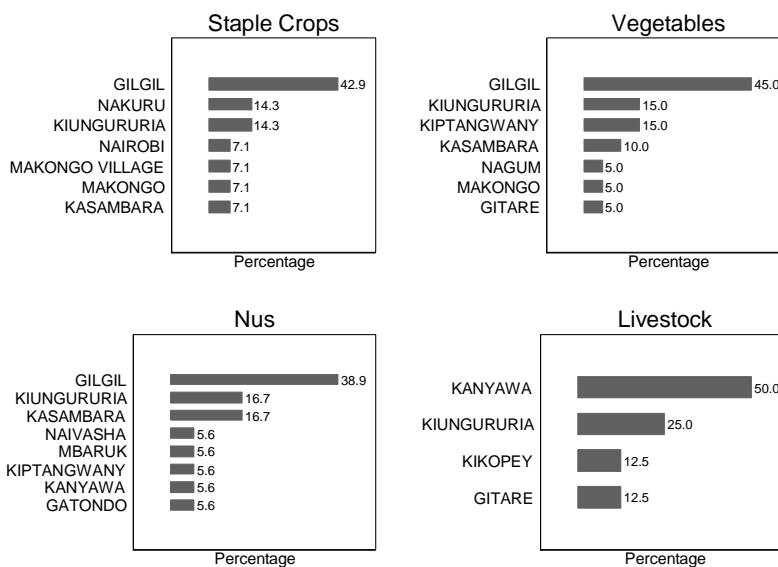


Figure 3. Locations/Markets where Farmers sell products



**Figure 4. Market villages by type of products**

When they sell, farmers declare finding several challenges. For instance, 62% of those farmers who sell their products declare not knowing at what prices their products are sold. Regarding challenges that farmers face in selling their products, the most cited are the low quantity of the products, the lack of transport means and the low bargaining power. Indeed, the low quantity of products and the lack of transport means result in being very or extremely relevant for 81% of the respondents, while 61% find their low bargaining power to be an important challenge to their selling activity.

## Main characteristics of small farmers

### Use of extension advice

Besides farmers' organizations, there are several actors that provide services to farmers. Indeed, this aspect was investigated in the questionnaire, asking the farmers if they receive extension advice on several topics regarding farming activities and techniques from actors like NGOs, Cooperatives, large scale farmers and TVs or radios.

As shown in figure 5, NGOs and Development Projects play a major role in providing advice to the farmers; indeed, they are the most frequently mentioned in all the topics investigated, even more than the farmers' organizations. Thus, it can be stated that external actors are, in some way, more able to help farmers than internal actors like farmers organization and even the government.

Moreover, it was surprising to notice that media (tv, radio and newspapers) play a role in providing information and advice to farmers in their production activities.

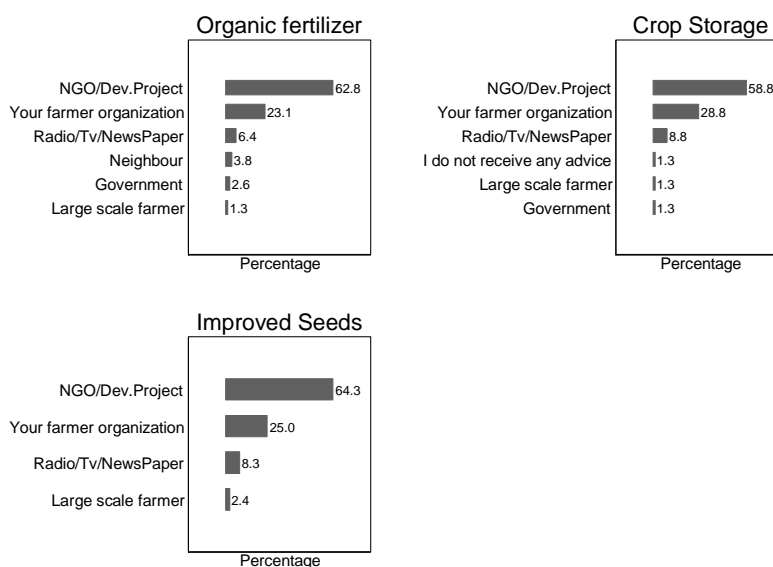


Figure 5. Extension advice and actors by topic; organic fertilizers, crop storage and improved seeds

## Waste management

Besides aspects related to production, even post-production activities are important, especially with regards with post-harvest and livestock waste management. Indeed, this issue is particularly important for environmental reasons and a more aware management of waste is a crucial point for becoming more environmentally sustainable for farms.

With the aim to have some measure of the engagement of farmers in wiser waste management, questions about residuals and post-harvest losses were asked to farmers. Then, positive behaviours (e.g. Making compost, reuse for other purposes) were weighted with value of +1, whereas negative behaviours (e.g. Burning, leaving them in the fields) were weighted with a negative value of -1.

These transformations were used to build an index of waste management calculating the sum of the values reached by each respondent. The original value of the sum was therefore standardized, with the aim to have an index with values between 0 and 1; the larger the index, the more the farm behaves in a sustainable way.

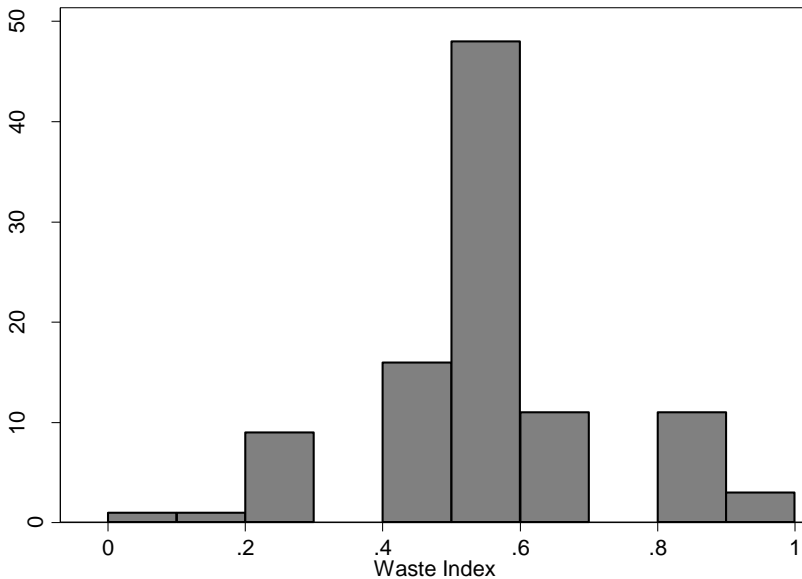


Figure 6. Waste management index

Figure 6 shows the distribution of the index. As it can be observed, almost 50% of the farmers display a medium level of positive waste management. Moreover, the share of farmers that have an index with a value less than 0,4 is around 20%. Thus, it can be argued that the farmers under study have, on average, a good level of waste management.

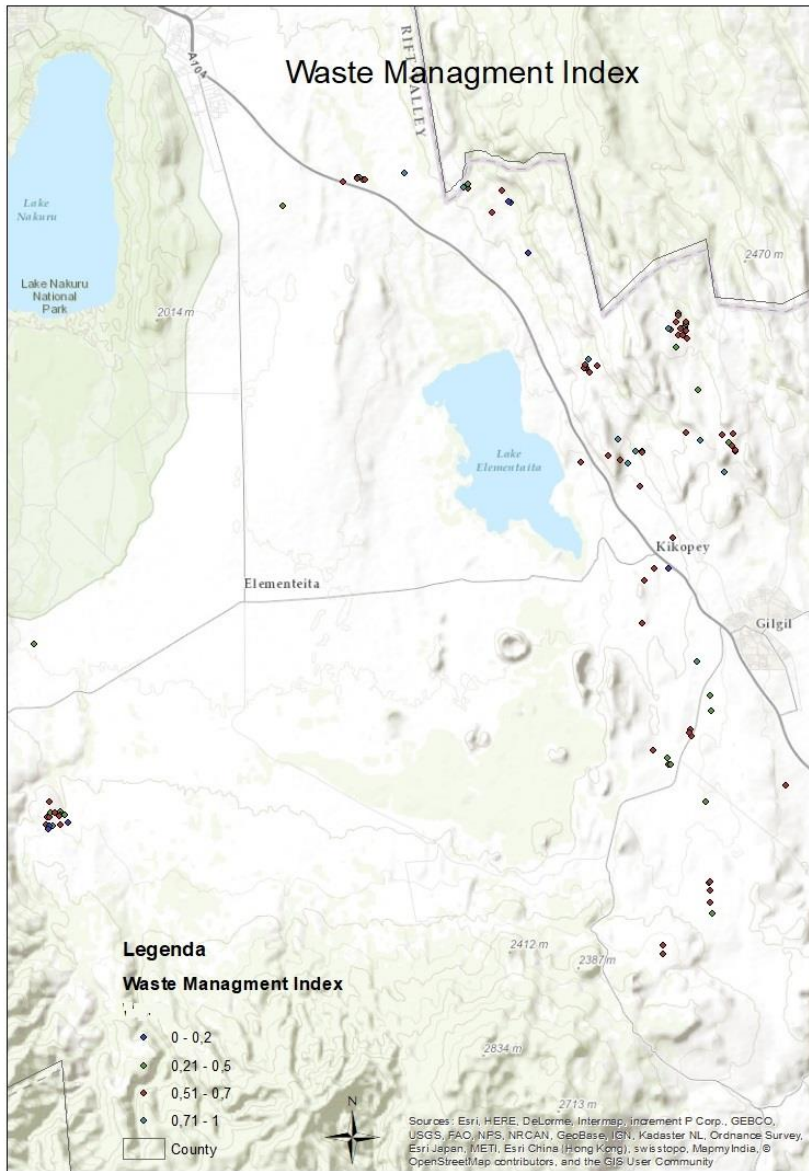


Figure 7. Geographical distribution of Waste Management Index

## Women's role and gender dynamics

With respect to gender dynamics, three dimensions were investigated; ownership by women, women's involvement in decision making processes and women's activities.

Despite women being most respondents, they are not the owners of the farms in the same way: indeed, only 36.25% of the women that answered the questionnaire are actually owners of the land they work on. Even though women are very present in farming activities to be the respondents in the questionnaire, they are not so frequently the owners of the lands where they work on. For this reason, it was worth investigating to what extent they are involved not just in the physical work of farming, but also in decision making processes.

