CLIMATE CHANGE, URBAN AGRICULTURE AND THE GREEN ECONOMY IN BENIN

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Abstract

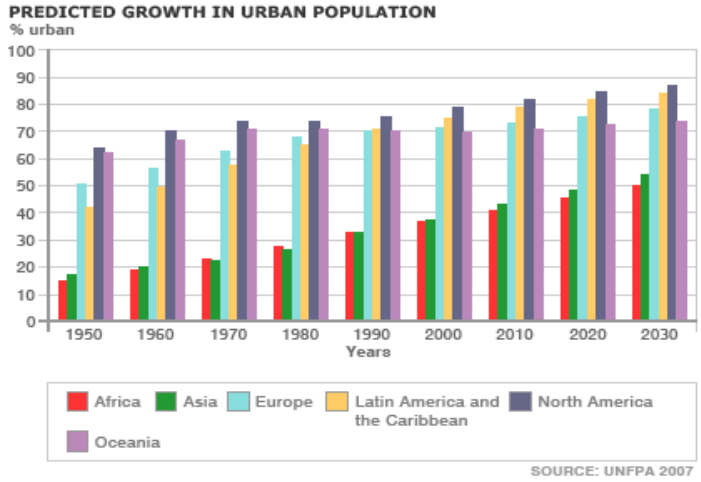
In west and central Africa region, urban agriculture remains a pillar of cities food balance. Since the beginning of food crisis in 2008 in terms of availability and prices, the debate on global food security has taking place. Also, the urban population growth, with more that 50% of people living in urban area in some west and central Africa countries increase the cities food needs and households consumption and incites increasing of urban and peri-urban agriculture production. But emergent challenges as climate change, energy access, water crisis in term of availability and management, land access and financial crisis are the new stakes which influence urban agriculture production and food security. The objectives of this study was to analyze the impact of emerging challenges specially climate change and water resources crisis in urban agriculture in Cotonou and communicate on action which can be improved in context of green economy to insure food security. For more than 60% of urban farmers in Cotonou, decreasing of water resources, caused by rainfall irregularities and increasing of temperatures, disrupt the production calendar and deteriorate the working conditions. Some tasks as watering become more and more painful in term of daily times and physical efforts necessary to their accomplishment. The immediate consequences are (1) the reduction of production in term of space and quantity but also quality (2) the exclusively production of species which require little working time and less water requirement. These constraints which weaken the capacity and diversity of urban farmers production, contribute also to reduction of their financial incomes. For the urban households, it is translated by constant shortages and absence of certain products in markets. The consequence is the prices speculation which defines the contents of housewife's basket and households food balance. In context of green economy we need to build a new vision for urban Agriculture – integrand emerging challenges, delivering food security, environmental sustainability and economic opportunity- some adaptation as farming of species with less water requirement and irrigation system which improve water management system, the using of biological fertilizers as compost which reduce environmental pollution and improve land quality.

Keywords: Urban agriculture, Climate change, water access and green economy.

INTRODUCTION

The food price crisis of 2008 has led to the re-emergence of debates about global food security (Wiggins, 2008) and its impact on prospects for achieving the first Millennium Development Goal (MDG): to end poverty and hunger. In 2020, more than half of Africa population will live in urban area. In 2008, 3.3 billion people lived in urban zone. By 2030 this is expected to swell to almost 5 billion, with 80% in cities of developing countries (UNFPA 2007).

Ensuring food security and appropriate nutrition of the urban population – and in particular of the poorest households – has become a special challenge in the tropics where rural food production is limited by marginal soil fertility and too low incomes to buy necessary inputs.



In Benin as, in other sub-region countries, small and average cities/towns grow and urban farming contributes up to 50% of urban household food requirements (FAO 2004). In 2005, the contribution of urban agriculture to world food production was expected and estimated at 30% (FAO 2005). According to the food Summit Declaration of 2009, more than one billion people were suffering from hunger and poverty, whereas the year before, 800 million were estimated to be food insecure, mostly in poor countries.

In Africa, Agriculture constitutes the backbone of most local economies. It remains crucial for pro-poor economic growth, as rural or urban areas support 70-80% of the total population. More than in any other sector, improvements in agricultural performance have the potential to increase economic incomes and purchasing power for large numbers of people to lift them out of poverty (De Zeeuw *&* *al.* 2010). 70% of the continent's population depending on agriculture for their livelihood (FAO 2007). Urban agriculture is one mechanism that plays a role in enhancing access to and distribution of food in urban areas (Lee-Smith 2010; Bryld 2003). Urban agriculture referring to agriculture that takes place within the built-up city agriculture in the areas surrounding the cities (Nugent 2000).

In Benin, is practiced in a variety of places (on field plots, on vacant public land, in gardens, on rooftops, in barns and cellars) and most often focuses on perishable and high-value products specially green vegetables. In Cotonou, urban farming practices becomes intensified with more inputs and always attracts new actors and more especially women and young people. But, the impacts of climate change – sea level rise, droughts, heat waves, floods and rainfall variation – could, by 2080, push another 600 million people into malnutrition and increase the number of people facing water scarcity by 1.8 billion (UNDP 2008). The progress in human development

achieved over the last decade may be slowed down or even reversed by climate change, as new threats emerge to water and food security, agricultural production and access, and nutrition and public health. As a result, agriculture in Africa is highly vulnerable to changes in climate variability, seasonal shifts, and precipitation patterns. The means impacts of climate change on agriculture include reduction in soil fertility, decreasing of livestock productivity directly. (Feddema and Freire 2001). The objectives of this study was to analyze the impact of emerging challenges specially climate change and water resources crisis in urban agriculture in Cotonou and communicate on action which can be improved in context of green economy to ensure food security.

