

The Ignored Producers: Reflections from Urban Vegetable Growers in Arusha, Tanzania

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Abstract

In the context of sub-Saharan Africa, growing evidence demonstrates the expansion of farmer-led irrigation. Evidence also suggests that farming plays a significant role in the improved well-being of farmers, enhanced food security, and nutrition for a growing population in the region. Despite its vital contribution, most states in sub-Saharan Africa seem to disregard farmer-led irrigation. This study aimed to explore how vegetable farming operated in Arusha City, Tanzania; the contribution of vegetable farming to food security, and how government authorities perceived irrigated agriculture. The study applied a qualitative research approach to explore the interaction between the government and farmers in Arusha. Thirty-one (31) farmers, traders, and government officials were purposively selected and interviewed between January and March, 2023. The analysis showed that irrigated farming contributed to livelihoods. Additionally, government authorities did not support vegetable-irrigation farmers as they considered them to be operating farming activities illegally and informally. This study concludes that given the contribution of farmer-led irrigation initiatives to improved livelihoods and food security, the government should rethink its relationship with the farmers to strategize ways to support them.

Keywords: *small-scale farming, farmer-led irrigation, marginalisation, Tanzania.*

1. Introduction

1.1 Background

The growth of farmer-led irrigation in sub-Saharan Africa (SSA) is vital for expanding irrigated areas (AGRA, 2018; de Bont, 2018; Woodhouse et al., 2017; World Bank, 2018). The development of farmer-led irrigation is a process in which farmers drive the establishment, improvement, and expansion of irrigated agriculture (Veldwisch et al., 2019). Literature on farmer-led irrigation in SSA indicates a significant growth in farmer-led irrigation initiatives, and that irrigated areas could be more significant than what is documented (Beekman et al., 2014; de Fraiture & Giordano, 2014; IWMI, 2016; Lefore et al., 2019; Woodhouse et al., 2017). These developments are mostly results of individual farmers' efforts and not initiatives by governments.

Though farmer-led irrigation is growing in SSA, agricultural and irrigation policies do not favour small-scale farmers. Literature indicates that the patterns of irrigated agriculture in SSA are changing, with the idea of abandoning traditional farming in favour of modern ones (Birner & Resnick, 2010; Scoones et al., 2018). Narratives of agricultural transformation in SSA promote structural economic transformation that

enables a change from small-scale peasant agriculture to large-scale commercial production. Therefore, the modernisation of agriculture is critical for agricultural change in Africa. However, small-scale farmers tend to be dismissed in the agricultural modernisation discourse. This assumption persists even while small-scale producers dominate agricultural production (Birner & Resnick, 2010).

Evidence suggests that agricultural transformation discourses are causing emerging patterns of dispossession and redistribution of land and water resources from the poorer to the wealthier (Mdee & Harrison, 2019). Concerning land, this can be fuelled by individual titling and large-scale land investments (Stein et al., 2016; Maganga et al., 2016; Dell'Angelo et al., 2017). The same tensions are evident in access to water for irrigation, with formal preferential access being given to large-scale investors (Mdee & Harrison, 2019). In this transformation trend, small-scale farmers tend to be dismissed as 'traditional' and uneducated that need knowledge and inputs to improve production (de Bont, 2018; Mdee and Harrison, 2019). In her analysis of small-scale farming in Tanzania, de Bont (2018) asserts that farmers' irrigation initiatives are generally considered traditional, backward, and unable to contribute to agricultural transformation in many African nations.

Some scholars advance that small-scale farmers are driving a more rapid expansion in irrigated production than previously assumed (Mdee & Harrison, 2019; Woodhouse et al., 2017). The recent rapid development of farmer-led irrigation seems to be driven by innovation in irrigation methods by some farmers through better access to technology, such as hosepipes and tiny pumps; which has led to improvements in local food markets that are driven by economic growth, population increase, and urbanisation (Woodhouse et al., 2017). Several studies have also outlined the prospected potentials of farmer-led irrigation to improve smallholder farmers' livelihoods and food security, particularly in the face of climate change (Veldwisch et al., 2009; Kawamba et al., 2012; Pavelic, Villholth & Vema, 2013; Pittock et al. 2017; Hall et al. 2017; Dittoh, 2020; Osewe et al. 2020). According to Veldwisch et al. (2009), irrigated farming practices initiated by farmers increased agricultural productivity and improved farmers' living standards. For example, a recent study in Ghana has indicated that urban and peri-urban vegetable production is a significant source of employment and wealth creation for many young people in urban areas. There is also a considerable demand for vegetables produced in urban and peri-urban areas (Dittoh, 2020).