Women take part in almost all the activities in the farm. They are active in all the traditional farming activities like ploughing, planting and harvesting. The only area of work in which men overrepresent women are more physical works like taking the crops to the market and warehouses. However, the involvement of women in farming and selling activities does not mean that they are equally considered when decisions must be taken. As can be observed from figure 8, women are involved, totally or partially, when it is time to take decisions about farming, consuming and selling activities. Indeed, in most of the questions about decisions, it was found that women are involved in more than 90% of the farms investigated. Thus, the framework that emerges from our sample is that of farms where women are active members of the activity, both in the decisional and concrete dimensions<sup>2</sup>.

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<sup>2</sup> However, since women are the respondents in most of cases, and since the interview was conducted without the presence of their husbands, it could be that answers about these topics are not totally trustworthy



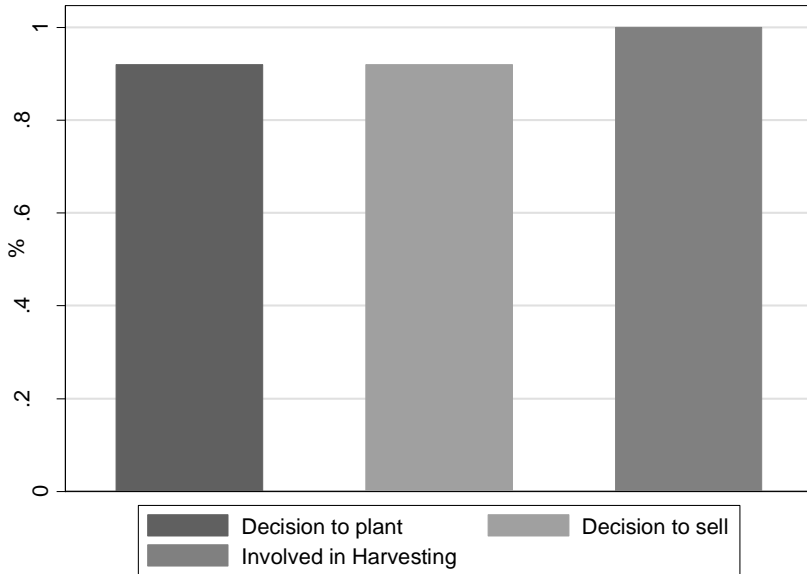


Figure 8. Women's involvement in decisions in the farm by topic: decision to plant, decision to sell and involvement in harvesting

## Discussion and conclusions

The object of our analysis – the situation of small farmers in the Kenya region – is quite interesting. The small farmers interviewed were found to have a certain sensibility and attention for local productions, the Indigenous Vegetables, and for the employment of non-treated seeds.

Side by side with this strong interest, many difficulties come to light for small farmers, mainly concerning the ways by which is possible for them to acquire knowledge and competence. In fact, small farmers assert that they can get information mostly by means of mass-communication devices (the radio), while extension services seem to be less effective. They also affirm to be in difficulty especially regarding the sale of their products, because of the interference of middlemen who highly influence the price of goods.

The last issue worth reporting concerns the condition of women. Despite being the main protagonists of foodstuff's production, they are seldom direct owners of the land, with the result of being in a subordinate position. Three dimensions of gender dynamic were investigated: ownership of women,

women's involvement in decision making processes and women's activities. They are active in all the traditional farming activities like ploughing, planting and harvesting. The only area of work in which men overrepresent women are more physical works like taking the crops to the market and warehouses. However, the involvement of women in farming and selling activities does not mean that they are equally considered when decisions have to be taken. Women are involved, totally or partially, when it is time to take decisions about farming, consuming and selling activities. Indeed, in most of the questions about decisions, it was found that women are involved in all cases. Thus, the framework that emerges from our sample is that of farms where women are active members of the activity, both in the decisional and concrete dimensions<sup>3</sup>. Despite high levels of contribution to farming activities and decisions, women of the sample are marginal in terms of land ownership.

The Gilgil sample is characterized by important elements of sustainability: farm management and crop growing practices are highly desirable, thanks to employment of local seeds and a highly diversified production. Furthermore, crops residual and animal droppings (usually considered as waste) are usually employed for compost-making or as natural manure, reducing the level of waste.

Besides aspects related to production, even post production activities are important, especially waste management. Post-production and livestock waste management is particularly important for environmental reasons; and a more aware management of waste is a crucial point for more environmentally sustainable farms. From field detection, it appears that the sample have, on average, a good level of waste management, contributing in enhancing the level of sustainability of Gilgil farms. Besides, farmers appear highly interested in gaining new knowledge about correct and sustainable practices of waste management.

Two major weaknesses may jeopardize the development of Gilgil rural areas: on the one hand, problems related to market-access and volatility of profits on behalf of producers; on the other hand, gender inequalities that threaten the empowerment of the female work-force, limiting their access to the main asset necessary for farming, land.

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<sup>3</sup> However, since women are the respondents in most of cases, and since the interview was conducted without the presence of their husbands, it could be that answers about these topics are not totally trustworthy

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## Chapter 4

# WHAT POTENTIAL FOR SMALL-SCALE FARMERS IN TANZANIA? EVIDENCE FROM ARUMERU

Chiara Caterina Razzano, Giulia Mura, Nunzia Borrelli

The main objective of SASS research is to understand and describe the local agri-food system strengths and weaknesses, in order to produce policy recommendation for the food system transition to sustainability. Namely, the research intended to investigate the role of smallholders of Arumeru within the food system. Given the rural development literature about the African context, the detection started from the assumption that small-scale producers face several complex and systematic challenges in the production and distribution of food, but can still play a pivotal role in stimulating sustainable rural development practices.

The research, whose design and methodology are described in the next paragraph, aims at investigating actors' discourse and practices within the food system and their role towards sustainability transition. Here, it is highlighted what emerged in regard to farmers' challenges and what they would need, in order to contribute to the sustainability of the food system. The second paragraph "research findings" compares literature about smallholders and rural development constraints in Africa, with the findings. The last paragraph "Discussion and conclusion" is an attempt to corroborate our initial hypothesis, answering the following questions: can farmer overcome their difficulties and stimulate sustainability practices in the food system? How can they do it? Does it turn into enhanced sustainability of the system?

Farmers in the Arumeru are very poor, operate in flawed markets and it is difficult for them to achieve profits. Furthermore, they are acting in a scenario where natural resources are scarce and the effects of climate change and the 4F crisis are showing up.

After field detection, in the form of interviews with local actors, it is possible to state that collective actors and initiatives (in the form of farmers'

associations, civil society organizations, or community-based organizations) contribute to alleviate most of the farmers' problems reviewed in this chapter, therefore contributing to the sustainability of farmers' production activities and livelihoods.

If farmers are in the situation of improved production and marketing performances, while able to preserve their traditional livelihoods, it will surely contribute to improved and inclusive performances of the food system, making the local food system more sustainable in the long run.

## Research design and methodology

The main aim of this chapter is the discussion of peasants' conditions and challenges in Arumeru district, Tanzania. Namely, the chapter will attempt to answer to the following questions: What do farmers need and want to improve their lives and farming activity? How can local farmers contribute to enhance the sustainability of food production?

The research starts from the assumption that small-scale farmers encounter some difficulties in improving their production and in distributing their agricultural products. Namely, our hypotheses are: Notwithstanding small farmers' problems, the small-scale farming systems can play a pivotal role in stimulating sustainable rural development practices.

To verify these hypotheses, semi-structured interviews of key informants were chosen as primary research tool (along with literature review). Semi-structured interviews are qualitative method of social research (Corbetta, 2014). Two distinct field experiences have been conducted in Arumeru. One in 2017 (three months) and one in 2019 (two months), when about 40 different food system actors have been interviewed. This chapter is going to cover just a small portion of a broader research, conducted over two years in Arumeru, and this is why only few interviews are considered useful here.

The interview selected includes the following interlocutors:

- MVIWATA (representative): it is the National network of Farmers' Groups, therefore is considered a primary source of information about farmers and how groups of farmers coordinate at higher level of organization. It has a regional branch office as an intermediation between local groups and national level coordination;
- TAHA (representatives): is the Tanzania Horticultural Association, an apex member-based private sector organization that advocates for the growth and competitiveness of the horticulture industry in Tanzania. It is

- probably the strongest organization in farming sector, always considered as a main interlocutor in national political forum;
- Home Vegetable Tanzania LTD (director): Horticultural products pack and export company. Mainly towards EU. Works with donors to invest in local farms to become compliant with EU safety standards. Farmers and pack house are mainly located in Arumeru area.
  - Traders from Arusha Markets (4 representatives): In Arusha there are different marketplaces. Traders are either wholesalers, retailers or different sort of intermediaries that help sellers and buyers to meet in order to bring food in the markets. They can reunite themselves in associations to advocate for their needs.
  - Extension Officers (4 representatives): they are local administration officers either from District, Ward or Village administrations, entitled of informing and supporting farmers as intermediaries between agricultural research and farmers. They operate as facilitators and communicators and help farmers to obtain the best results.
  - Farmers groups (different representatives from 5 groups): spontaneous association of agricultural producers that give themselves by-laws and common objectives in order to help each other and improve their farming performances.
  - Small- scale farmers (9 representatives): the backbone of local food production. They grow on small plots, with low access to machinery, input and irrigation compared to industrialized western agriculture, and they are only partially integrated to markets (Kassie et al. 2013; Salami et al 2010).

## Arumeru small farmers, a marginalized community in a well-endowed area

Due to a favourable bimodal climate, and a huge variety of agroecological zones (from semi-arid areas to evergreen forests), Arumeru is an important pastoral and farming area where most of the population is rural, occupied in small-scale agriculture and livestock keeping activities (URT, 2012; URT, 2013). This area borders the capital of Arusha region, the city of Arusha, an expanding urban area, where 76% of the urban population of the whole region resides (URT, 2013).

The intensification of agricultural activities is already showing its downsides in Arumeru: serious soil erosion and deforestation problems (overgrazing, forest clearing and land fragmentation are the effects of rising human pressure over resources) (Oikos, 2011; Kajembe et al., 2005; Shetto et al., 2007), as well as cases of agri-toxins in the area are well documented

(Kihampa et al., 2010; Kariathi et al, 2016). Despite Arumeru District is one of the most fertile areas of Tanzania, food production and the surrounding ecosystem are under threat, because of climate change and farming activities pressure that are causing the thinning of resources. The agricultural and food system needs to shift towards sustainability in order to be able to feed an increasing population and preserve livelihoods and resources.