MATERIAL AND METHOD

This transverse case study was realized between January to June, 2011, during the implementation of initiative of improvement of urban farmers adaptation capacities in the context of climate change in Cotonou/Benin through a knowledge sharing process. The investigation was confined in a truck farmers group of Enagnon district and 75 urban farmers specialized in the production of vegetable were targeted. An integrated methodological approach was employed in conducting the research that resulted in this paper. Data collection process was made through structured interviews and questionnaires administered to urban farmers. The means information's collected included socio-economic challenges of urban farming link to water access and adaptation practices. A triangulation of quantitative and qualitative methods was used in order to give the research statistical and conceptual significance.

RESULTS AND DISCUSSIONS

At the end of the project, 50 trucks farmers have participated during the data collect process . The main cultivated products are vegetables such as the lettuce, Carrots, cabbages. Production is for urban household diet and farmers financial incomes.

New challenges of urban farming linked to water resources available

Increasing of temperatures, the rains irregularities and nature of soil are factors which reduce the quantities of water resources available and increase physical efforts needed during accomplishment of some daily tasks as watering. In dry season -December to May- daily watering about 10 hours per day (Fig.1). Because some vegetables require an important water quantity, farmers have to irrigate more times per day on essentially sandy grounds with low capacity of retention.

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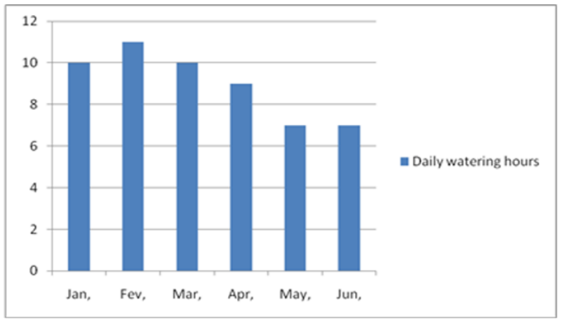

Fig. 1. Daily watering variation of truck farmer's between January to June 2011.

Source: project data

To analyze the challenge of urban agriculture practices such as urban farming, it is important to identify who produces, who has access to farming knowledge and technologies to produce (Pretty *& al.* 2003). Many surveys indicate that women and youth predominate in urban farming. This conveniently enables women to earn income, improve household diets, perform household chores, and exert greater control over household resources and budgets (Mougeot 2007). Women in African cities involve in urban agricultural because they continue to bear primary responsibility for household sustenance largely due to traditional or cultural values and societal expectations (Obuobie *& al.* 2004; Von Grebmer *& al*. 2008). But women and youth are the groups who are more vulnerable in urban framing practices in term of water resources control with different impacts in production calendar and quantity. More than 80% of young urban farmers interviewed, noted that the hardness in urban agriculture impact also their academic program. Indeed, urban farming constitutes an alternative for several young to finance their studies in secondary or high level. The mean economic incidence is decreasing of production and reduction of financial incomes which can be estimated at 70 $ per month.

Adaptation strategies

To reduce the hardness of farming tasks imposed by availability of water resources, new practices have been improved or adopted or improved by the urban farmers:

- The compost is adopted by urban farmers as bio-fertilizer and soil conditioner limits the environmental pollution. cycles which can be applicable on the small urban exploitations scale. Compost can be considered as a fertilizer rich in organic matter. The organic matter is an excellent soil conditioner because it has been stabilized, decomposes slowly, and thus remains effective over a longer period of time. With synthetic fertilizers the nutrients are mainly directly available for plant uptake. Besides acting as organic fertilizer, compost plays a role in soil physical properties. Compost maintains the humus balance in the soil, which improves the structure of the soil, helps to bind nutrients, ensures the proper circulation of air and water, and is thus indispensable for the growth of healthy crops. When compost is applied around the plant it has a mulching effect which includes moisture holding capacity, prevention of weeds and reduction of soil erosion.
- A small irrigation system based on the using of small spraying motor-pumps is adopted by urban farmers to reduce the physical effort needed by watering task (Pic.1). Although 90 % of truck farmers wish to adopt this technology, the lack of financial resources ensure acquisition, installation and daily maintenance of system remains a key obstacle.

Picture1: small irrigation system, Enagnon, Cotonou 2011.

The farming of species which can be produced with less water stays a challenge for truck farmers. In rainy season, the production is sometimes interrupted by the floods caused by heavy rainfall. Farmers are obliged to stop their activities because they have no technical and financial means suited to drain and put in reserve quantity of water in more. the constructions of water retention ponds during the floods, which can be used during the dry periods, can be developed.

CONCLUSIONS

In Benin urban agriculture is an important element for urban diets, especially in access to vegetables. But the impact of climate change on availability of water resources is one of the new challenges and stakes that have to be considered in urban farming system. Some practices such as the use of compost and small irrigation system are used by farmers to improve their water control system. But the urban population growth implies an increase of food needs. Besides the valuation of vegetables species with short production cycle and law water requirement, short-term solutions can be promoted to increase the water control system of farmers. The development of water restraint infrastructures can strength of the irrigation system in dry season in term of availability of water resources

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