In Tanzania, the agriculture sector contributes 31% of the country's GDP and about 30.9% of its export earnings; while employing over 70% of its workforce. Accordingly, the industry continues to drive economic growth in the country (Epaphra & Mwakalasya, 2017). Despite its importance, agriculture is greatly affected by inadequacy, seasonality, and unreliability of rainfall and periodic droughts. In response, the government prepared a National Irrigation Policy

intending to ensure a sustainable availability of irrigation water and its efficient use for enhanced crop production, productivity, and profitability that will contribute to food security and poverty reduction. The policy, among other things, aims to improve irrigation schemes, construct new irrigation schemes (small-scale, medium, and large-scale), and train farmers on irrigation techniques for water management (URT 2010). Though the policy recognises the growing farmer-led irrigated agriculture, it does not provide any statement or strategic plans on how this kind of irrigation will be managed and supported. This is in line with what many studies have demonstrated: that states, particularly in Africa, have disregarded farmer-led irrigated agriculture (Lefore et al., 2019; Woodhouse et al., 2017). Hence, little investigation has been done in Tanzania to understand the interactions between the government and irrigation farmers. The present study sought to fill this gap by exploring how vegetable farming operates in Arusha City, the contribution of such a farming to food security, and how the government perceive irrigated agriculture.

1.2 Theoretical framework

This study applied a political ecology perspective to explore farmer-led irrigation in Arusha, Tanzania. According to Watts (2000), cited in Robbins (2004), political ecology seeks to understand the complex relationship between nature and society through carefully analysing what is known as the forms of access and control over resources, and their implications on environmental health and sustainable livelihood. Political ecology is a multi-disciplinary field rooted in neo-Marxism and political economy, and has been influenced by the social movement theory and post-structuralism (Bryant & Bailey, 1997). Political ecology is understood as a theory with many concepts. In this study, the researcher used the idea of *marginalisation* to discuss how the government has marginalised vegetable growers in Arusha despite their vital contribution to improved livelihoods and food security. Political ecology considers access to resources as determined by power, or what is called the "... ability of an actor to control its interaction with the environment and the interactions of other actors with the environment" (Bryant & Bailey, 1997: 67). This explains that in interaction with resources, there are people who usually want to control the access to resources by other actors. Those who manage to control access to resources and limit the ability of others possess more power than their counterparts. Here, those who have control over resources tend to marginalise the others.

Political ecologists have demonstrated these relationships in many places around the world. For example, Robbins (2004) provides the case of indigenous groups in the Amazon Forest, where the indigenous people were denied access to the forest, which served as their source of livelihood. Similarly, Nthomang (2002) observed that the Bushmen made up a distinct population in Southern Africa with a subsistence economy based on foraging (hunting and gathering) for centuries. However, fuelled by wildlife conservation strategies, the government forced them from their traditional land; and denied them access to the same piece of land and other resources, causing a considerable worsening of their socio-economic position (ibid: 2002:103). Harrison and Mdee (2017), in their study of small-scale

farmers in Uluguru Mountains, Tanzania, demonstrated that, in their attempt to improve farming through self-irrigation initiatives, were regarded as illegal water users, polluting water, destroying a fragile habitat, and unfairly stealing a resource from domestic users in downstream urban areas.

This study considers political ecology a vital analytical tool because the theory reveals social relations embedded in resource access and use, power struggle, and ways in the battles: some groups may take control of resources and influence ways other actors can access the same resources. In this struggle, some groups are given due consideration while others are marginalised. The present study attempted to explore how irrigated farming is conducted, its interaction with the state, and the implications of such interaction on the well-being of farmers; with the use of the theory expected to help uncover the stated social relations.

2. Methodology

2.1 Study communities

The study was conducted in Sekei, Naura, and Thembi areas of the Arusha City Council (Figure 1). Sekei is in the Sekei ward, while Naura and Thembi are in the Thembi ward. The studied community relies on petty trade, day-work, and farmer-led irrigation farming.