Farming households in Arumeru are usually poor (poor hygiene infrastructure in their dwellers, low ownership of individual assets, firewood as widespread source of domestic energy). Their farming activity faces many challenges, such as: unpredictable or declining yields due to climate change and soil degradation; low profit margin on highly variable prices of commodities, low access and rising costs of inputs and equipment; poor road infrastructures (certain rural areas can become inaccessible in rainy season); poor bargaining power towards middleman and difficult market access; poor access to credit and extension services, and competition over land use (URT, 2012; URT, 2013). Rural poor can be regarded as a marginalized community, far from roads, markets and urban centres; they are socio-economically marginal actors, while being the core of the food chain, who live in a very valuable area with great development potential.

According to rural development literature, long-standing challenges to rural development in the African continent are mainly related to low productivity of agriculture (Fao, 2006; Salami et al., 2010), due to the fact that the African continent has been excluded by the technological progresses of the agricultural revolution of the 60's, known as Green Revolution (Conwey, 2012). While the rest of world was introducing improved varieties, bred to be highly productive and pest resistant, no specific variety was developed for the peculiar features of the African context, while varieties that were developed for Asian and Latin American countries were introduced, in order to give a quick response to the urgent need of feeding the population.

As a land abundant country, in Tanzania and in Sub-Saharan Africa in general, the growth of agricultural production occurred because of expansion of cultivated land and adoption of improved seeds and thank to improved labour productivity on the behalf of smallholders, rather than due to the adoption of technologies.

Technologies in agriculture (such as machinery and agro-chemicals) lead to increased agricultural productivity, but their employment in African context is lower than any other developing region of the world (Elliot, 2016; Salami et al 2010). On the other hand, technical and technological innovation only do not guarantee agricultural growth. The peculiar socio-economic and institutional factors of a specific context are equally important in order to achieve significant and long-lasting rural development objectives. This paragraph reviews the disabling factors of rural development and the main

constraints that African small-scale producers face, according to literature and compare them with the empirical findings of the research conducted in Arumeru, Tanzania.

## Financing Agriculture and Access to Credit on behalf of peasants

Lack of capital for investments in agriculture is among major breaks to rural development Tanzania (URT, 2013). The problem with financial capital in agriculture is not lack of willingness to do investments<sup>1</sup> rather a systematic problem in accessing the needed capital, especially on the behalf on private actors, like small farmers and local traders (MMA Study for SCF, 2008). The financial/capital problem is two-fold: on the one hand, peasants' investment to start the farming season (purchase on inputs and seeds) rely on saving economy, but smallholders find themselves with insufficient savings to purchase what they need to start the new farming season (Salami et al 2010). On the other hand, access to credit and loans from formal banks is confined to urban centres, and the requirements to access it are too high for peasants. As in Salami et al. 2010 (p. 22) “the share of commercial banks' loans to agriculture has been very low compared to manufacturing, trade, and other services sectors, hampering expansion and technology adoption”

An urgent need of access to capital and credit was expressed by Interviewed smallholders from different villages in Meru and Arusha DC, but also by the traders who bear the difficulties of food transportation and distribution. Liquidity availability is poor either for farmers and for traders and lack of capital hampers their activity. Producers and distributors reported access to credit and loans as very difficult and almost impossible to apply at a formal financial institution, such as banks. Moreover, Farmers reported how they usually lack of the appropriate capital to start the farming season, in order to buy what they need or do little maintenance, due to very small profits they gain from agriculture.

The MVIWATA representative, as well as TAHA and Extension Services representatives reported access to capital on behalf of smallholders as one of the major constraints to production activities.

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<sup>1</sup> For African governments commitment in agricultural public expenditure and investment see the Maputo Convention, while for the status of Tanzania public expenditure in Agriculture see the Agricultural Sector Development Program on <http://www.tzdp.org.tz>



*“Our farmers are very poor, they don’t have capital to do agriculture”* – Extension Agent

*“The problem of farmers is capital. You can find farmers sowing maize in the soil without any fertilizer, without anything. If you don’t spray pesticides now that we are having an outbreak, you cannot harvest.”* – Extension Agent

*“He collects problems and finds solutions for the members. Among these problems, there is capital.”* - Traders’ organization representative

## Access to Inputs

Access to agricultural inputs (namely, seeds, fertilizers and pesticides) is a crucial precondition to securing yields and to the transformation and development of this sector towards commercialization (Elliott 2016, Salami et al 2010). Access to affordable and high-quality inputs and technologies is still difficult for smallholders, given the high and constantly rising costs. The application rate in Tanzania, as well as in other African countries, is very low. The adoption of improved maize varieties in Tanzania is around 22%<sup>2</sup>, as well as the average application rates of fertilizer for arable crops is very low (1 kg/ha/year, compared to world average of 1000kg/ha/year)<sup>3</sup>.

Expensive costs of agricultural inputs are considered the second major constraint by roughly quarter of the smallholders in Meru and Arusha DC, surveyed during Agricultural Sample Census of 2007/08. In line with that, according to RWAAG study (2007), 87 %of farmers in Tanzania did not use chemical fertilizers; 77% did not employ improved seeds; while 72 of them did not accessed pesticides, herbicides or insecticides (agrochemicals), as a result of high costs of agricultural inputs and service<sup>4</sup>

Problems related to access to sufficient and quality inputs were pointed out during field revelation: both farmers and extension agents reported that, despite availability of agro-chemical in local markets, farmers cannot afford them and this, in turn, affect employment rates, that stay low.

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<sup>22</sup> Maize is among the most commercial crops and the rate of application of improved seeds is relatively high, while improved seed adoption rates for other crops are likely to be substantially lower (Elliott, 2016)

<sup>3</sup> Smaling E., M. Toure, N. Ridder, N. Sanginga and H. Breman (2006)

<sup>4</sup>Salami et al., 2010, citing R&AWG-Research and Analysis Working Group (2007)

A farmer stated: *“Nowadays, the more time goes on, the more inputs are expensive. In 2014-15 one bag of fertilizers was around 30.000 TSHS; now it is 60.000 Tshs or up to 75.000 Tshs.”*

During field investigation in 2019, indigenous vegetables represented a focus of the research. This because a wide literature recognizes great benefits for smallholders, while important for local biodiversity. Speaking of difficult access to quality inputs, extension agents reported how difficult is to find quality seeds of indigenous vegetables. On the other hand, many farmers reported they are currently growing them or are interested in growing and that they usually save their seeds from the harvest. Allegedly, there is an unmet demand of quality seeds of indigenous vegetables, even if the information is different from what detected from the questionnaire, where majority of respondents reported that markets and agrovets are the mains source for indigenous vegetables seeds.

For more information on indigenous crop varieties and where farmers find their seeds, see the findings from the quantitative research in chapter 5.

## Markets Access, Accessibility Infrastructure and Price Volatility

Marketing of agricultural crops is underdeveloped and inefficient in the African and Tanzanian context. Inaccessibility of rural areas, inadequate logistic and power infrastructure and inadequate storage facilities directly affect the price, the profitability and the competitiveness of the agricultural market because it directly affects production and transportation costs (URT, 2013, Oikos, 2011). Furthermore, hungry/harvest season cycle creates high farm gate price fluctuations (Oikos, 2011); prices are very low during harvest season (market is over supplied) and very high in lean season (when crop supply is not enough to satisfy the demand) (Oikos, 2011).

Poor or difficult Market access on the behalf of farmers. is intend as a broad definition of all those constraints that prevent farmers to properly locate their products on the market: the inaccessibility of markets occurs either as immaterial marginalization (lack of market and agricultural information) and as geographical, socio-economical or commercial marginalization (inaccessible rural areas, lack of road, power and communication infrastructures and lack of trusted traders and intermediaries). Furthermore, large quantities of agricultural commodities

turn spoiled because unsold or because of lack of proper storage and conservation (Salami et al., 2010)

High transport cost occurs due to bad roads conditions, especially in rural areas, that become inaccessible; hence, distribution of food crops is costly. Many intermediaries and traders are usually involved in bringing food from farms to markets, as production takes place in scattered areas and it is hard for just one actor to bear all the costs and risks. This means that farmers that sell at farm gate have very low power over prices, who are in turn decided by buyers.

The above-mentioned hungry/harvest season cycle, but also the lack of bargain power of producers, affects farm gate prices and play a role in price volatility, therefore, exposing smallholders to a risk which inhibit them from pursuing commercial agriculture opportunities.

Lack of personal connection is a reason behind long distribution chains: farmers, wholesalers or retailers may not know the right buyer or seller of the product they want to take to the market, consequently they may rely on some sort of intermediaries (locally know as *middlemen*) that help them in finding the right connections. This is in line with a finding from the quantitative investigation, most of the farmers reported they sell their crops to middleman at farm gate, or they just go and sell directly to the local market (usually in their same village) to overcome transportation and distribution constraints.

Market-related problems are often cited by our respondents as major farmers' constraints. One of the smallholders we interviewed made a very exhaustive statement:

*“There are many problems, for example is a problem to bring the products to the market, because it is both far and I do not have a mean of transport. Products are perishable and long way to the market does not help. Sometimes intermediaries are not reliable, they do not respect timing or agreement and I have very low power on the prices I sell my produce”.*

Other smallholders, as well as some extension agents, reported market access as a major constraint. Either in the sense that prices are very low (and this, in turn, affects income and capital availability of farmers) and in the sense that farmers are not even able to locate their products on the market as they don't know or cannot be reached by buyers, as their farms are located in inaccessible areas.

A trader from Samunge market, Arusha, cooperates with farmers who supply him with fresh products, planning production together. He works closely with farmers in order to avoid food waste when the market is oversupplied and to assure higher profits by selling the right product at the

right time of the year. Besides, he stated about mark-up application and price fluctuations:

*“Sometimes when a crop is very scarce he doubles the price, sometimes there is too supply in the market so he can mark up just a very little, and sometimes he also sells at the same price or even less, getting a loss”- Arusha Trader*

Other traders reported how prices are volatile in markets: on the one hand, lack of storage facilities and perishability makes it impossible to preserve fresh products long time after harvest. Crops have to be sold immediately after harvest and seasonality of production means that market prices fluctuate according to a seasonal cycle. On the other, as many intermediaries are involved in the distribution of products, each intermediary or trader apply his own mark up and this results in unstable final prices.

About difficulties related to accessibility of rural areas and transportation, an extension officer stated:

*“When you look at our roads, you see that not every village has a road to take products for farmers. You can find road you cannot pass. There are areas that more reachable, not many, because many cars cannot go to the farms directly”.*

## Agricultural Extension and Innovation

Agricultural growth is hampered by low research and development investments. Most African countries spend less than 0.7 percent of agricultural GDP on agricultural research, while developed countries spend up to 3 percent (Karugia et al., 2009)

Weak access to agricultural education and information occurs due to lack of extension agents, scarce budgetary resources and inaccessible rural area. Incorrect using and disposing of pesticides are a symptom, as well as the common employment of counterfeit products. This caused episodes of contaminations from agro-chemical in soils and water (Oikos, 2011; Elliot, 2016; Kihampa et al., 2010 ).

