

**Review Paper**

## Issues and Concerns on Urban Agriculture and its Potential Contribution to Food Security in Zimbabwe

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**Abstract**

Poverty and food insecurity are some of the problems facing the urban population in Zimbabwe today. Urban agriculture holds promise at solving these intractable problems. Urban agriculture is a sustainable form of agricultural activity that has significant potential for alleviating malnutrition and food insecurity in Zimbabwe. The demand for food due to increased urbanization is predicted to grow faster than production resulting in a growing food deficit and insecurity in urban areas. Due to recent trends where urbanization is becoming a major socio-economic factor driving the increasing demand for both crop and livestock products due to concentrated rapidly increasing population, rising income and change in life style, food production need to be improved. To satisfy the food needs of the growing urban population new approaches to food production need to be employed. The discussion attempt to explore the role of urban agriculture in meeting the food demands of rapidly increasing urban population. It is against this background of increasing urban poverty that this discussion puts forward some suggestions for promoting urban agriculture. Urban agriculture should be considered as a normal component of agriculture system and urban development, which has the capacity to improve nutrition and food security. It is very much associated with increased food security as it lends itself to the majority of urban poor. Urban agriculture has diverse economic, social and ecological functions and can be valued as one of the agricultural sectors having enormous untapped potential to contribute to food security. The rapidly growing urban population will drive major social and economic changes which will lead to evolution of transformed urban food production systems as the most efficient and sustainable means of food production. Urban agriculture will be the new approach to food production, however best provided incentives to urban farmers are credited by formulating urban policy fair to urban food producers. Strategies which foster gender equality in urban food production will impact positively on food production, which may translate into expanded food production to meet the needs of the growing urban population for the majority of residents are failing to make ends meet. On the other hand urbanization has created a growing affluent population which demands more food and a greater variety. Hence, it is envisaged the promotion of urban agriculture will address the nutritional needs and food security of the urban poor. Given the economic, social and ecological advantages of urban farming it is arguably deserves even greater attention than the present scenario. This discussion explores the opportunities of urban agriculture as an alternative food production source in solving the perpetual food insecurity challenges in Zimbabwe.

**Keyword:** Urban Agriculture, Poverty, Food Security, Zimbabwe

**Introduction**

The Zimbabwe's population stands at 12,619, 600, with an estimates annual growth rate of 4.357 per cent (CIA, 2012). In total 62,6 percent of the country's households are poor (Financial Gazette, 2013), of this figure 38,2 percent are in urban areas and can go for several days without a decent meal (Mhishi, 1998). This current and projected population trend – growing population require in turn appropriate responses to the anticipated pressures on food production. Importantly, the unprecedented rate of poor urban population growth will have important repercussions on nutrition and food security. This discussion explores the opportunities of urban agriculture as a complementing source of food production in an attempt to solve the food insecurity challenge in Zimbabwe, taking into account its untapped diverse economic, social and ecological functions. Urban agriculture can be defined as the growing of plants and rising of animals for food and other uses within urban and peri-urban areas, and related activities such as the production and delivery of inputs, and processing and marketing of products (Wortman and Lovell, 2013). Population trends in urban areas will create new models of food production, marketing and consumption patterns. The demand for food products will definitely increase due to increased population in urban settings hence the ability to maintain food self sufficiency and food security within urban areas depend on the refocusing on alternative source of food production such as urban agriculture.

