ASSESSMENT OF PLANNING STRATEGIES AND INTEGRATION OF URBAN AND PERI-URBAN AGRICULTURE INTO URBAN PLANNING

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ABSTRACT

The major challenge in Kenya is that UPUagr lacks supportive local policy and legal framework recognizing the socio-economic value of UPUagr. Its integration in broad urban development plans with minimal conflict is also a problem. The study was conducted in 2011, at Bondo Sub County, Bondo Town Council through field studies at Nyawita, Barkowino and Ajigo sub locations. The overall objective of this study was to assess the extent to which Urban and Peri-urban Agriculture is integrated into Bondo Urban Planning achievement of sustainable food security to enhance food security. The objectives were to examine planning strategies suitable for integrating UPUagr into urban planning and to identify major constraints to UPUagr in Bondo town. The study employed descriptive survey design. Proportionate method was used to determine the sample size of 368 households and 248 traders. Key informants from relevant Government Ministries and Non-Governmental Organizations were incorporated. Respondents were identified through purposive and random sampling. Primary data was collected using questionnaires, interview schedules, participants' observation, photographs. Qualitative data was analyzed through sub-themes and themes as they emerged. Quantitative data was analyzed using descriptive statistics. The results showed that Urban and Peri-urban Agriculture complemented rural agriculture and increased the efficiency of the food system.

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INTRODUCTION

Food security is a key element of healthy society and its compatibility with urban planning, would go a long way in the achievement of the Millennium Development Goal (MDG) 1 - eradication of extreme poverty and hunger. This requires more research on optimal Urban and Peri- Urban food production, value chain development, interaction between rural and urban food supply and strategic planning and management mechanisms to integrate Urban and Peri- Urban agriculture and harmonizing urban expansion with preservation of peri – urban areas for food production and other uses (Dubbeling, 2007). Historically in Kenya, UPUagr has been going on for over a century since 1899, when the railway workers from india started the practice despite urban planning regulations restrictions enforced by European settlers. After independence, when Africans were permitted to reside permanently in urban areas. However, the laws, both national and local, tend to restrict urban agriculture, this practice is tolerated in the town (Foeken, 2000). Most laws and by-laws are archaic and do not support design and activities that take place now in cities of the developing countries (UNCHS 1996). The National Land Policy of 2006 discloses that the Government of Kenya provides limited extension services to UPUagr farmers. Some local governments in the Sub-Saharan region have made significant progress in incorporating UPUagr in their urban development plans, and that others are now beginning to rise to the challenge. The Nakuru Strategic Plan in Kenya is an example of a changing approach to UPUagr where it is designated as a zoned land use. The need to incorporate UPUagr into urban planning is justified by the rapidly growing human population. Against this backdrop, Urban and Peri-urban Agriculture (UPUagr), or food production conducted in or around urban regions, provide a realistic and pragmatic solution (Mougeot, 2001; 2005; Pothukuchi and Kaufman, 1999). For example, reports indicate that urban and peri-urban agriculture is an important source of food throughout developing-country food systems and a critical food security strategy for poor urban households. (Mougeot, 2000; Nugent, 2000; Klemesu & Maxwell, 2000). Urban and Peri-Urban agriculture may improve household nutrition as it provides a source of fresh, locally grown crops that increase the micronutrients in poor households' diets (Maxwell, 2001; FAO, 2001). This can increase household incomes (Smit, 1996; Sanyal, 1985; Sabates *et al.*, 2001; Henn, 2002; IFPRI,2002).Urban and peri-urban agriculture contributes to a community's nutritional self-reliance, reducing hunger and malnutrition in urbanizing areas around the world. Food must travel through a complex network in order to supply cities. Generally speaking, food travels

between 1,500 and 2,500 miles from farm to plate, about 25 percent further than in (Halweil, 1980). At the same time, people's expectations of a food's freshness continue to increase. Only food with a high durability can make a long journey and still appear fresh on the supermarket shelves. Consequently, appearance often trumps taste and nutrition in many supermarkets.