All the extension agents interviewed reported a series of challenges in a proper dissemination of agricultural information. If they agree that the first problem for farmers are the outbreak of pests and diseases, they also mentioned how local administration completely lack of the budgetary resources for a correct extension service performance. Extension agents do not have cars to reach farmers in remote rural areas. Lack of human resources in the District Agricultural departments is another problem.

Some extension agents mentioned how counterfeit products are common, as farmers usually go for cheap products. Besides, extension agents reported practices of incorrect use and disposal of agro-chemicals are occurred in Arumeru. From their statements, it seems that unaware farmers wash pesticides bottles in the same canals where they get water for irrigation or livestock. Extension agents are already informing farmers about environmental and health-related risks, but a great work of education still has to be done. Extension agents and the TAHA representative reported that farmers do not really know the chemical products and the pest and they apply excessive or wrong product to treat the pest, unnecessarily.

Many of the interviewed smallholders confirmed that access to education and information is crucial to them, despite still difficult. They report big harvest losses due to diseases and pests. During the quantitative investigation in 2019, respondents were asked to evaluate how often they received advice on the various topics and what relevance had the advice they received. Findings show that trending topics for advice are about the employment of improved seeds, how to cope with pest outbreaks and about the employment agrochemicals and organic fertilizer. The most relevant advice for the respondents is about the correct employment agrochemicals and improved seeds (see chapter 5 for more details).

Poor access to agricultural information on behalf of farmers is particularly dangerous when it comes to the application of agro-chemicals, given the impact they can have on the environment.

## Discussion and conclusion

What can be done to improve farmers' conditions and performances? Do these improvements enhance the sustainability of the food system? This paragraph is about to illustrate different solutions to farmers' needs that emerged from field detection and the interviews with local actors.

Community-based financial organizations (CBFOs) are often the only institutions available to provide basic financial services and offer a solution to the rural poor who hardly access them. The primary goal behind these local organizations is to help members financially in case of personal/family emergency (funeral, hospital or school expenses among the most common needs). Secondly, the goal is to increase members' saving capacity, and many farmers reported that, since joining the group, they bought or improved their house, they bought new livestock, and they even bought motorcycles or invested in a pump machine for irrigation. One of the farmers' saving groups has now enough capital to start its own micro-finance bank account. MVIWATA monitored Village Community Banks performances and reported that their capital was increasing and the direct management on the behalf of farmers was successful, as the organizations were responding to their members' needs.

An extension officer about the farmers' groups he works with in his Ward:

*"For instance, Isshauri group and another called Parachichi, they are very good groups that we call VECOBA; Village Community banks. There is another group, Tiluka, they are very good, they have good capital and money now, so the issue of loans to them is less of a problem. Isshauri and Parachichi groups are not so big."*

Farmers' association usually assure a better access to farming inputs on the behalf of members. This is stated either by groups' representatives (smallholders) and by extension agents. All the groups mentioned that, being together, members recorded a better access to inputs as they, buying in bulk, purchased them at cheaper prices. On the other hand, improved access to inputs occurred due to shared costs among group members and thanks to improved members' savings, gathered to purchase farming inputs.

*"The issue is price of inputs. Farmers in this ward buy fertilizers but then they find out the price is very high. Products are available on the local market, the problem is the price."*  
– Extension Agent

Indigenous vegetables deserve a special mention at this regard. This because a wide literature recognizes great benefits for smallholders, while representing an important share of local biodiversity. Indigenous vegetables are less demanding of resources and inputs, meaning they are quite affordable to grow; they adapt to scarcity of water, while growing fast and preserving a very high nutritional values, compared to more common varieties of

vegetables, pulses and cereals (Mwangi and Kimathi, 2006; Muhanji et al, 2011; Keller et al, 2005). Farmers listened during interviews and those who to filled the questionnaire confirmed that they grow different types of Indigenous vegetables, either for their own consumption and for the market, and extension agents reported that farmers consider these varieties particularly useful for family nutrition but also for medical purposes.

Farmers involved in the field detection confirmed what literature says about indigenous vegetables' benefits: they adapt to low-input agriculture; they demand less water and can grow fast, assuring higher returns. Therefore, it is clear how the cultivation of these crops should be enhanced, especially when farmers cannot afford expensive inputs or there is no large availability of water. The cultivation of indigenous vegetables benefits local farmers besides maintaining and enriching local biodiversity, allowing farmers to be productive even in shortage of resources. (See chapter 5 for more details on indigenous vegetables production).

All the extension agents we interviewed confirmed market access is probably the biggest constraint to smallholders. One of them suggested that peasants might find a solution by joining farmers' associations and groups:

*"Farmers reach good volume of produce, but the main problem remains the market challenge. Then, a reason behind groups is marketing and selling of their produce, searching for buyers together and selling together."*

One of the Farmers' groups mentioned TAHA assistance and trainings about marketing of products. Since members attended those trainings, the group recorded a greater number of buyers coming at farm gate

Contract Farming projects are an attempt of developing organizations, together with private companies, to include small farmer in more integrated value chains. Value chain integration is the primary solution to market isolation and is the ratio behind many projects, as emerged from respondents. A local company that deals with export of fresh crops (Home Vegetables Tanzania LTD), interviewed as one of the key actors of the local food system, supports small farmers to get into groups and, thanks to TAHA and donors' financing, integrate them in high-quality export chains. Farmers receive GAP trainings (UE quality standard for fresh horticultural products) in order to become GAP standard compliant and allow them to sell to international markets.

An Extension Agent about how positive it can be for farmer to become integrated in export markets:

*"There is a group in this village, called Isshauri, they grow French beans for export. As you know, in local market in our country sometimes prices go down. This is why small farmers prefer export markets, because of stability of prices. This group is Global GAP*

*certified; they received external support and funds. To export as individuals is too difficult, because of quality, consistency and quantity of supply, so farmers tend to unite so they can meet the standards”.*

Contract farming has also downsides, as mentioned by some respondents.

*“There are some farmers’ group involved by TAHA in Mung and French Beans contracted production. TAHA reached the farmers and ordered the production of certain amount, but eventually was not able to purchase it all, and farmers found themselves with a premium product (that was produced to respect international standards) and they had to sell it on the regular market”- Extension Officer*

Contracted farming activities require farmers to be supported in every step, they have to raise their production and safety standards, they need to be able to maintain a constant flow of production and they need a constant monitoring of field activities, in order to respect the strict standards. Problems occurs when supporting services are not delivered at the right time and in the right place. In order to respect certain standards, farmers would need great investments that could make them dependent on donors and investors. Besides, higher market integration may reduce farmers' autonomy in decision-making, while pushing them towards a more intensive employment of farming input in order to respect the requested amount of outputs, directly undermining the diversification of farming systems in the area and therefore their contribution to or sustainability performances. Moreover, as reported by respondents, farmers may end up with a higher quality product (that has higher production costs) that the export company is not always able to buy, thus forcing farmers to sell premium products on regular markets.

Access to education, capacity building, and trainings on agricultural-related activities is still challenging, despite a key element for sustainability transition of the local farming system. Informed and aware farmers manage on-farm resources in a careful manner, while being conscious of the environmental consequences of farming activities. Improved access to agricultural information is a key condition to improve farmers’ contribution to the sustainability of the food system.

From field detection, emerged that different local institutions, either community-based organizations, farmers’ association or civil society organizations give their contribution to mitigate difficulties in accessing agricultural information and education. Namely, MVIWATA and TAHA representatives reported they disseminate agricultural information among smallholders, thanks to demonstration plots, workshop and trainings. Lack of resources to reach all farmers in need of information and advice is reported as the first challenge. Targeting group is, indeed, the way to enlarge project scope and reach a greater number of farmers.



*“We also help farmers to get into farmers associations, because if they gather it will be easier to access to loans and when Taha plans agronomic interventions and trainings is always better to plan activities when farmers are together” -TAHA*

Preservation of natural resources, proper or even reduced employment of chemicals and their correct disposal are key issues of the educational projects and extension services. According to extension officers’ statements, farmers are usually highly interested in more sustainable practices and the reduced costs of production that go along with practices such as Integrated Pest Management (IPM) or conservative farming (practices that preserve or enhance the natural capability of natural resources to regenerate themselves).

*“A better training for farmers means a better use of natural resources automatically, I.E. use of water for irrigation. Once they learn how to proper divert a canal, improved access to technology will help farmers to use natural resources properly” –TAHA*

*“Most of farmers are interested about it. In this Ward, I did more than 10 trainings with groups of farmers about IPM, and their feedback was that it was good to them. Slowly we will get there, because it is a very important issue.”- Extension Agent*

*“It is very important for farmers to employ these practices, like IPM, because when a farmer uses Integrated Pest Management he lowers the cost of production! Few of our farmers employ these techniques/ knowledge, because farmers always need simple technology or things they can do only once, and then the harvest is safe from pests. We suggest them about IPM” – Extension Agent*

Greater access to agricultural education and services would enhance sustainability performances of the whole system. For instance, either extension agents and smallholders mentioned that, once farmers accessed trainings on Integrate Pest Management, losses and production costs reduced thanks to natural prevention of pests.

Waste disposal could represent another great opportunity to enhance sustainability of the system, and the quantitative findings show a complex scenario. Despite episodes of improper disposal of agro-chemical containers that caused the contamination of soil and water, questionnaire respondents reported they actually undertake interesting “circular” practices: 86 respondents (over 100) exploit the useful on-farm interaction between livestock keeping and crop farming, re-using animal droppings as natural source of fertilizer. 83% of them employ crop residuals to feed animals and 54% of them make natural compost recycling crop residuals. Not surprisingly, 91% of the respondents would be interested in learning how to reduce the

waste they you produce and getting value and how out of it. However, only 15 of them already received information on waste management from local organizations, extension services and NGO. The quantitative research confirmed a scenario where farmers are highly interested in improving their performances thanks to greater knowledge, but, on the other hand, service provision does not satisfy the demand (see chapter 5 for more details).

