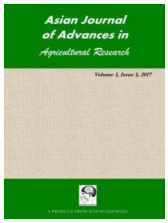

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The Social, Economic and Health Impacts of Urban Agriculture in Zambia

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Authors' contributions

This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.

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ABSTRACT

Urban agriculture practices are on the rise among the Southern Africa populations bringing with it positive and negative impacts. Nevertheless, the impacts of urban agriculture over Southern Africa cannot be equated to an individual country due to varying characteristics of each nation such as: national policies, geographic location, context of urban agriculture and the socio-economic and political conditions of the area. As a result, this paper, focusses on one nation only, in particular, Zambia. Agriculture in Zambia is vital for economic growth and poverty reduction, mostly focusing on rural areas rather than urban locations. Therefore, there is not sufficient knowledge on the impacts that urban agriculture brings to its urban populations. In this regard, this paper investigates the benefits of urban agriculture in Zambia, with a specific focus on the social, health and economic impacts on the Zambian urban population.

Keywords: Food security; impacts; urban agriculture; urban farming; Zambia.

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1. INTRODUCTION

Mougeot [1] defines urban agriculture as "*an industry located within (intra-urban) or on the fringe (peri-urban) of a town, a city or a metropolis, which grows and raises, processes and distributes a diversity of food and non-food products, (re-) using largely human and material resources, products and services found in and around that urban area, and in turn supplying human and material resources, products and services largely to that urban area*." From the above-mentioned definition of urban agriculture, it can be said to contribute to various socio-economic and health benefits to the population in the cities, moreover contributing to food access, nutrition and food security [2,3,4].

A study by Crush et al. [5] on the place of urban agriculture in cities of Southern Africa reported on the benefits of practising urban agriculture among the cities of the southern populace. Accordingly, Crush et al. [5] provide a general overview of the scope and impacts of urban agriculture for all cities within southern Africa. Conversely, some authors argue that the extent and or impacts of urban agriculture of a region, for example, southern Africa, cannot be equated to an individual country due to the varying characteristics of each country [6]. The varied characteristics include: the context of urban agriculture, geographic location, individual country land policies, socio-economic and political conditions of the area [6,7]. In this regard, this paper focusses on Zambia, with the aim of providing a review on the documented impacts of urban agriculture in the country.

Zambia considers the agricultural sector to be of the highest importance for economic growth, food security and poverty alleviation [8,9]. The main focus areas of agriculture development are the rural areas rather than the urban locations [8]. As a result, most impacts of urban agriculture are rarely documented. Over, the past years, the practice of urban agriculture has increased in the country, especially among the poor urban populations [10], and mostly involves the production of crops, livestock and tree crops on plots or open public and private land rented within the city and peri-urban areas [3,5]. Most cultivated crops include maize and vegetables [11]. The increase of urban agriculture in Zambia prompted to investigate its impacts within the Zambian context, with a specific focus on the social, health and economic impacts. This review will add to the knowledge on urban agriculture in Zambia.

2. METHODOLOGY

A systemic literature review was conducted over three databases (EBSCO Host, Google Scholar and Scopus) using the University of Cape Town library services. The search terms included 'Urban agriculture OR Community-based farming OR Urban farming': Impacts of urban agriculture OR urban agriculture as a livelihood strategy, namely, the growing of crops for sale OR consumption: and the location term used were 'Zambia OR Southern Africa OR Developing country'. From the relevant literature found, the researcher also used the citations from the articles and listed in the bibliography to find other relevant literature important to the study in identifying the socio-economic and health impacts of urban agriculture in Zambia. After that, all the characteristics that emerged from the literature were listed and then coded into three manageable themes of social, health and economic impacts and then analysed.

3. DISCUSSION

3.1 The Impacts of Urban Agriculture in Zambia

The section discusses the economic, health and social impacts of urban agriculture in Zambia found in the literature. For the purpose of this review, sub-categories are utilised to aid structure the discussion of each of the main impacts of urban agriculture in Zambia.

3.2 Social Impacts

A social impact is defined by Golden [12] as the "*effect and or influence of activity on the social fabrics of the community and the welfare of the families or individuals*". Additionally, Golden [12] states that social impacts in urban agriculture that are of significance should "*incorporate the impacts that urban agriculture has on human relationships and interaction with each other and the built environment*". Thus, for the purpose of this review, the definition and approach of social impacts illustrated below are guided by Golden [12].