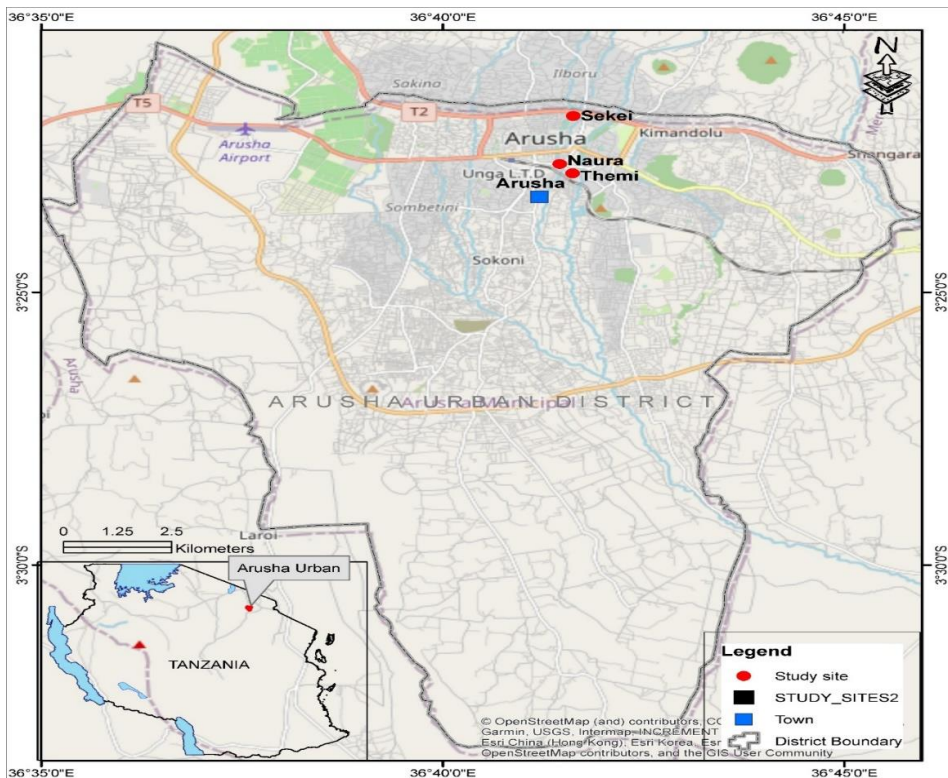


Figure 1: The Map showing the study sites

Careful consideration was paid to the selection of the study sites. The selection involved hanging around the city to observe different farming activities. The idea was to get a picture of urban farming in the Arusha City Council. Several areas were visited in this process, such as Daraja Mbili ward, Remala ward, Themis ward, and Sekei ward. These areas were visited because they are among the critical areas in urban farming in Arusha. After visiting the mentioned areas, the researcher was impressed by farming activities along river banks. Then, Naura, Sekei, and Themis areas were purposefully selected to explore farming on river banks. The areas were chosen because, since the idea was to explore vegetable farming on the river banks, these were areas practising agriculture along river banks. The study involved various stakeholders, such as farmers, consumers, government officials, and community-based organisations.

2.2 Sampling and data collection methods

This study adopted a qualitative approach to generate data on farmers’ perceptions and experiences regarding farming. Data were collected in three months: from January to March, 2023. The researcher relied heavily on observation, in-depth interviews, and focus group discussions throughout the process, as shown in Table 1.

Table I: Number of interviews and their distribution among study sites and different categories of informants

Target Group	Method	Location	No. of Participants	Gender	
				Male	Female
Farmers	Interview	Sekai	5		
		Themis	10	3	2
		Naura	8	7	3
Land Planning Officer	Interview	City Office	1	5	3
Agricultural Department	Interview	City Office	2	1	
River Basin Authority	Interview	Basin office	1	1	1
World Vegetable Centre (Arusha Office)	Interview	Arusha office	1	1	
Chairpersons	Interview	Themis, Naura	2	1	
Consumers of farm produce	Interview	Arusha Market	1	1	1
Focus Group discussion with farmers	Focus group discussions	2 FDGs in each study site	6-8 in each study site		

Source: ???

This approach made it possible to assess everyday community life from the participant’s perspective (Berg 2001). Field visits were conducted in two phases. In the first phase, the researcher spent much time in the Arusha City Council to observe and become familiar with farming activities. Additionally, the researcher purposively sampled the study sites, and conducted a few interviews. During the second field visit, the researcher collected much of the data. During each field visit, the researcher stayed in the study area for four weeks.