According to the principle of self-determination of food production (food sovereignty), in order to “contrasts the homogenisation of the agro-industrial complex, reinforces the diversity of production methods and respect for single types of crops” (Cavazzani, 2008), the autonomous production of seeds on the behalf farmers is of paramount importance for the sustainability of the system. On the other hand, majority of seeds in Tanzania comes from the so called “informal market”, namely farm-saved seeds (the market cannot meet the national demand of seeds) (Elliot, 2016); despite this in contrast with the quantitative research findings, where most of the respondents reported that agro-vets are the major source for seed purchase. Interviews confirmed that seed saving (the selection of the best part of the harvest in order to save it for seed production) is a very common practice in the study area. Respondents reported how farmers employ their indigenous knowledge to select best and most productive seeds. Further positive element is the fact that Tanzanian law allows and recognise on-farm seed production and exchange within the community. Thus, farmers can barter local seeds and overcome input access problem, while preserving local crop varieties. Seed production, handling and exchange also occurs through community seed banks, a form of social organization based on the local community.

After a review of the biggest farmers’ challenges and constraints (found in literature and confirmed by our testimony) and given what respondents said about possible improvements in farmers’ conditions, we can conclude that in many cases, collective actors and initiatives (in the form of farmers’ associations, civil society organizations, or community-based organizations) contribute to the sustainability of the local food system. Like empirically detected, collective actors actually answer to the great majority of farmers’ needs. Women’s Associations need a special mention. These type of groups targets specifically women in order to address their specific needs. Either in forms of self-help groups or Women VECOBAS, women associations help women farming and realizing their expectations from their activity. Lastly, small-scale producer and civil-society organizations in the Arumeru represent key actors, able to strengthen framers’ role within the system and reduce their marginality and exclusion, whilst enhancing their capability in stimulating sustainable place-based rural development practices. In order to to Stimulate such practices, governmental support is fundamental, especially in the form of direct support to farmers’ communities and their organizations.



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Chapter 5

# **SMALL FARMING POTENTIAL FOR TERRITORIAL INNOVATION: EVIDENCE FROM ARUMERU, TANZANIA**

Giulia Mura, Chiara Caterina Razzano, Nunzia Borrelli

This chapter is dedicated to the presentation of the quantitative data collected in Tanzania in May 2019 as part of the SASS project. The research, stemming from the international debate on the role of small farmers in developing countries, intended to offer a snapshot of small farmers' life and work, in order to provide the base necessary for policy recommendation proposals.

The research was developed in partnership with the Nelson Mandela African Institute of Science and Technology, based in Arusha, and with the support of Oikos East Africa, a Tanzanian NGO.

## The research methodology

### The research hypothesis

The general aim of the SASS research project is to “contribute to the ongoing debates and initiatives on increasing the sustainability of food systems”<sup>1</sup> and the data collection was intended to provide a realistic and very detailed description of the experience of small farmers in the area, both at a personal level and in the reconstruction of the chain of food production, sale and consumption. The general theoretical framework is that of eco-economy

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<sup>1</sup> <https://ecdpm.org/sustainable-agrifood-systems-strategies/>

and agroecology, and the hypothesis guiding the work focused on the assessment of relevant variables such as the diffusion of sustainable practices in small farm agriculture and the impact that various NGOs are having in the area.

More specifically, the research intended to evaluate:

- What kind of farming strategies are common amongst the sample? What crops are grown and how? How is the production refined and what is the chain of sale?
- What are the gender dynamics, and the intergenerational similarities and differences?
- What is the role played by indigenous vegetables in local farming? Are they produced? in what proportions? and to what ends?

The starting hypothesis was that the activity developed by the farmers would prove to be sustainable at an environmental level but less so on a social level, and that many of the sustainable aspects would not be sufficiently valued to guarantee their spread and improvement.

## The questionnaire

In order to create the questionnaire, an extensive literature review was conducted to identify the topics of main interest. As summarized by Borrelli, Corti and Benegiamo (2018), the critical issues of small agriculture in Sub-Saharan Africa include land availability, with the shrinking of small farm sizes in the face of growing urbanization and small scale industrial farm practices (Jayne et al. 2014) and unsustainable farming practices (Tittonell and Giller, 2013), motivated by the need to intensify agrarian production as a consequence of farming land reduction. This expedites the process of soil degradation, finally leading to higher food insecurity and poverty (ELD-UNEP, 2015), thus weakening the bargaining power of small farmers (Woolverton and Neven, 2014), and even forcing them to abandon the land to look for other, non-rural sources of income (Haggblade, et al. 2010). In addition to the aforementioned issues, the questionnaire aimed at gaining a deeper understanding of the issues of gender dynamics, waste management and social organization interventions.

Once the topics had been identified, an ad hoc questionnaire was built around six main areas of interest, adopting a mix of closed and open questions:

1. Personal data: this section aimed at investigating the composition and characteristics of the household unit, detecting the number and type

of members, educational levels, type of involvement in farm work and other unrelated activities.

2. Crop and livestock production and transformation: this section collected information about land ownership, crop production, farming techniques, farm labour and livestock keeping.
3. Commercialisation and urban-rural linkages: this section focused on the commercialization of the production (strategies, opportunities and constraints).
4. Social organizations: data about the organizations respondents are involved with was collected, including organization type, main areas of intervention and respondent's expectations and evaluation of their results<sup>2</sup>.
5. Waste management and energy use: this last section collected information about available infrastructures and common behaviours in waste management and use of energy.

The questionnaire used in this study was based on one already submitted in a previous phase of the research, to a sample of farmers from Kenya. After the first draft of the questionnaire was created, it was submitted for validation to two experts from the Department of Bioengineering of the Nelson Mandela African Institute of Science and Technology of Arusha and one from the Oikos East Africa Institute, also active in Arusha. A revised version was then submitted to an initial sample of 10 farmers, and their feedback integrated in order to define the definitive version of the questionnaire.

All questionnaires were geo-localized, in order to analyse the spatial distribution of the sample and of the variables of interest.

### The data collection and analysis

In order to collect the desired information, Università di Milano-Bicocca and the Nelson Mandela African Institute of Science and Technology had to work in close collaboration, at both a theoretical and practical level. More specifically, in order to obtain the research permits Università Milano-Bicocca was sponsored by the Nelson Mandela Institute via the definition of a Memorandum of Understanding that specified in detail the tasks to be performed during the collaboration of the two institutions. The MoU was then transmitted by Università di Milano-Bicocca to the Tanzania

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<sup>2</sup> As stated in the introduction of this volume, the data related to social organizations' work was not included in these analyses but will be presented in a separate work.



Commission for Science and Technology (COSTECH) along with a supporting letter from Nelson Mandela, with an official request of research permits for three Bicocca researchers. Once the research permits were issued<sup>3</sup>, the Nelson Mandela Institute contacted the district agricultural department, informing them about the research and describing the kind of sample required. The district agricultural department provided the list of farmers to be interviewed: direct contact between the university and the farmers is not allowed, and the interaction is always mediated by district and ward officers. For their part, the Nelson Mandela Institute provided enumerators that were both fluent in the local dialect and experts on the subject of the research.

The data collection took place in May 2019, with a pen and paper questionnaire that was submitted to respondents at their farms. The enumerators visited the farmers at their premises, and, under the guidance of the district and ward officers, read them the questions and noted the answers.

The analysis of data was carried out using SPSS 25, and consisted in descriptive analysis of frequencies, means and differences in variables' distribution. To analyse the spatial distribution of the respondents the qgis software was used.

## The sample

The sample is composed of 100 small farmers of the Arusha and Meru districts, located both in remote rural areas and in the outskirts of Arusha. More specifically, 49 interviews were collected (conducted) in the Arusha district wards of Ilkinding<sup>2</sup>a, Sambasha, Nduruma, Oloirien, Mlangarini and 51 in the Meru district wards of Mbunguni, Kikwe, Ambureni and Mororoni.

The Arusha Rural District encompasses an area of 1.239 km<sup>2</sup> around the Arusha city area, with a population of about 320.000 (Census 2012) and a low average age, with 41,8% of the population under 14 years old.

The Meru District, situated East of the Arusha area includes an area of 1.266km<sup>2</sup> and a population of about 270.000., once again of relatively low age, with 39% younger than 15<sup>4</sup>.

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<sup>3</sup> Permit n° 2019-107- NA-2019- 88; 2019-106- NA-2019- 88, 2019-105- NA-2019- 88

<sup>4</sup> Information from the webpage [citypopulation.de](http://www.citypopulation.de), consulted on 25 November 2019 (Thomas Brinkhoff: *City Population*, <http://www.citypopulation.de>).

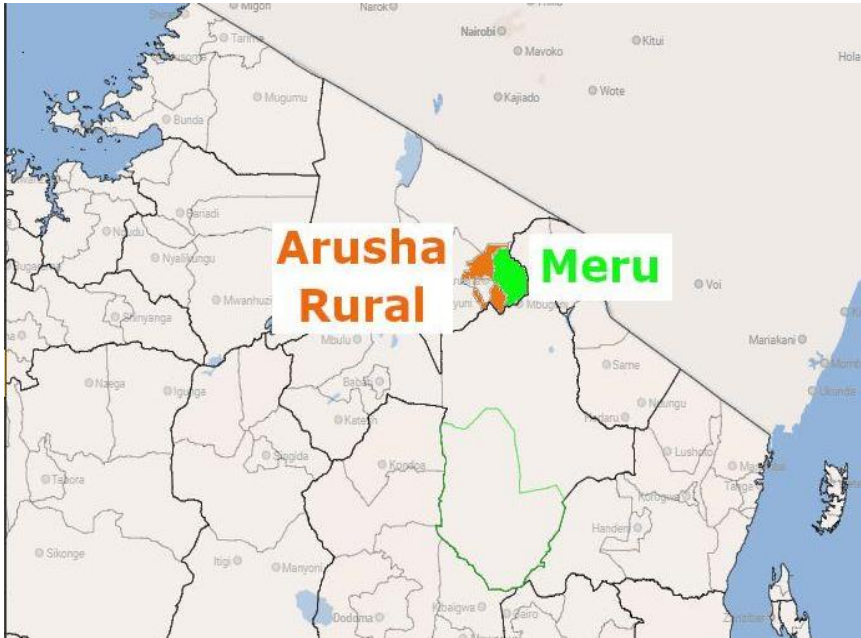
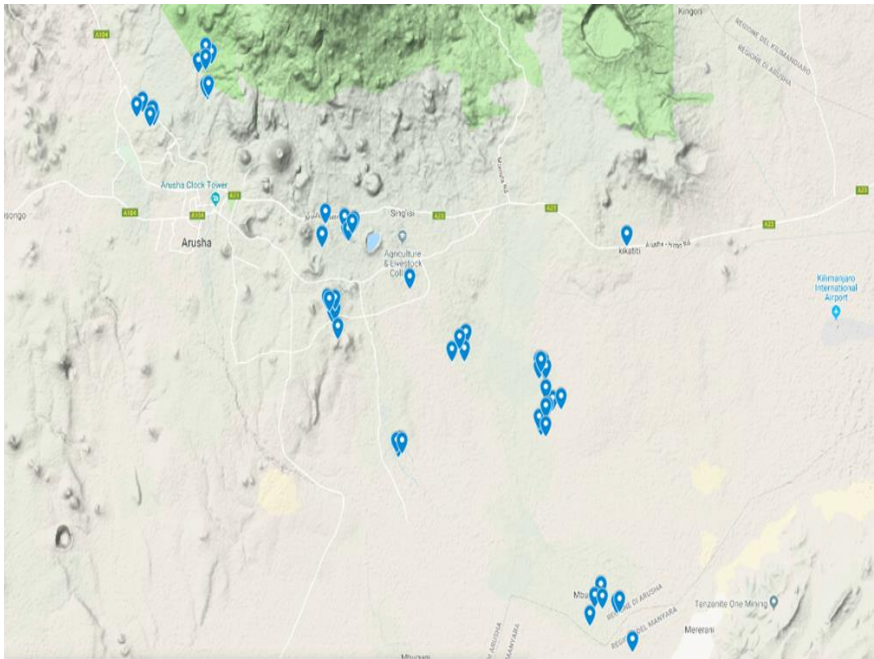


Figure 9. The Arusha rural and Meru districts.