### Poverty alleviation and enhancing food security in urban areas through micro livestock farming

Micro livestock in urban areas of Zimbabwe have potential economic, social and environmental advantages over classic livestock rearing. There are a number of positive benefits for farmers who engaged in micro livestock farming. Micro livestock keeping should not be seen as a rival to classic livestock rearing, but as a complement to other livestock farming activities. However, micro livestock can be highly productive in areas that are not suitable for large animals, especially where land is limited. In some parts of Southern Africa classic livestock rearing may not be suitable, while micro livestock may thrive. Use of micro livestock reduces the pressure to alter the environment in order to accommodate classic livestock rearing. Farmers engaged in micro livestock farming accrue multiple benefits including provision of owners with a range of products which including the major one enjoying the health benefit of animal products. Suitable for women and children, small-scale farming of certain breeds of rodent is now widely seen as a valuable weapon in the fight against malnutrition and poverty. It provides protein to the poorest families, especially children who would otherwise eat no meat at all in cultures where tradition dictates that the head of the family should take priority. Due to their small size micro livestock may be readily converted into cash and can be well integrated into the crop livestock integrated systems. Backyard micro livestock production can be a major contributor to a more balanced diet for communities. Households that practice micro livestock farming are more likely to have access to a wider variety of nutritious animal products. Micro livestock can provide people with a primary or supplementary income. They offer prospects of a regular income source once the volume of production exceeds what the resource poor farmer wishes to use for household consumption. Micro livestock keeping is an affordable solution for women, young people and landless farmers, since it generally requires little space - it can even be practiced in the corner of a room - and only needs basic equipment (a few cages) which is cheap and easy to make for resource poor farmers. Classic livestock rearing such as cattle, sheep, and goats require a lot of land, which is increasingly becoming scarce in Southern Africa. Breeding micro livestock - smaller animals not traditionally used as livestock - could be the solution to scarce land. Micro livestock have considerable advantage given the current feed resources scarcity due to climatic variability, which is in turn linked to the soaring cost of commercial animal feed. Most of the small livestock can adapt well to less feed, reproduce very quickly, require little in the way of care and have good resistance to disease. Most micro livestock are prolific producers and thrive in feed scarcity farm environments. This means micro livestock can improve total yield and supply diversity of animal products in away which is compatible with limited feed resources. Vulnerable groups, mostly women and children essentially may raise the household incomes, improving access to protein nutrition and enabling local livestock products to compete better with low price livestock imports. The enjoyment of outdoors, exercise, learning about nature, working with friends and neighbors on improving their livelihood is also indirect benefits of micro livestock farming. Many types of micro livestock species remain important for the poor and landless, especially during times of famine and insecurity or conflict, when normal food supply mechanisms are disrupted and local or displaced populations have limited access other forms of nutrition. Even in normal circumstances, these small animals are often important in complementing protein supply to provide a balanced diet, and wild species may often be important in this respect. Limited research conducted on opportunities for micro livestock production have recognized the species' smallness as desirable but not much literature exists acknowledging micro livestock as part of a broader solution to food security. Basic research has explored the potential for micro livestock as major alternative protein source to complement the provision of animal product from conventional livestock. It is argued that the smaller the animal, the more likely it will be kept close to home where it will be used for the benefit of the family (De Wilde, 1991). In this way, it is expected that by encouraging the production of micro-livestock at the household level, deficiencies in protein intake can be managed in poor rural communities. Furthermore, having a diverse range of livestock production activities in which to draw an income is also essential to the vitality of rural household's poverty alleviation and food security. Micro livestock often do not have to be fed, do not require substantial labor inputs and do not require access to land beyond the backyard. The sale of individual animals can provide small cash sums without threatening household capital in the way that the sale of larger animals does. Micro-livestock are believed to present an opportunity in which by-products, breeding stock, meat products and other intangibles (e.g. increased knowledge of animal husbandry) can be exchanged for cash or in-kind. Micro livestock species are associated with small body size, moderate and management (Akinnus, 1998). Smaller animals tend to breed more quickly and reach sexual maturity at a younger age than large animals. The small size is undoubtedly one of their most significant assets since it makes it possible to produce and manage on small area and in cluster (Thys, 2001). They have shorter gestation interval and are prolific. High numbers of progeny are useful in ensuring both the sustainability of production, and for income generation for the resource poor farmer. Due to shorter generation interval households could sell excess young ones, breeding stock, or use older animals for home nutrition. Alternatively, due to their small size, the poor resource farmer could increase the number of animals held at a given time without necessarily needing large amounts of extra land, and sell the animals when deemed most beneficial, providing a steadier source of income. Mini-livestock can make an important contribution to increased food security because of its small scale, indigenous and flexible nature and because women are likely to be very much involved in the routine management of the animals (Hardouin, 2003).

Micro livestock are well adapted to local conditions are partly resistant to many of the disease and parasites, and have the ability to survive limited feed and water shortage. These characteristics have become genetic for the simple reason that they have been acquired by natural selection over hundreds of generations. In my opinion these characteristics are essential for successful livestock production in the context of climate change. Africa still has an abundant micro livestock genetic pool; however the large reserve in the