A total of 31 interviews were conducted (see Table 1). Informants were selected purposively. The criteria used were that a person should have been farming within Arusha for at least five (5) years. More extended residents of Arusha would have a better understanding of farming and land access issues in Arusha. Therefore, such a person could provide vital information to the study. Informants were selected with the help of a Mtaa chairperson, or farmers' group leader, in each study location. Two focus group discussions (FGDs) were conducted in each area, making a total of 6 FGDs; each focus having between 5 and 7 members. Each member of the FGD was selected among the individuals who participated in the interview sessions. A review of secondary data—such as village reports, land use policy, water policy, agriculture policy, and reports from the Arusha Municipality—was conducted to supplement primary data.

2.3 Data analysis

Interviews were transcribed and entered into N-vivo software. Data processing was done using N-vivo version 11 software. The software, however, only helped to organise the bulk of raw data generated in the fieldwork. The process included coding and identifying themes. Then, a grounded theory approach was applied to data analysis, specifically open coding and constant comparison. This approach began by carefully reading data to familiarise the researcher with the data (Hammersley, Martyn & Atkinson, 1997). Here, the researcher identified the key concepts and emerging themes. After this, the researcher employed the 'constant comparative method' (Glaser & Strauss, 1967; in Walker & Myrick, 2006), which entailed finding the meanings and exploring the relations with other categories. The researcher compared and contrasted each piece of data with the rest to see whether there were similarities/differences in how farmers conducted their farming. Several themes related to interactions between farmers and government authorities emerged through coding the interviews. Some key themes that emerged include farming practices, urban agriculture, livelihoods and food security, and marginalisation of farmers. This process was followed by grouping all quotes related to each theme to form a typical representation of informants' narratives.

3. Results and discussion

3.1 Results

3.1.1 Farming practices

Farming in the study area was primarily characterised as open-space cultivation, whereby farmers grew vegetables for niche markets such as hotels and restaurants. The study showed that most areas along streams, rivers, and open spaces throughout Arusha had cleared bushes, and were used for small-scale irrigated agriculture. Riverbank irrigation was mostly market-oriented and focused on producing fast-growing green leafy vegetables such as *mchicha* (*Amaranthus*) and *sukumawiki* (*Collard*). Water is taken from the streams with buckets, watering cans, or small pumps. Both land and water rights are informally arranged. The interactions with informants revealed that most farmers in the area were poor.

Regarding gender, observation during data collection established that most individuals and vegetable farmers in the area were women; hence those interviewed in the study sites and were also mostly women. The researcher was interested in knowing why most women engaged in this farming. In the interviews, one respondent commented:

Women dominate the kind of farming conducted in Arusha. Most men do not prefer this kind of work. Vegetable farming is not an easy task. There are many activities involved. Though it is generally believed that difficult tasks are for men, here in Arusha, it is different; women do most of the farm work. Men prefer other work such as day work in industries and construction sites, or petty trade. (IDI, Woman, Naura).

This study was also interested in understanding how farmers accessed land. The respondents were asked to explain their experiences in accessing the land they used for farming. The interviews revealed that most of the lands were open spaces or areas near river banks, which were accessed in various ways. In a focus group discussion in Themí, one respondent indicated:

This area is in an open space. It is about seven acres. The area belongs to the government. Around 2000, there were government houses in the area. Later, the houses were dismantled, and the area was left open. With time, this area became a bush, and thieves hid there. Some people approached the Mtaa leaders and asked them to allow them to do farming in the area. They were allowed to use the area for free, but we are not allowed to plant permanent crops; we are allowed only to grow seasonal crops (FGD, Themí, February 2023).

Another respondent added:

This area is indeed a government area; we are allowed to do farming in this area on condition that we should be ready to evacuate any time. We are also not allowed to plant permanent crops. We are also responsible for keeping the environment in this area by planting trees along the river bank (FGD, Manka, Themí, 2023).