3.2.1 Access to land

The first social benefit of urban agriculture is that it provides an avenue for individuals to access

land within the cities which is usually not available for agricultural purposes. In most instances, the private enterprises own the land in the city, thus making it impossible for the urban people, mostly the poor, to access land for cultivation [10,13]. Fortunately, Simatele et al. [10] through their study in Lusaka city, consisting of Chilenje Township, Seven Miles and Garden compound as study sites, highlighted two methods in which land was accessible for urban agriculture within the city.

Firstly, Simatele et al. [10] cited that the interested individuals/ households were able to access land through renting of land from another individual (whether a farmer or not) who is leasing out land for agricultural purposes. Secondly, crop sharing is the other method of accessing land [10]. Crop sharing practice occurs when a person who has access to land and finances makes these available to an individual farmer who wants to farm in the city [10,14]. In return, the farmer that received the finances and accessed the land pays back the land owner in monetary terms and a proportion of the crop produce after harvest [10,14]. However, between the two methods of land access, the authors suggest that crop sharing was the least practised of the two methods [10]. Despite the possibilities of having access to land, Hampweya [11] argues that most people that practise urban agriculture are the urban poor who do not have access to credit, thus do not have money to pay to rent land for agriculture purposes therefore it can be deduced that the extent of this social impact is minimal in Zambia.

3.2.2 Recreational benefits

The second benefit is that urban gardens create spaces for recreation to households/individuals. In particular, a study by Hampweya et al. [15] in Ndola, Copperbelt Province reported that 12% of the urban households practised urban agriculture as a hobby, thus providing them with an activity for relaxation and leisure. Similarly, Smart [16] emphasised that urban agriculture is a good source of unwinding and relaxation for the middle and upper-income earners. In addition, Smart [16] stated that some people take up urban agriculture as a lifestyle choice because it symbolises the level of maturity of an individual. Specifically, it is seen as the stage of settling down (married stage) in a person's life. Lastly, Smart [16] further shows that some people who practice gardening as a hobby do so because of past experiences in farming, thus continue to grow their produce from their home gardens.

3.2.3 Reduce safety and beauty of the city

Although the positive social impacts of urban agriculture exist in literature, the other reported social impact is negative. Accordingly, Smit et al. [17] reported that urban gardens reduce the level of safety in the urban areas due to the fields providing a haven for thieves to hide, thus posing a threat to the safety of the community. Additionally, other researchers–[18] are of the notion that urban agriculture is viewed as a public nuisance to the environment and the neighbours. There is plausibility in this argument in that the presence of livestock could cause air and noise pollution to other people in the community due to living in close proximity to both the animals and human beings [18]. Furthermore, conflicts may arise between neighbours when the livestock of an individual eats the vegetables of another farmer in their field.

Finally, Smart [16] discovered that some people perceive that gardens in the city reduce the beauty of the city. Specifically, Smart [16] shows compelling evidence that the urban population link the practice of agriculture in the city to rural areas. In other words, people view urban agriculture to make the city look like a village (rural area), thus removing the beauty of it when agriculture practices continue in the area.

3.3 Economic Impacts

Some studies in the urban cities of Zambia have reported some significant economic benefits to the people practising urban agriculture [19,20,21,22]. The researchers state that monetary benefits play an important role in income generation and savings to the low-income urban populations, rather than the high-income earners. The following are the economic benefits of urban agriculture listed from literature:

3.3.1 Economic savings on food

Various researchers indicated that urban agriculture saves participants' money on their food expenses [10,22,23]. The food produced from the gardens/fields is consumed within their homes, thereby reducing the budgeted amount of money required to buy household food. Moreover, it has been reported that the household harvests and eats some vegetables

from their fields rather than going to buy them from the markets [10,22,23]. As a result, the monetary savings on food purchases is diverted to other household services such as health and education. For instance, the evidence from literature from studies carried out in Garden Compound (urban informal township), Chilenje (urban formal and organised township) and Seven miles (peri-urban) of Lusaka province, quantified the costs of food savings of the participants as per location [10,22]. In relation to the Garden Compound, the authors [10,22] indicated that the individual gardeners made a saving of US$15-35 per month on food expenditure because 75% of vegetables eaten in the household was from their gardens. Secondly, the farmers in Chilenje Compound saved at least US$ 100 per month due to that fact that 65% of leafy vegetables consumed in the homes were from the gardens. Lastly, the participants from Seven Miles consumed at least 96% of their agricultural produce which included both livestock and vegetable produce. Consequently, the authors reported that the farmers saved money amounting to US$ 500 which was equivalent to two months' salary of a civil servant at the time of conduction of the study [23].