smallholder sector face the danger of being wiped out by the frequent droughts as a result of climatic variability. The merit of the micro livestock apart from their ability to adapt to stressful environment is a valuable asset to the smallholder farmers as they could provide their basic needs. The group will survive the increased temperatures, feed resource scarcity. The serves to point to the fact that intensification of micro livestock production would be a viable option in the context of demand for animal protein where conventional livestock species production may be vulnerable to high input. There is need to set new standards for sustainability of micro livestock. Some of the micro livestock attributes which are not considered in this breeding situation such as smallness and low maintenance cost may be valuable to marginalized rural households. The ability to graze and browse a wide range of forage species which may be unpalatable will be a necessary adaptive characteristic in micro livestock. Micro livestock are smaller animals which have less maintenance requirement which will be paramount in the event of scarce feed resources. Despite the large numbers of micro livestock, information on micro livestock research related to climate change is scarce and often unavailable. Largely as a result of prejudice and ignorance of the importance of micro livestock to farmers in the smallholder farming sector, there had been little research on productivity. On performance alone it is difficult to understand why micro livestock has not reached a position of importance in livestock production. The choice of micro livestock production may increase the adaptive capacity of resource poor livestock farmers because the goat has a greater effect on the ecosystem than other animal species. They are numerous in Africa and could provide substantial quantities of animal protein. However their production is based on age-old husbandry system which need to be gradually modified in order to actual respond to crisis in protein provision. Given the considerable hardy characteristics of micro livestock their promotion will go a long way to facilitate livestock production coping with stressful environment as a result of limited resources. Most micro livestock require little capital or labor, provide an inexpensive, readily palatable meat, some have no odor and are suitable for keeping indoors. Rural poor farmers raise them to supplement diets based on grains and vegetables.

Utilization of micro livestock can be the basis of development programs linked to human nutrition component. The previous developmental programs had no active nutritional component as part of the poverty alleviation and food security. Micro livestock production may focus on hopefully protein consumption by the vulnerable groups and income generation and increasing the intake of meat to improve quality of diet. The widespread use of poultry in Southern Africa villages demonstrates the importance of small, easily managed, household livestock. Small size, the ability to forage for themselves, and a natural desire to stay around the house put chickens, ducks, guinea fowl, and other micro livestock among the most vital resources of rural communities. Scratching a living out of the dirt, dust, ditches, and debris, these often-scrawny creatures are a resource to be given greater attention if food insecurity is to be avoided. For the most resource poor farmers, micro livestock may be the only source of meat during much of a lifetime. The climate change influence through gas emissions resulting from use of large animals is well known. Micro livestock, in contrast, have insignificant gas emission which can cause ozone layer depletion.

### **The role of women in urban agriculture**

Promoting urban agriculture and poverty reduction continues to be a challenge in Zimbabwe. One of the major reasons for such a state is discrimination of against women who are the custodian of urban food production and food security in many urban areas. This is on the backdrop that women constitute the majority of urban dwellers. The unavailability of resources to urban women to ensure that they have means necessary to participate in urban agriculture development initiatives and enhance food security has been inadequate has been a major challenge. If there are any urban agriculture projects are often designed and implemented without fully understanding the potential for involvement of women to develop sustainable livelihoods that are necessary for the alleviation of poverty and enhance food security. This lack of consideration often leads to most poverty alleviation programs being inaccessible to urban women which has result into food insecurity and increased poverty in urban areas. Involvement of women in urban agriculture production issues can contribute to reduced vulnerability, increased food security and accelerated improved income in households. Strategy which involve women participation in urban agriculture should be instrumental in ensuring food security. The planning and implementation of urban food production initiatives to improve food security, gender sensitive policies are proposed, which target women as focal point of urban food production. Women should become increasingly important and can have a tremendous influence on achieving the primary objective which should be food security. Women involvement should be accompanied by changes in social values and attitude towards women. The critical role of women in urban agriculture and food production have been compromised due to the fact that there has been comprehensive policy to support urban agriculture. The relationship between women and the agriculture revolves around their concerns for providing family food security (Popin, 1994). Training can be leveraged to aid in new livelihood development for women living in urban areas who lack the resources necessary for agricultural livelihoods. Targeted and deliberate action in the form of comprehensive education and training of urban women with special focus on the urban poor women have positive implication on urban food production. High priority should be attached to education and training of urban women as a possible avenue to reduce poverty and enhance food security. The need to set up gender sensitive training programs for urban women with well defined goal should be one of the future priorities to alleviate poverty and food security through enhanced food production. The technical education can broaden urban women farmers intelligence and lay the basis for increased food production. In addition, it enables the urban women farmers to perform agricultural operations intelligently and with full appreciation of their contribution to the final products. Education and training should promote the sharing of expertise with their rural counterparts but at the same time

balancing the involvement of urban women themselves. Before embarking upon any training as a priority to support women in urban agriculture, specific agricultural enterprise which suit urban women should be identified. This should take into account the individual women's potential in their involvement which normally ranges from small subsistence farming to modern commercial farming practices existing side by side. In the past decades the commercial agriculture has been able to feed the rapidly expanding population in urban areas with less of small scale urban agriculture. Training of women who are the majority in urban agriculture should be aimed at developing a strong urban food production base, while at the same time empowering urban women to make a living out of urban agriculture, also improving the general food production. It is logical to assume that broad based urban women training is the key factor in developing urban agriculture to meet the food demands of increased urban population. Training women in urban food production should be the fundamental bases for acquiring knowledge, skills and techniques for increased food production.