**Figure 10. Geographical distribution of the farms in the sample**

Each respondent belonged to a different household and was asked to provide information about him/herself as well as about other members of the household. Each household represents one family, generally composed of a husband, a wife and the couple's children.

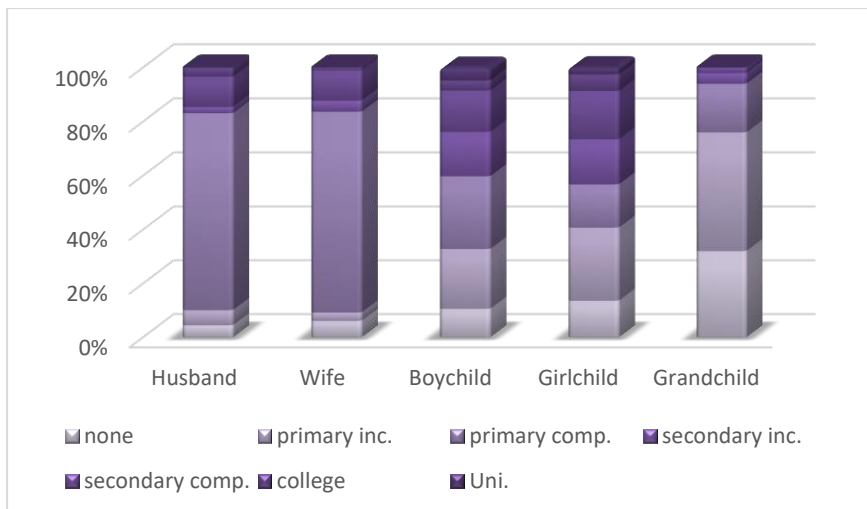
Half of the respondents belonged to the Masai tribe, 25% to the Mmeru tribe and the remaining 25% to a number of other tribes.

The respondents are adults, mostly of working age: the average age of the people interviewed is 45 years old, with a minimum of 23 and a maximum of 75. The distribution is quite wide and balanced, without large groups of same age respondents, allowing an equilibrate representation of different age groups: the first 25% of respondents are less than 38 years old, the following 25% are between 39 and 44, the third 25% between 45 and 55 and the remaining 25% are between 56 and 75 years of age.

Most of the respondents are male (67%), and in 63 cases they are the husbands in the household (in 4 cases they occupy the position of sons) while the 33 female respondents all have the position of "wives" in the household. The composition of the household seems to be typically that of a mother, father and four children. Only in 7 cases is the household composed of 1 or 2 people, while in 31 cases the household is composed of 7 to 14 people.

There are only 2 cases of adopted children or of employed people living with the family. Other relatives living with the family are grandchildren, sisters and brother in law, a grandparent, an uncle, and a nephew.

The questionnaire collected data on the level of education for all the members of the family and it is possible to see how the average level of education increased over one generation (table 1), as fathers and mothers mostly completed primary education while their children went on to secondary education, and in a few cases even college and university.



**Figure 11. Level of education per member of household**

## Main results

### Crop production and commercialization

In most of the cases respondents own 1 plot (28%), 2 plots (39%) or 3 plots (28%), and the average size of the land owned is 2.90 acres, with 35% of the respondents owning a plot smaller than 2 acres, and 3 outliers owning 8 acres, 13 acres and 22 acres of land respectively. All of the land is used for agriculture, but in 40% of the cases it is both agriculture and pastoral land.

Overall, the crops that are most widespread among respondents belong to the groups of staples (Maize, Beans and Banana), vegetables (Sukuma, Tomato and Swisschard) and one Indigenous Vegetable (Managu), while the fruits are less diffused. More precisely, the distribution of crops is:

- Maize (96 growers)
- Beans (88 growers)
- Sukuma (44 growers)
- Banana (42 growers)
- Managu (Nightshade, 40 growers)
- Tomato (40 growers)

- Swisschard (31 growers)

On the subject of crop production estimates, the research highlights a scenario of little awareness: in many cases respondents are unable to quantify their production, and also when they do, they have difficulty in providing realistic estimates, a fact reported by the interviewers and confirmed by the extremely high variance in the numbers provided and the lack of correlation with other variables such as the size of the land owned.

Seeds are mainly acquired via Agrovet. The source for seeds seems more linked to the type of crop than the characteristics of the respondent: even if most of the crops comes from Agrovet or the market, some specific seeds are also retrieved from the neighbours or seed savings, namely the seeds of Banana (the only crop that is never acquired via Agrovet), Managu, Pumpkin and most of the fruits, especially, Avocado, Papaya and Mango.

Sale of the products is via only four of the eight options provided. None of the respondents, in any case, sell their products to a farmers' cooperative, a marketing board, a shop or a hotel. The most frequent options are, by far, sale to a middleman at the farmgate or at a local market. Wholesalers and retailers are used, although less often. The difficulties connected with the sale of products are detailed in chapter 4.

Livestock rearing is mostly for self-consumption and includes the keeping of poultry (86% of the respondents), cattle (73%), goats (61%), and sheep (20%). On average, families own only a few head of livestock, that are sold only in case of necessity. Only in one case poultry is kept for business, with the respondent owning more than 600 chickens. The transformation of the food produced is mentioned by only 1 respondent, that uses milk to produce yogurt for self-consumption.

## Indigenous Vegetables

Overall, 44% of respondents cultivate one or more indigenous vegetables and only Managu can be considered as widespread among respondents, being grown by 40 respondents, and in 5 cases, represents the main crop produced by the farmer.

Other indigenous vegetables include Kunde (15 growers), Terere (14 growers), Cassava (4 growers), Kale (3 growers) and Lablab (3 growers), and usually less than half of the land is dedicated to these crops.

Despite being indigenous crops, Agrovets and markets are the main sources of these seeds, rather than seed saving or exchange amongst

neighbours. The most diffused reasons to grow indigenous vegetables are profitability and contribution to nutrition.

In most cases, the production of indigenous vegetables is destined for sale, and only a small portion of it is consumed by the farmers, while bartering is not mentioned. There are however a few cases in which the main part of the production is consumed by the farmer.

Just like with other crops, the sale of indigenous vegetables is in most cases mediated by a middleman, and less frequently, they are sold at a local market. The option of contacting a wholesaler or a retailer is much less diffused.

### Farming techniques and sustainability

Respondents show a good level of tree management and agroforestry practices in their farms. Almost all the respondents (94) manage trees on their land. Tree management makes agricultural practice more sustainable, especially when practiced on a small scale and with limited resources: they provide shelter and shade for the soil and crops, limiting water loss in arid areas (38 respondents), while being a source of food (50 respondents), of fuel (79), of timber for further transformation (65 respondents) and of animal food (29 respondents).

Bean rotation (61 respondents) and intercropping (77) are also quite diffused practices, while the mixing of trees and crops is signalled by only 37 respondents.

At the same time, other sustainable practices such as conservative tillage or employment of natural pesticides are not so common among the respondents (6 and 15 respondents respectively).

Less sustainable practices that are quite diffused among the sample include the use of synthetic pesticides (88%) and of synthetic fertilizers (65%).

Of the suggested livestock rearing, only “tethering/zero grazing” is widespread (86 respondents), while only 9 respondents practise seasonal grazing, 3 of them practise nomadic pastoralism and none practise ranching.

The topics for which most advice is requested are agrochemicals, improved seeds, crop storage, pest control and inorganic fertilizers.

The more frequent providers of advice are the government, radio/television/newspapers and the neighbours.

On a Likert scale from 1 to 6, respondents were asked to evaluate how often they received advice on the various topics and what relevance the advice received had. From the data, it is possible to see that the topics requiring more

frequent advice are improved seeds, pest control, agrochemicals and organic fertilizer. The advice received is considered most relevant on the topics of agrochemicals and improved seeds, while the evaluation is most negative for mechanization and labour saving, commercialization and technologies.

	Tot answers	Frequency of advice (mean)	Relevance of advice (mean)
Agrochemicals	67	3,7	3,6
Inorganic Fertilizer	48	3,6	3,4
Improved Seeds	47	3,8	3,6
Erosion Control	47	3,1	3,3
Pest control	46	3,8	3,5
Organic Fertilizer	45	3,7	3,4
Crop Storage	44	3,4	3,2
Soil conservation	41	3,4	3,4
Irrigation Technologies	40	3,5	3,3
Technologies	29	3,5	3,2
Commercialization	23	3,3	3,1
Mechanization and labour Saving	22	2,8	2,0
Vermin control	2	5,0	3,7

**Table 1. Frequency and relevance of the advice received on various topics**

## Waste management

In order to assess the environmental sustainability of small farm agriculture the issues related to waste management clearly represent a highly relevant aspect. For this reason, different phases of the waste production and management linked to farming and livestock activities were investigated. The results indicate that this specific phase of the food production is still open to improvement, not only related to the specific habits of the individuals, but on an infrastructural level.

Only 9 respondents have a waste collection system at their village, managed by the district council (4), ward officer (2), municipal council (2), or village chairperson (1).

None of the respondents process food to reduce post-harvest losses.