3.3.2 Source of income

Another economic benefit is that urban agriculture provides a source of income through the sale of crops [10,18,24,25]. Simatele et al. [10] argue that the income generation benefit of urban farming is most significant among the urban poor because most of the urban poor have less disposable income and other assets. Furthermore, the authors argue that the poor lack formal employment or any small business that can supplement to household income for other services required by the household [10]. This leads to the conclusion that the income generated plays a vital role for the poor to purchase other required household services. Other sources of income reported in the literature included the leasing of land and crop sharing to people that want to cultivate in urban areas [10,13].

Conversely, other researchers show that urban agriculture may lead to losses in household income and increases in household food expenditure [22]. However, their theory only holds true in cases of extreme weather such as droughts and floods. In particular, the researchers [22] studied the impacts of excessive drought on urban agriculture between the years 2000-2005 in 3 study sites of Lusaka city. On the first study site, the authors [22] reported that farmers in Garden compound experienced low yields due to drought, which led to the household income loss of at least 40%. Also, food shortages were reported to have increased by 65% in the area.

Additionally, the authors demonstrated that the farmers on the second study site, Chilenje Township, lost at least 35% of their income from the droughts that resulted in poor crop harvest [22]. Furthermore, household food expenditures increased by 45% in Chilenje. Finally, the authors reported that the farmers in Seven Miles lost 90% of income generated from agriculture and their level of food insecurity increased by 30% [22]. In all, extreme weather change adversely impacts agricultural yields, leading no less crop for sale and household consumption.

3.3.3 Job creation or source of employment

The last economic impact is that urban agriculture provides a source of employment to some of the urban populations in Lusaka and Copperbelt provinces [6,10,21]. For example, Smart [16] identified that land owners of the fields/gardens require additional labour to take care of the gardens. Therefore, the landowners employ either seasonal or full-time employees depending on labour needs. Seasonal employment is usually available during land preparation and harvesting periods. Most, low-income areas employ seasonal workers, while high-income earners will employ a full-time worker to assist with the garden or farm. Furthermore, Smart [16] quantified that urban agriculture employed approximately 23% and 45% of full-time and seasonal workers in the Copperbelt province, respectively.

3.4 Health Impacts

The following are the positive and negative health impacts of practising urban agriculture in Zambia as documented:

3.4.1 Food access and security

Urban agriculture has proven to be an effective adaptation or coping strategy practised for improving access to food to urban areas that are food insecure [10], most especially among the urban poor who lack formal employment or any other alternative sources of income generation to purchase food [10,13,16]. In other words, urban

agriculture contributes to the food basket of the household through the provision of traditional and exotic vegetables required at home [22]. Additionally, some of the sold agricultural produce provides a source of fresh vegetables on the market to people in urban areas that are unable to grow their own vegetables.

With regards to food security, the study by Smart et al. [6] demonstrates that approximately 63% of the respondents in the Copperbelt province perceived themselves to be food secure due to practising urban agriculture. Furthermore, other researchers [15] showed that households in Ndola perceived themselves to be food secure for varied time periods because of practising urban agriculture. In particular, 30% of the participants cited themselves as food secure for 10-12 months, 32% stated having no food insecurity for 6-9 months and finally, 12% had food security of less than three months. In all, urban gardens provide access to food to populations that practice urban agriculture and to nearby markets for sale. Also, farmers that practice urban agriculture perceive themselves to be more food secure.

3.4.2 Food and nutrition literacy-capacity building

Another important positive impact recorded in literature apart from the production of food is that urban agriculture is used as a development strategy to reduce poverty through food and nutrition literacy in urban areas [16,26]. In particular, the government ministries (Ministry of Agriculture and Ministry of Health) and Non-Government Organisations (NGOs) promote urban agriculture as a development strategy through targeting malnutrition and food security. This is done especially to the most vulnerable urban poor populations, of people living with HIV/AIDS (PLWHIV) and vulnerable children [26]. Moreover, in her study of urban agriculture and economic change in Ndola, Kitwe and Luanshya, Copperbelt province, Smart [16] discovered that some NGOs had a programme of vegetable gardening which had been running for over two years. The produce from the gardens was used to build the capacity of the communities by teaching the population on food preparation techniques through home economics classes, that is, food, health and nutrition classes.