### **Improved technology and food security in urban areas**

There is little doubt that adoption of new technology in urban agriculture will promote greater food production which will result in improved livelihood of urban dwellers. Productivity gains in urban agriculture food production systems eventually will level off unless improved technology and inputs are employed. Intensive commercialization of urban food systems using advanced technology and high level of inputs will enhance food security. However the adoption of new technology to enhance food production in urban areas simultaneously draws attention to questions of sustainability in production. Relying on new technology will bring its own challenges to food producers in urban areas. Estimated achievable levels of increased productivity based on increasing of production and innovative technology adoption is feasible. An increase in productivity in urban agriculture is achievable provided substantial progress is made in use of appropriate technology. Using appropriate technologies in promotion dry season farming may increase quantity of food produced which could be supplied throughout the year, especially in areas where rain fed agriculture has been unsuccessful. However the extent of dry season farming will depend on the availability of water harnessing technologies. Dry season food production should be supported by policy towards integrated water resource management which promotes the coordinated water development and management of water, land and related resources in order to maximize the resultant food production without compromising the sustainability of vital ecosystems.

### **Addressing environmental problems related to urban agriculture**

Environmental issues have emerged from the human use of natural resources. Promotion of urban agriculture production if not done properly can create growing ecological and human health problems. Concern has been raised in terms of the long-term sustainability of urban food systems in relation to environmental pollution. Evidence has accumulated showing that whereas the present capital- and technology-intensive farming systems have been extremely productive and competitive; they also bring a variety of economic, environmental and social problems (Conway and Pretty, 1991). Due to the continued human population growth in urban areas outpacing the countries ability to produce adequate food supplies as called for intensification of urban food production which has fuelled concern on the unsustainable use of natural resources. The previous population growth did not reduce agricultural land because there was always more land to convert to agriculture. That scenario no longer exists due to limited cultivable land and water. Adaptations in farming practices and urban form such as higher densities and more compact development could limit the conversion of farmland to urban uses. This has led to intensification of limited land in urban areas resulting in degradation of land and water pollution. Some sectors of societies slowly are realizing that agrochemical technologies, resource scarcity, environmental degradation and uncontrolled economic growth, etc., are seriously threatening the long-term limits of urban agricultural expansion (Medvitz and Sokolow, 1995). The concentration and growing scale in urban agriculture has contributed significantly to negative environmental and human health (Altieri, 1995). The potential impact of livestock production activities on environmental quality has become a worldwide concern (Vukina, 2005). The high food demand from increased urban population has forced urban farmers to adopt chemically intensive measures to increase their production of crops and livestock which has resulted in agricultural wastes becoming an enormous problem. Choice of enterprise which have the potential to reduce the pressure on marginal urban dry lands, and yield higher income per investment than traditional livelihoods are recommended. Innovations are needed to ensure long-term sustainability and to avoid land degradation in the face of growing population pressures.

Waste and residues resulting from diverse agricultural practices for raising animals and growing crops are collectively called agricultural wastes and a pollutant can be any chemical substance, biological organisms, a product or a physical property that is released intentionally or inadvertently by man into the environment (EPTA). The production and management of waste generates many external effects. Innes (1999) cited three groups of externalities: (a) nutrient runoff and leaching from application of manure to crop land, (b) accidental spills and leaks from waste storage facilities and (d) direct ambient air pollution from feedlot and storage facilities including odors and ammonia gas. The accelerated exploitation of productive resources or inputs in urban agriculture to enhance food productivity has resulted in rapid increase in environmental pollution. With the development of the urban livestock production sector within and around cities, large amount of domestic animal waste have accumulated in the vicinities, as a result the animal waste has created environmental pollution such as contamination of water bodies and the production of obnoxious odours.