It was reported that farming in the area started in 2006 with about five farmers. When this study was conducted in January 2023, there were about 20 farmers in the area. Farmlands in Naura and Sekei were located along the Naura river. The Naura farmlands were found in the lower part of the river, while the Sekei farm was in the upper parts. Access to farmlands in the area was more or less the same. Both sites were open spaces close to the river banks. Farming was generally done along the river banks. When asked about how they accessed the land for agriculture, the informants noted that these were just open areas in which people started to clear bushes to farm, as one respondent said:

Farmland in Sekei is an open land close to the police quarters and border River Naura. I remember that in 1995, a few people started to clear the bushes and started small farming. Those people were mainly cultivating maize and bananas. Since then, more people have been coming to do farming in the area. Nowadays, however, most people grow vegetables (Interview, Anna, Sekei, March 2023).

Different types of crops were grown in the area. For instance, farmers in the study area cultivate various kinds of vegetables. The most preferred vegetables in the study area were *saro/sukumawiki* (*Brassica* spp.) [Figure 2(A)], *mchicha* (*Amaranthus* spp.) [Figure 2(B)], *matembele* (*Ipomoea batatas*), *boga* (*Cucurbita maxima*). *Mchicha* and *saro* dominated the vegetables farmed in all the areas in the study sites.



Saro/Sukumawiki – *Brassica* spp. **Mchicha** – *Amaranthus* spp.

Figure 2: Some of the dominant vegetables in the area

Source: Gideon, 2023

The researcher was interested in knowing which of the mentioned vegetables were preferred by farmers in the study area. The farmers said they preferred growing *mchicha* and *saro* because most customers liked them. Thus, the market for these vegetables was better than other vegetables. The respondents were also asked to explain how they accessed water for irrigation. It was revealed that farmers accessed water freely from the rivers in all the research sites. Two rivers form primary water sources for irrigation in the study area: Naura and Themí (Figure 3). River Naura was used by Sekei and Naura farmers, and Themí farmers used river Themí. The farmers used different irrigation methods, such as communal furrows/canals (at Themí) and water pumps and buckets (Naura, Sekei, and part of Themí).



Figure 3: Water sources for irrigation (A) River Naura and (B) River Themí

Source: Gideon, 2023

3.1.2 Urban farming, livelihoods, and food security

This study was also interested in understanding the contribution of urban vegetable farming to food security. Through observation and interactions with study participants, the researcher established that urban agriculture in Arusha significantly contributed to food and improved nutrition. In one FGD, an informant had this to say:

Urban farming in Arusha, particularly in the open areas such as Themis and Naura, provides a good supply of vegetables to urban dwellers in Arusha. Vegetables cultivated in the area are also sold in Arusha's hotels and restaurants. If you go to the farmers' markets, food stalls, and the street sellers, they would tell you about the contribution of these farmers to access to vegetables in Arusha (FGD, Themis, 2023).

Another informant added:

If we talk of vegetable supply in this city, small-scale farmers in the open areas have a role to play. Arusha is one of the cities with a good supply of vegetables. As farmers and residents of Arusha, we all witness this (FGD, Themis, February 2023).

This quote implies that urban farming in Arusha city was considered vital for food supply and improved nutrition. Though there are other large-scale vegetable farmers in Arusha—such as the Arusha prison—observations and interactions with informants in the city mostly showed that smallholders, such as those in Themis and Naura, contributed a lot to the supply of vegetables in the city (Figure 4). In the interviews with vegetable consumers, one consumer commented:

I have been living here in Arusha for over 15 years now. Arusha is a city with many urban farming activities. As a vegetable consumer, I can assure you that small-scale farmers in this city supply most vegetables. Go to the farmers' markets, such as Samunge, and the main market (Soko Kuu): you will find these farmers selling their vegetables. There are also several other places where these farmers sell vegetables, such as in small markets or shops (vibanda) and to street sellers. Try to walk around the city you will see by yourself (Interview, Customer, Samunge Market, 2023).



Figure 4: Vegetable sales at Samunge Market (A) and Arusha Main Market (B)
Source: Gideon, 2023

The researcher also interviewed the City's agricultural officers to understand the role of urban farming, mainly small-scale farming, on Arusha City's food security. The agricultural officer noted that the consumption of vegetables in Arusha was high; and that people in this city liked to have vegetables in their meals, which in turn promoted vegetable farming, as the agricultural officer elaborated:

Vegetable farming by small-scale farmers in Arusha is very high. It is done mainly in open spaces and along river banks. However, there are other big farmers, such as the Arusha Prison. Small-scale farmers are considered to have a more extensive supply of vegetables in this city. From our evaluations as agricultural officers, these farmers contribute much to food security and improved nutrition in this city. They are the most prominent suppliers even in the markets. And since they cultivate throughout the year, residents of Arusha can get vegetables. (Interview, Agricultural Officer, Arusha City Council)

Also interviewed were some organisations dealing with agriculture and agricultural research in Arusha. Such organisations include JICA, the World Vegetable Centre, and the Arusha office. The interviews with personnel at the World Vegetable Centre in Arusha noted that small-scale farming in Arusha was a stakeholder and drew the organisation's interest. The respondent had the following to say:

We are an international organisation researching vegetable farming. Arusha is one of our key areas because it has many urban vegetable farmers. Since our interest is to promote vegetable farming and thus improve food security and nutrition, these farmers are vital to us. If you go to the markets in Arusha, most of the vegetables are supplied by these farmers. To improve nutrition, we are now encouraging these farmers to cultivate traditional vegetables because our findings indicate that traditional vegetables are highly nutritious compared to modified seeds. The farmers are responding very well in the support for traditional vegetables (Interview, World Vegetable Centre, Arusha, 2023).

The study also indicated that farming activities enhance food security in Arusha and improve people's lives. The respondents in the study sites informed the researcher that they obtained several benefits from farming. One respondent commented thus:

I can feed my family; I can take small loans and repay them from this farm. The creditors normally want to see what kind of productive activities one engages in before they can give them a loan. So, they visited my farm, saw what I was doing, and gave me a small loan that enabled me to do what I wanted. I can pay school fees and house rent (Interview, Women, Naura, 2023).

It was revealed that farming was not such a manageable activity, but most respondents acknowledged that they benefited from vegetable farming. Most mentioned things like paying school fees, buying family food, buying clothes, and paying house rent. Also, a few reported having built houses from farming.

3.1.3 Marginalisation of farmers

This study was also interested in understanding the relationship between the urban farmers and government institutions in the study area. The respondents were asked to explain how they interacted with government institutions concerning their farming activities. Several issues were revealed from the interviews and interactions with respondents.

To begin with, the respondents were asked to explain how the government perceives their access to farmland. An analysis of the responses revealed that the local government perceived farmers in the study area as invaders who should not be farming there. In one of the FGDs, it was commented:

This area was open; since it was open, people started to dump waste. With time, the area became full of bushes, attracting thieves and robbers to hide in it, and hence, it became a dangerous area. People were even killed in this area. My husband was injured by robbers in this area when he tried to assist some robbed people at 15:00hrs. So, later on, the government decided to prohibit dumping in this area. Some people started to clean the area and do farming. So this was 1990, and since then, this area has been used for farming (FGD, Themi, February, 2023).

The above quote implies that this area was a bush, and with time, it attracted thieves as a hide-out. Therefore, the idea of conducting farming activities in the area was considered by farmers as a way of clearing the bush and thus enhancing security in the area. Though farming activities had been taking place in the area for years, and the site's security had improved, the respondents believed that the government officials did not appreciate their efforts and treated them as invaders who, at some point, should vacate the area. On the other hand, the respondents view that the government was supposed to consider them as vital contributors to the security of the area, as well as individuals who supply the city with vegetables, as put forward by one respondent:

As farmers in this area and other open areas in Arusha, we have done a lot to clear bushes and improve the area's security; even in Themi and Sekei, the same thing happened. However, we feel that the government does not appreciate our efforts. We are regularly informed that we should be ready to leave the area anytime. Leaving is not very good for us (Interview, Farmer, Sekei, March, 2023).

The researcher also wanted to understand how government officials perceived the farmers. In the interviews with the government officials, it was generally revealed that despite being at tension with formal regulations on land and water use (no land title deeds, no organisations in legal water user associations, no water permits), the use of open spaces and riverbanks by small urban farmers for irrigated vegetable production was tolerated. For the government, contributing to clearing unsafe bushy areas and increasing income and food for urban consumers was appreciate. However, the farmers were perceived as individuals who invaded the areas, had no rights, and should leave the sites anytime. In interviews, one government official said:

In these areas, people are doing their farming activities because they are not developed, but basically, they are government areas. These people are there for some time. Farming activities may destroy the land, and we make follow-ups. I think shortly, they should be stopped. We do not see much benefit from their activities (Interview, City Official, January 2023)