In addition, Smart [16] reported that the home economics classes also teach other lessons apart from food preparation, such as, the importance of crop diversification to the urban vulnerable population. In particular, maize is the staple food, and in most instances usually, the only crop grown among the urban populations. Thus, through the classes, the author showed that the NGOs encouraged the communities to grow crops which have nutritional and medicinal benefits to one's wellbeing, rather just growing maize [16]. For example, Moringa trees and amaranthus vegetables are promoted because consuming the leaves from those sources can boost the immune system of PLWHIV and control malaria, respectively [26].

3.4.3 Threats to human health

Various researchers reported that urban agriculture threatens human health due to diseases, namely cholera, dysentery and typhoid that have been linked to the consumption of vegetables irrigated with water from untreated sewer ponds [27,28,29]. The farmer's use of untreated wastewater is due to two reasons: The land near sewer ponds is free and easy to access because the land is not privately owned: and the lack of access to the water required for crop growth off the rain season. For instance, Simatele et al. [10] showed that at least 29% of the respondents in the Garden Compound, Lusaka city resorted to water their gardens with untreated wastewater from sewer ponds. most especially during the dry season because there is no available source of safe water to utilise due to the lack of infrastructure. Therefore, sewer ponds provide readily available water to the people practising urban agriculture. Consequently, the authors reported that various human health cases of dysentery and cholera in Garden Compound were linked to the consumption of vegetables which are grown in fields where the application of sewage and human waste occurred.

Similarly, Smart [16] illustrated that approximately 96 % of the urban respondents in the Copperbelt province mentioning that they cultivate their food due to the rising concerns of unhygienic and inorganic produce available on the market. Moreover, Smart [16] further stated that the cities of Ndola and Kitwe in the Copperbelt reports food safety challenges due to the rise in the number of human cases of typhoid and other health diseases at the hospitals that have also been linked to the consumption of vegetables irrigated with water from sewage ponds.

Apart from the adverse health impacts that arise from the use of water from sewer ponds, the use of irrigated water contaminated with heavy metals in highly industrialised urban sites has negative effects on human health to people that eat the vegetables [21]. Kapungwe [28] agrees with this view through a study in which he investigated the levels of heavy metal contamination of soils, water and crops in Mufulira and Kafue districts of the Copperbelt and Lusaka provinces respectively. He specifically, [28] tested the presence of heavy metals, namely cobalt, lead, nickel, copper and cobalt, in soil, water and plants using the atomic absorption spectrometer method.

In his results, Kapungwe [28] showed that the level of the heavy metals in the water, soil, and plants near the industrialised areas was above the critical threshold which led him to conclude that the use wastewater contaminates the soil, water and plants in the areas. In addition, the growing of vegetable in soils irrigated by water from heavily industrialised areas causes serious health impacts to the urban population. Furthermore, Sanyal [21] stated that the improper use of pesticides on crops consumed in urban gardens would lead to more cancer cases in humans in the long term. Lastly, with regards to livestock and human interaction, Thornton, et al. [18] highlighted that human beings are at risk of developing of zoonotic diseases. The zoonotic ailments are transmitted from animals and birds to people that live in close habitation to each other.

4. CONCLUSION

The literature review showed that urban agriculture has various positive and negative social, economic and impacts to urban populations in Zambia. The positive impacts of the practice included: income generation, source of employment, increased food access, food capacity building, health and nutrition classes, the source of recreation (hobby), economic savings on food and improved access to land. The negative impacts included: the reduction of safety in urban areas and beauty of the city and reported cases of threats to human health due to cases of cholera, dysentery and typhoid that is linked to the consumption of vegetables that have been irrigated with untreated wastewater from the sewerage ponds. Another threat to human health mentioned would arise from eating vegetables that have been grown and irrigated with water from highly industrialised peri-urban areas. The water and soils in industrialised areas were reported to be contaminated with heavy metals leading to negative health effects on the populations.

In all, urban agriculture provides some social, economic and health benefits to the population in Zambian cities. Despite the view from the R_SNDP [8] that agriculture contributes to poverty alleviation, food security and employment opportunities [13,30,31], the practice is mostly considered as an activity to supplement food security, thus would not adequately contribute to the social, economic and health benefits of the populations. In addition, the urban populations do not view urban gardens/fields as the priority to solve the problems of poverty alleviation, food security and unemployment [10]. In other words, the urban populations perceive that urban agriculture plays a critical role as an adaptation or coping strategy to the urban poor, implying that as soon as other alternative sources of income are available, the practice can be dropped.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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