Odor pollution may cause significant health hazards (Ryer-Power, 1991). Odours emanating from gases such as ammonia, hydrogen sulphide and methanethiol of piggery waste are irritating and smelly with low odour threshold (Hery and Gehr, 1990). Animals may become major waste pollutants once they enter into water supplies. When confinement animal areas are cleaned or when these wastes are carried away by the runoff water contamination hence pollution and health hazards occur. Leakages of animal waste materials may over flow sending dangerous microbes, nitrates pollution and drug resistant bacteria into water supplies. Livestock waste contain many pathogenic microorganisms including bacteria, viruses and protozoa (Mwadseley, 1999) hence application of these waste to land the potential exist for environmental contamination. Several disease outbreaks related to water contamination with animal waste have been traced to bacteria and viruses from animal waste material. Urban livestock production raises different concerns of possible disease transmission from animal to humans, and chemical contamination from over use of animal health products. With no regular waste removal the piling up of manure also presents a health hazard contributing to transfer of zoonotic diseases, rain water often washes manure and other agricultural wastes into the cities water bodies. Ultimately water bodies and underground water subsequently used as water catchment areas for public water supply system may also be contaminated. Policies which safeguard against permissible numbers of livestock in specific location based on human population densities and choice of animal enterprise should be put in place. As urban agriculture is intensified there should be growing concern about its impact on the immediate environment. Wide spread environmental damage may occur as a result of increased productivity from urban agriculture. The greatest threat is on water bodies which may be severely polluted. Regulatory measures that need to be put in place towards controlling animal waste disposal should be more stringent to avoid catastrophes; however the cost effectiveness of animal waste management and pollution control should not narrow the marketing margins of selling food products by urban farmers (Ryer-Power, 1991).

The inorganic fertilizers, no doubt are a crucial input in intensive urban agriculture. When applied to soil they meet the nutrient requirement of crops. The effectiveness and efficiency of application of fertilizers depends on the type of management system adopted. Among several problems in urban agriculture is are land degradation. Land degradation refers to the temporary or permanent reduction in the product of land and this is attributable to continuous utilization of cultivable land with inadequate soil fertility renewal. Inorganic, mineral, chemical or synthetic fertilizer contains straight single nutrient: nitrogen, phosphorus or potassium and compound or mixed fertilizers contained more than one of these macro nutrients and trace elements while inorganic sources are animal manure, household waste, plant materials including crop residues and compost which may impact on soil fertility. Organic fertilizer when available can, and should be an integral component of soil fertility management strategies but organic fertilizer alone will not be sufficient to support the sustained high productivity and production levels that will be necessary to rapidly growing urban population. The advantages of inorganic fertilizers is that nutrient content is known and they release nutrient quickly became other materials need not to be decomposed. Emphasis on increase agricultural productivity from the perspective of soil conditioning has been on chemical fertilizer while the impact of the bio-organic input has been neglected (Yusuf and Ukoje, 2013). In crop production the subsequent unchecked use of chemicals and pesticides has worsened an already desperate situation of pollution. Not all the quantities of applied inorganic fertilizers is taken up by the crop but some quantities is retained by the soil some can be washed down by erosion or by drainage water into water sources or can also be lost into atmosphere as a gas. This has contributed to ozone layer depletion hence climatic variability. In excess amount of nutrients from cropping often because an explosion of algae that robs water bodies of oxygen, killing aquatic life. Agricultural waste can be better recycled by suitable methods like composting, dehydration and incineration. The most efficient method of avoiding pollution by agricultural wastes in the use of biologically active systems of aerobic and anaerobic digestion. Anaerobic digestion of waste leads to production of methane gas which can be used as energy.

### **Implications for Zimbabwe**

The pressure on increased crop and livestock products needed to provide adequate food for the projected growing urban population is feasible, provided good progress is made towards empowering women in urban food production, use of alternative protein sources such as micro-livestock and establishing an enabling policy environment for urban agriculture production. Transformed urban food systems as a direct consequence of increased urban population pressure on food demand for both crop and livestock enterprises have an essential role to play. Therefore there is need to better understand the critical facets of crop and livestock dynamics that suits urban agriculture and the diversity of its underlying factors in enhancing urban food production. Market opportunities with good education and training for urban residents in good farming practices, all these considered in totality will change the face of urban food production in Zimbabwe, for the better. However, caution should be taken in the event that urban agriculture is intensified. Challenges that may be associated with ecological and human health problems due to accumulation of agricultural waste which will result in environmental pollution need to be identified and addressed. Land degradation and pollution associated with intensification in agricultural productivity in urban agriculture can affect the quality of water; threaten drinking water through contamination and harming the quality of surrounding air. Farmer friendly technologies which can turn agricultural waste into convenient and marketable products such as animal feed may be one of the solutions to environmental pollution. Waste management strategies should be put in place to avoid disasters related to environmental pollution from intensified agricultural activities.

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