The respondents were also asked about how the government considers them concerning their access to irrigation water, and respondents mentioned that the government regards them as illegal water users. One farmer respondent in Naura had this to say in in this regard:

We indeed use water from the river for irrigation, but we are considered to be using the water illegally. We were told that we should ask for a permit to use the water. We are also supposed to pay an annual fee based on the quantity of water we use. But let me tell you, how is this possible for us, poor women who cultivate small lands to earn some income to support our families? Refusing us from using water is unfair; our income is meagre to manage such payments (Interview, Farmer, Naura, February 2023)

An interview with the Water Basin officials noted that the office does not recognise urban farmers as legal users of the water they use for irrigation. It was reported that their access to water resources is illegal, as the following comment from the interview indicates:

There are also smaller users of water resources who are not registered but can access water from the river or make small canals. Such users do not pay for the water they use. It is not easy to monitor some of these users. Some, for example, use buckets to water their small farms. For instance, farmers at Sekei or Naura use buckets and water pumps to water their plots. Some water users may take advantage of available water user associations - they can find a way to access water from other water user associations, such as making a small canal and accessing water from some users who are members of a particular water association.

On the other hand, the water crisis has been critical since July, when user conflicts were visible. Most of the users in the area of your study have no user rights; we do not recognise them. They take advantage of registered users and sometimes cause conflict with our registered users (Interview, Water Official, February 2023).

This quote implies that anyone who wants to use water from a source such as a river must have a water user permit. In Arusha, most irrigators, particularly large-scale ones such as the Arusha Prison, had water user rights. However, most urban irrigators in open spaces, such as in Sekei and Naura, had no user rights. According to the regulations of the Water Basin Office, irrigators with informal access to land use could not be granted water user rights. In this regard, irrigators in the study area did not qualify for water user rights. As indicated in the quote above, registered water users paid more attention to accessing water resources than non-registered users. Thus, non-registered water users were perceived as causing competition with registered users who had the rights to access the resource.

The marginalisation of urban irrigators in Arusha was seen in ways that large-scale investors were given due priority to access to water. In interactions with respondents, it was noted that small-scale vegetable farmers perceived large-scale water users as having more power to access and control water resources. The respondents, for example, mentioned that during the dry season, when the river's water flow is low, the Arusha Prison or the military base typically block water flow in the rivers. Farmers at Naura, for example, had approached the government several times for assistance on the matter in vain. Though urban irrigation in Arusha had grown extensively (and is visible in most river banks, for example), government institutions responsible for this sector did not seem to pay attention and/assist this kind of urban farming.

The respondents were asked if they accessed agricultural extension services from agricultural officers, and most replied that they did not. The following are some of the views of respondents:

I have been farming in this area for six years now. I have never seen an agricultural officer in this area. We do our farming traditionally, and we have not seen them; but if they could visit us, they could notice something and advise us on ways to improve our farming (IDI, Yohana, Sekei, March, 2023).

.....

We do not get any government assistance. For example, I have never seen any extension officer in this place. We normally share knowledge about farming, but we have no agricultural officer to help us. When there is a problem with our crops, we normally approach the agricultural shops to seek advice and buy products. Working closely with agricultural shop experts is how we do our farming (IDI, Mama Dan, Themi, January, 2023).

This response implies that despite the importance of urban farmers in food security (evidenced by their farming activities throughout the city and their supply of vegetables in markets), little attention has been paid to them. Interestingly, most respondents at Themi, for example, said they had never seen an Agricultural Officer despite Themi being located very close (about two kilometres) to the Arusha Municipal Agricultural Office.

4. Discussions

This study aimed to understand how farmers in irrigated farming in Arusha conducted their farming and interacted with government officials. Through interviews, we found that farmers introduced irrigated agriculture in open areas and along river banks, and used such technology as small water pumps and buckets to irrigate their farms. Though they did not receive assistance from agricultural extension officers, they shared experiences and, in some cases, received advice from agricultural shops. Sharing experiences enabled them to run their farming, supply Arusha city with vegetables, and earn some income.