The most frequent way of disposing of crop residue is to feed it to animals (83). Less diffused but still consistent is its use to make compost (54), leaving it in the field (43) and burying it when preparing the soil for farming activities (40).

Animal droppings are:

- collected and used to prepare manure: 86 respondents
- buried when preparing the soil: 36 respondents
- left where they are: 26 respondents

Used containers and bottles are mostly burnt (60), while expired chemicals are often buried in the ground (52).

Not surprisingly, 91 of the respondents would be interested in learning how to reduce the volume of waste produced and getting value from it. However, only 15 of them had already received information on waste management from local organizations, extension services and NGOs.

## Gender dynamics

With respect to gender dynamics, different aspects have been taken into account, regarding education, involvement in farm work, ownership of the land, and involvement in decision making processes and activities. Overall, the results seem to show a quite balanced distribution of tasks and opportunities, although still skewed in favour of males.

With regards to education, it was possible to enlarge our evaluation, having collected data not only about the respondents but also about their partners and children. We have then a sample of 262 females and 281 males. No education or incomplete primary education is reported by 25.3% of males and 28.6% of females, primary was completed by 41.3% of males and 37.8% of females, and further education had been pursued by 33.5% of males and 33.6% of females.

The questions assessing the involvement in farms work also collected information about the whole family group. In this case the answers regarded 273 males and 262 females, and once again the frequency of involvement does not show much difference between sexes, although there is a slightly higher involvement of females. While 32.2% of males and 29.9% of females are never involved in farm work, 9.2% of males and 10.3% of females get involved only in peak season, 23.4% of males and 22.9% of females work part time at the farm with 35.2% of males and 37% of females working full time.



Household-related decisions are often taken by husband and wife jointly. Regarding the following issues:

- getting seed inputs for agricultural production,
- deciding what kind of crops to plant for the season,
- deciding when to plant/harvest,
- deciding the proportion of harvest to consume and the proportion to sell and store,

In about 50% of the families the decision is taken by both husband and wife, in about 35% the husband decides and in the remaining 15% the decision is taken by the wife.

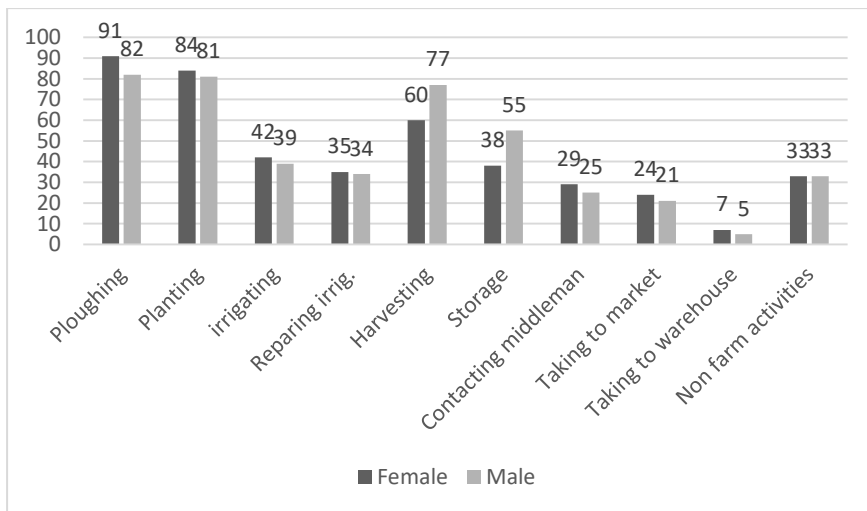
When it comes to:

- deciding if crops have to be taken to the market,
- deciding who to sell to,
- deciding the selling price,

the rate of joint decisions drops, and the division is roughly 1/3 husband only, 1/3 wife only and 1/3 joint decision.

In a few cases the sons are involved in the decision process, and even less frequently daughters are involved.

With regards to the contribution to farming activities, the involvement of males and females is quite balanced. The only noticeable differences are found in “harvesting” and “storage”, where the contribution of males seems to be more relevant, while “ploughing” is slightly more frequent amongst women.



**Figure 12. Percentage of males and females participating “frequently” and “each time” in farming activities**

Moreover, there is no big difference between genders when it comes to carrying out income-generating activities outside the farm. Basically half the adults of the households (48 out of 99 wives and 49 husbands out of 92) and 17% of the sons (31 out of 182 boychildren) and 16% of daughters (28 out of 166 girlchildren) sought a job opportunity outside the farm and most frequently these extra-farm activities are livestock breeding, seasonal working and industry working.

The ownership of land is the only clearly unbalanced aspect: of the total number of plots owned (162), roughly 47% is owned by the husband, 7% by the wife and 46% by both. Still it is worth remarking that women hold a share in 53% of the total plots mapped.

## Discussion and conclusions

This chapter presents a first description of the data collected on a sample of small farmers in the Arusha district, with the main aim of providing a detailed description of the situation encountered and with a specific focus on the issue of sustainability. As discussed in chapter 1 of this volume, such data is considered crucial for the development of policies that allow a place-based, sustainable food system to grow.

The data collected allows reflections both on the environmental sustainability and social sustainability of the practices diffused among the 100 households surveyed.

With regards to the environmental sustainability of the farming, both positive and negative aspects emerge, basically confirming the starting hypothesis that sustainable practices, although present and even quite widespread, do not carry enough weight to be considered a motor for the necessary transition to a new system of production.

- Not surprisingly, the most cultivated staple crops are also the more commonly consumed by local families, maize and beans (Ugali na Maharage, a plate including beans and maize, which is the national dish); with an important contribution of bananas. Banana used to be the local staple food (especially the Plantain, a cooking and frying banana) but was slowly replaced by white maize during colonialism. According to Haapanen (2011), in the pre-colonial period (before 1890) in Tanzania, there were two main farming systems: grain-based and banana-based. Banana-based farming, which continues to exist, was mainly developed in the volcanic highlands (like the Meru Area and Arusha region, objects of this study).
- The diffusion of indigenous vegetables could be greatly improved, and, as discussed in chapter 4, represents an unmet demand from the farmers. Such vegetables have for generations represented an important source of food for sub-Saharan populations (Munhanji et al, 2011) but this capital of knowledge and genetic diversity is at risk of being lost (Keller, Mndiga, Maass 2005). Research support the idea that the characteristics of indigenous vegetables could make them great investments for small farmers, that would be “able to maximally utilize their small portions with less depletion of soil nutrients” and a faster production circle (Mwangi, Kimathi 2006).
- Small farmers are far from independent in their acquisition of seeds and have to rely strongly on Agrovet and markets. The auto production of seeds, that would be crucial in assuring their independence, is a costly process that requires the “sacrifice” of the first harvest and specific knowledge in its handling. It seems that this kind of knowledge is not diffused among farmers, and this data provides important input for the definition of supporting policies.
- Many sustainable farming techniques are widespread, such as the use of manure, which is higher than the use of synthetic fertilizers. On the other hand, the use of synthetic pesticides is much higher than that of organic ones and other non-sustainable practices are widespread and of interest to the farmers (particularly topics such as agrochemicals and improved seeds). The interest in topics such as

organic fertilizing or conservation of the soil is less widespread, but still relevant and this could represent an entry for programs of support, that should use this curiosity as leverage to extend the discussion on sustainable practices and define policies coherently. As discussed in chapter 4, access to agricultural inputs is very difficult for small farmers. The necessity to find alternative inputs represents an opportunity: stakeholders working in the promotion of sustainable small farming can investigate ways to introduce and support agricultural inputs that are sustainable and affordable at the same time (Altieri, 2009).

- The issue of waste management is the one that most clearly testifies to the need for an organic, infrastructural intervention managed by the local authorities. Farmers are mostly left to themselves in the management of the waste produced, and while some of the strategies adopted are fully sustainable, they cannot be applied to all kinds of waste. In many cases the solutions adopted to dispose of plastic, glass and chemicals are highly polluting, and the interest in alternatives strategies is very high amongst the sample (more on this topic is discussed in chapter 4).

The issue of social sustainability has been taken into account with regards to the gender situation, and in this case the starting hypothesis has been at least partially disconfirmed, as the distribution of work and responsibility between males and females in the sample resulted to be less unbalanced than originally expected.

It is true that an aspect as crucial as land ownership reveals a strong unbalance towards men, and the fact that the ownership is still mostly in the hands of the husband of each family should be taken into account. However, for all other aspects, going from education to frequency of work on the farm, to contribution in the decision taking process, female representation is far from marginal.

In conclusion, it appears that the current structure of small farming in Tanzania could easily represent a fertile environment for sustainable development, via the promotion of policies that should at the same time support and enhance existing practices, and address the specific issues identified.

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## Chapter 6

# CONCLUSIONS

Nunzia Borrelli, Chiara Caterina Razzano

Food and agricultural systems are under pressure worldwide. A rise in prices in 2007/2008, due to the onset of the global financial crisis, plummeted more than two billion people into a state of food insecurity. Greater awareness of the effects of the food system on climate change; the need to pay closer attention to food quality, in the wake of food scandals during the last 15 years (mad cow disease, avian flu); land conflicts which resulted in the progressive loss of arable terrain; make the sustainable transition of the food system more urgent than ever.

The sustainable transition of the food system is nothing but an alternative vision to manage a food system which had come to be envisioned as place-based and sustainable. The model of governance should start from knowledge and the effective management of local resources (tangible and intangible), underpinned by activating the local network of actors. This type governance focuses on controlling food quality, promoting local production, so as to limit shipment costs (and thus reduce carbon emissions), organising campaigns to raise awareness on healthy eating and low environmental impact foods and lastly, enabling the regular use of lands.

As a consequence of the global 4F crisis, scholars ask themselves whether agri-food systems can guarantee sustainability, and it turns out that yes, effectively managed agri-food systems can indeed guarantee sustainability.

The present work had one main goal: to investigate the degree of environmental and social sustainability<sup>1</sup> of two local small-scale farming

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<sup>1</sup> In the 1987 Brundtland report on sustainable development, the definition of Sustainable Development is given: “*development that meets the needs of the present without compromising the ability of future generations to meet their own need*”. The three fundamental components to sustainable development are environmental protection, economic growth and social equity. The concept of sustainable development focused attention on strategies to promote economic and social advancement, while avoiding environmental degradation, over-exploitation or pollution. United Nations World Commission on Environment and Development (1987) *Our Common Future*.

systems in Sub-Saharan Africa: Gilgil Sub County (Kenya) and Arumeru district (Tanzania).

Small farmers constitute the dominant production model in Sub-Saharan rural areas, accounting for up to the 80-90% of all farms (Grain 2014). They make up most of the active rural population (IAASTD, 2009) and include more than half of all economically active African women (Fao, 2010a).