As indicated in the findings, access to land and water resources was informal. The farmers took advantage of open spaces, which they cleared and farmed. They also cleared bushes, which were considered to threaten security. Farming in the study areas contributed to the food supply in Arusha and improved the farmers' livelihoods. Studies from other places have also indicated that small-scale farmers and farmer-led irrigation initiatives significantly contribute to food supply and security (Woodhouse et al. 2017; Peters 2013; Woodhouse, 2012; Birner & Resnick, 2010). For instance, Birner and Resnick (2010) noted that sub-small-scale farmers' food supply dominates SSA. Woodhouse et al. (2017) also suggest that small-scale farmers are behind a more rapid expansion in irrigated production than previously assumed.

The study has also demonstrated that government officials have not paid due attention to small-scale irrigation farmers in Arusha as has been the case with large-

scale farmers in many parts of Tanzania. For example, their informal access to land was considered a criterion to disregard them. The farmers' access to water for irrigation was also regarded as illegal, and their actions were considered an hindrance to the access to water by legal users; i.e., those with water user permits. Other researchers have also noticed the tendency to ignore or marginalise urban or farmer-led irrigation practices (Schmidt, 2016; Mdee & Harrison 2019). Mdee and Harrison (2019), for example, assert that African farmer-led irrigation is unrecognised or still poorly accounted for. The focus on big-scale state or public-private irrigation schemes means that small-scale irrigation activities predominantly occur outside formal governance mechanisms, hence they are deemed illegal. In other words, the problem of marginalising urban irrigators lies in the policies being designed based on normative ideas of how irrigation should be managed in theory rather than dealing with existing practice and capabilities. Marginalised farmers are "... farmers who have thrived at the margins of state planning" (Venot et al., 2021). The state has not recognised the contribution and role of these farmers in development and food security. In Tanzania, irrigation is primarily discussed in terms of schemes and the need to attract private investment. Therefore, traditional irrigation can only be considered when it is improved and integrated within formal and bureaucratised water management systems (URT, 2010).

The Tanzania irrigation policy pays much attention to large-scale commercial irrigated farms' by promoting and developing new irrigation schemes and appropriating irrigation technology (URT, 2010). Even though the policy recognises the growing urban irrigated agriculture, it does not provide any strategic plans on how this kind of irrigation should be managed and supported. As such, urban irrigation initiatives by small-scale farmers may cause health hazards, over-stress domestic water supply, and interfere with urban planning. Notwithstanding, farmers in Arusha were marginalised in access to agricultural extension services. As demonstrated in the findings, most respondents never saw or received assistance from agricultural officers; instead they relied on help from fellow farmers or agricultural shopkeepers.

The use of political ecology in this study enabled the study to reveal the relations between farmers in the study area and the state. As indicated in the findings, small-scale farmers were not given due consideration; instead, they were regarded as individuals with no farm rights and illegal water access. The lack of formal access to land was considered a criterion to disregard and marginalise them. The political ecology theory helped to uncover that state policy tends to favour agricultural modernisation discourse in which traditional farming and small-scale farming are supposed to be transformed into modern agriculture, characterised by mechanisation and modern irrigation schemes. In this way, small-scale farmers like those in Arusha are dismissed and denied rights to access vital services such as water and agricultural extension, even though they significantly contributed to food security, nutrition, and improved livelihoods. This marginalisation is systematic because even the national irrigation policy,

when articulating irrigation plans, discusses improved irrigation schemes, modern irrigation schemes, and formal access to water resources. The question of small-scale farmers and farmer-led irrigation is redundant in the policy. The irrigation practices of these farmers are regarded as "... contributing substantially to water losses and overall poor performance" (URT, 2010: 16).

5. Conclusions and recommendations

The findings of this study are significant in shedding light on the fact that farmer-led irrigation has a far-reaching significance on the well-being of these farmers and enhanced food security. Importantly, in the context of the study area, and Tanzania generally, the government has neither recognised nor appreciated their contribution. As noted in the findings, small-scale irrigation farmers continue to be marginalised instead of being valued and supported. Based on the fact that irrigated farming has a significant contribution to food security and improved social well-being, including those in informal (informal since their access to land and water resources was a criterion to the category) irrigation agriculture is imperative for the country's socio-economic development. Hence, this study calls for the government to revisit its conceptualisation of these farmers and find ways to improve their farming, instead of disregarding and marginalising them to its detriment.

Ethical approval: All procedures in studies involving human participants were within the ethical standards of the institutional and national research committee, and the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. This article does not contain any studies with animals performed by the author.

Informed consent: Informed consent was obtained from all participants included in the study.

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