In Kenya, small farmers that constitutes the dominant group in the agrarian sector, which involves more than half of Kenyan rural inhabitants and two-thirds of active rural woman (Alila and Atieno, 2006). Women represent the dominant workforce in Kenya's agriculture and are more involved than men in subsistence small-farming activities (Rapsomanikis, 2015) while providing the 75% of the labour force in small-scale agriculture (Alila and Atieno, 2006).

In Tanzania, smallholders are the main producers of food crops. About 70% of Tanzanian households are rural and are engaged in agrarian activities (Faostat<sup>2</sup>). Agriculture accounts for about 75%-80% of the labour force (Salami et.al, 2010; Costa et al., 2013). Women account for nearly half of the workforce, producing more than 70% of the food (URT, 2016), and approximately 7.2 million youth depend on agriculture. The rural population is relatively young, with about the 44% being below 15 years of age. The average plot size is about around 2 hectares (URT, 2012, p. 24; Salami et al., 2010), but vary widely across regions. The most dominant type of agricultural activity is crop production, followed by crop and livestock production. In Tanzania the majority of smallholder practices mixed farming. However, the 2007/2008 Census (URT, 2012 p. 16) also noticed an increasing shift toward non-agricultural activities among rural households.

After the food and financial crisis of 2007-2008, the Sub-Saharan region became target of a set of renovated policies and programs related to agri-food system development (Blein et al., 2013; de Schutter, 2015). There are many reasons supporting this: Firstly, agriculture has the capacity to mitigate the effects of climate change, to which African smallholders are particularly vulnerable and exposed. Secondly, Sub-Saharan Countries host the highest percentage of undernourished population (FAO, 2010a, 2017) and the majority of the Sub-Saharan population (as well as the study areas population) live in rural areas and depend on small-scale agricultural activities (OECD-FAO, 2016). Moreover, African food systems are highly dependent on staple-food importation (FAOSTAT, 2010 ; Rakotoarisoa et.al., 2011) and this exposes African countries to food price fluctuations and shocks. Against this backdrop, improving the sustainability of smallholders' systems and

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<sup>2</sup><http://www.fao.org/faostat/en/#country/215>

enhancing the agro-ecological performance is key for assuring socio-economic development in Sub-Saharan Africa.

Literature review and field investigations allowed to bring about weaknesses and challenges hampering the development potential of Gilgil and Arumeru rural areas. Factors such as shrinking farm sizes, reduced availability of natural resources and demographic growth are pushing local producers towards intensified production, that, in turn, increases the unsustainable nature of farming practices (Fittonell and Giller, 2013).

In this scenario, smallholders are forced to sell immediately after the harvest at very low prices, due to low bargaining power towards buyers (Woolverton and Neven, 2014) or even forced to abandon agriculture and migrate to urban centers or diversify their income through rural non-farm employment, as on-farm labour returns per person are too low (Haggblade, et al. 2010).

The international debate around the sustainability challenge of Sub-Saharan African agriculture gravitates around two major stances. On the one hand, the adoption of an agriculture development paradigm based on the liberalisation of agricultural trade, the development of modernised production systems to boost small farmers productivity and their consequent integration within the global market. This approach can be regarded as a new version of the Green Revolution for Africa, proposed by the *Alliance for a Green Revolution in Africa* (AGRA), promoted by the Rockefeller Foundation and Bill & Melinda Gates.

On the other hand, the other position is the one upheld by supporters of the Food Sovereignty principle (which should be distinguished from the principle of food security). According to this principle, “the self-determination of populations in the production, distribution and consumption of foodstuffs contrasts the homogenisation of the agro-industrial complex, reinforces the diversity of production methods and respect for single types of crops” (Cavazzani, 2008). Strategies for affirming food sovereignty are particularly meaningful in Sub-Saharan Africa, where the majority of people inhabit rural areas and engage in traditional farming practices which have not disappeared despite widespread destruction suffered during the colonial and post-colonial ages (Sivini, 2006).

Traditional farming and peasantry are not synonymous with backwardness, nor they are intrinsically averse to development. Actually, peasants and smallholders are characterised by a strong innovative spirit and Van Der Ploeg (2009) recognises that small farmers have the ability to undertake territorial conservation and promotion practices, in virtue of their knowledge of the natural and physical territory, coupled with technical knowledge on how to farm the land, the use of natural pesticides and autonomous seed production. Studies about sustainability of rural systems



intersects with another important area of research, also frequently cited by Van Der Ploeg, agroecology. According to one of the major exponents of Agroecology, Miguel Altieri, small-scale farming is valuable as grows crops with local resources and low use of external input. Small farmers produce most of the staple crops (grains, pulses, tubers) with almost no fertilizers, nor improved seeds. Furthermore, according to Altieri, if considering the total output and not a single crop yield, small farms are much more productive than large ones. Traditional multiple cropping system (or polyculture, as opposed to monoculture practice of corporate agriculture) practiced by small farmers is a diversified farming system where grains, fruits, vegetables, trees, fodder and animal products are produced on the same field (Altieri, 2009). According to Van der Ploeg (2009), the main economic and livelihood strategy guiding peasants and small farmers' behaviour resides in a quest to minimize economic and environmental risks. Lastly, smallholders' systems are mostly based on short and decentralized circuits of production and consumption and are strongly grounded in local and regional socio-environmental landscape.

Gilgil and Arumeru farming system are representative both of the opportunities, on the one hand, and of threats, on the other, of sustainable transformation of agriculture in Africa.

Farmers' vulnerability in Gilgil Sub-County is particularly linked to water scarcity. Rainfed agriculture is predominant and only a limited number of households count with irrigation or some systems of water storage. As a consequence, agrarian production is seasonally and, due to rain uncertainty, a high-risk and low-profit venture. Livestock provides an important alternative-income resource, in addition to supplying a key input-resource through the recycle of livestock manure. Alongside these general trends, the small farm sector is not homogenous, differences exist between the small farmers attesting for various degrees of integration between subsistence and commercial production. These differences reflect in turn variations in agrarian performance, assets and capabilities between farmers. More precisely, small farms in Gilgil Sub-County fluctuate *between two poles*. At one extreme, we find farmers whose activities are predominantly subsistence oriented. They cultivate land with the principal intent of producing food to own consumption and they sell to the market the surplus production. Opposite in the continuum, we can find market-oriented farmers for whom Market and capital access are difficult

Access to proper agricultural information is often difficult on the behalf of Gilgil small farmers: radio and media turned out to be the prevalent and a privileged source of information, rather than extension services that are deemed inefficient.

In Arumeru, farming households are usually poor (poor hygiene infrastructure in their dwellers, low ownership of individual assets, firewood

as widespread source of domestic energy). Their farming activity faces many challenges, such as: unpredictable or declining yields due to climate change and soil degradation; low profit margin on highly variable prices of commodities, low access and rising costs of inputs and equipment; poor road infrastructures (certain rural areas can become inaccessible in rainy season); poor bargaining power towards middleman and difficult market access; poor access to credit and extension services, and competition over land uses (URT, 2012; URT, 2013). Rural poor can be regarded as a marginalized community, far from roads, markets and urban centres; they are socio-economically marginal actors, while being the core of the food chain, who live in a very valuable area with great development potential.

Both systems heavily rely on female work-force, and, in both systems, women are usually excluded from land property and capital access.

Instability of profits and the high risk related to seasonality of harvest, lack of market and household infrastructure, difficult market access and unreliable middleman, together with gender inequalities represent the main challenges to overcome in both case studies.

Despite the constraints of the two systems, food producers in Gilgil and Arumeru can play a pivotal role in stimulating sustainable place-based rural development practices. In both farming system, on farm-practices can be regarded as highly desirable, because environmentally sustainable, place-based, and aimed at the reduction of economic and environmental risks in order to pursue the outliving of their own livelihood system. Surveyed farmers traditionally grow diversified crops (high level of on-farm crop diversification, inter-crop, crop rotation and fallow alternation); employ little external inputs (chemicals), thanks to autonomous seed production and employment of integrated pest management practices; they traditionally manage natural resources (soils and water) in a careful manner by applying conservative tillage and carefully regulating access to irrigation water (where available). In case of rain-fed agriculture, local farmers employ different practices to preserve water, such as ground cover (to limit water loss) and stock of rain water. In both areas, small framers manage crops, trees, and livestock on their land. This creates favourable ecological interaction between animals, crops and trees, enhancing the biodiversity of the farm, while protecting it from environmental shocks and climate change. Besides, farmers exploit these interactions in a sort of circular employment of resources: animal droppings offer natural manure for crop; crop residuals offer ground cover for mulching as well as fodder for animals. Tree-keeping helps the biodiversity and protects crops from excessive heat and some pests. Small-farmers good agricultural practices (agro-forestry, intercropping, conservative farming), detected during field investigation, definitely represent a great element of environmental sustainability. The employment of local seeds on the behalf of local peasants

is very important to preserve local biodiversity and counter the homogenization of food varieties.

Lastly, local farmers currently produce Indigenous Varieties that, otherwise, would probably get lost. It is important to foster local varieties in order to diversify products and productive methods. In order to realize the sustainable transition of agriculture, traditional practices and the knowledge related to them cannot be neglected nor overlooked.

Despite both food systems being geographically limited, difficult market access makes peasants dependent on middlemen to purchase their goods at farm-gate. Buying and selling occurs on spot market, and the Lack of contracts means that trust relationship between producer and buyer is crucial. When a trust relationship occurs, this assures high level of sustainability for either parts: traders help farmers in planning the production in order to realize higher profits for both parts and reduce food waste that stays unsold in the markets. From the testimony, emerged that traders cooperates with each other in the markets to keep prices stable and avoid unfair competition; while some of them are committed in recognizing farmers fair prices (always in relation to transport and distribution costs). Both horizontal and vertical cooperation along the food chains are very important and they occur in the survey farming systems, contributing to easier market placement of products and therefore making the food system more sustainable.

Element of intersection between social and environmental sustainability is that farmers adapted their practices from the local endowment of resources and a rooted and strong relationship with their territory and the resources available there. They traditionally know the potential of their climate and of their environment, from which they derived their livelihoods and farming system, which are perfectly adapted to it. Furthermore, this “place-based” approach, together with their marginalization from global markets help local farmers to self-determinate agricultural production, making them less dependent on corporates and technology intensive- patents. They are able not just to diversify production, but, more important, they are able to diversify productive systems and technologies, co-producing the knowledge necessary for agricultural innovation.

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