STATEMENT OF THE PROBLEM

Kenya National Bureau of Statistics, 2010 estimates the population of Bondo Sub County at 157522 people with an average density of 265 persons per km. The population density being highest in Maranda division and this is attributed to Bondo town where the three study sites are found. From the same data the number of females is higher than males and this means higher dependency level. From the food balance sheet, it is evident that the Sub County is a food deficit area as its maize consumption far outstrips its production. The gap is therefore bridged by importation from other surplus maize producing districts, provinces and countries. In future it may be unlikely to have maize coming from other countries like Uganda because Southern Sudan has joined the "ugali" eating communities of Eastern and Southern Africa creating another pocket of high demand for maize (Bondo District Annual Report, 2010). The major challenge is to make the Sub County food sufficient in terms of food crops, frequent droughts that affect farm labour force, environment degradation, high levels of poverty and non-use of fertilizers to stem declining soil fertility. Despite the fact Urban and Peri- Agriculture plays significant role in economic development, UPUagr has not been given attention as a catalyst for urban development and important weapon for poverty reduction strategy. Although quite a lot of researches on urban agriculture have been done, including; Smith & Memon (1994), Nyange (1995), Foeken & Owuor (2000), Foeken & Mwangi (2000), Hansen &Vaa (2004), Mougeot (2005), hardly of the cited studies attempts to provide empirical evidence related to contribution of the urban agriculture to food security. Further research is recommended on these localized typologies and on commonalities between cities in function and potential. This study, therefore, intended to fill the identified gap, by examining the economic, social and environmental contribution of UPUagr in providing a complementary strategy to reduce food insecurity and enhance urban environmental management focusing on planning policies, since very few studies have been done to that effect. In general much of the current urban planning legislation and policies tend to recognize UPUagr in a rather negative way hindering its development. The other reason of the

study was to make recommendation to improve development of UPUagr by integrating it into planning.

RESULTS AND DISCUSSIONS

Economic Contributions to Urban and Peri – urban Agriculture

The economic impacts of UPUagr can be distinguished at the following levels, the household level which include the direct economic benefits and costs for the urban households involved in the agricultural production, including: self-employment, income from processing, sales of surpluses, savings on food and health expenditures, exchange of agricultural products for other economic goods. The main source of livelihood in Bondo town was employment. About 43.92% depends on employment and Barkowino had 23.36% of households depending on employment. The households depending on farming were 31.78% , and shows that UPUagr is taking place and a number are involved in farming. Ajigo being in the Peri-urban takes the lead in farming with 20.56% while the two other study sites are in urban centre shows few are involved partially in farming and depend on other sources of livelihood for example employment and business as in Table 2

Table 2: Main source of livelihood

		Main source of livelihood			Total
		Farming	Business	Employment	
Sub location of the respondent	Ajigo	20.56%	11.21%	11.21%	42.98%
	Nyawita	3.74%	7.48%	9.35%	20.57%
	Barkowino	7.48%	5.61%	23.36%	36.45%
Total		31.78%	24.3%	43.92%	100.0%

Source: Field data

Table three shows households practicing farming irrespective of being the main source, it can be observed that a number of households depend on farming. Nyawita and Bar kowino have the highest percentages of those involved in farming despite having other sources, the two fall within the urban region confirming that farming is being practiced and should be given more attention particularly UPUagr. Because the global urban population is expected to double by 2038, urban and peri urban agriculture has an opportunity to make a positive impact on the world's food systems. Urban centres must generate food security for themselves, since food distribution becomes more complicated as a metropolitan area expands.

Table 3: Percentages of farmers within the study area

Sub location	Ajigo	Nyawita	Bar Kowino
Farmers	52.17%	86.4%	79.49%
Non farmers	47.83%	13.6%	20.51%
Percent	100%	100%	100%

Source: Field data

The main aim of farming within the study areas majorly was for subsistence as in Table 4. Ajigo had 16.67% of the households depending on subsistence and 40% do farming not as a hobby. This could be justified by Ajigo being in the Peri-urban and the vast land within the area. Nyawita and Barkowino had households with 22.22% and 31.11% respectively doing farming. Approximately 53.33% households within the urban region focus on agriculture. Although many urban farmers are from the poorer strata of the population, one can often observe lower and mid-level government officials, school teachers involved in agriculture, as well as richer people seeking good investment for their capital, or for leisure. Some urban farmers are recent immigrants, but contrary to popular belief, more often than not urban and peri-urban farmers have already lived in the city for long periods and gained access to urban land, water and other productive resources.

Table 4: Objectives of farming

		Objectives of farming				Total
		Subsistence	Commercial	Both	Hobby	
	Ajigo	16.67%	10.00%	13.33%	3.33%	43.33%
	Nyawita	15.56%	2.22%	4.44%	1.11%	23.33%
	Barkowino	14.44%	5.56%	11.11%	2.22%	33.33%
Total		46.67%	17.78%	28.88%	6.66%	100.0%

Source: Field data

Despite the level of education, farming within Bondo town remains for subsistence Table 5 shows that most households of secondary and university level of education have concentrated in

farming for subsistence. From college 11.36% doing both subsistence and commercial is important to note as it shows that from college a number may be unemployed and doing farming as a source of income generating activity.

Table 5: Level of education with respect to farming

		Objectives of farming				Total
		Subsistence	Commercial	Both	Hobby	
Level of education	Primary	10.23%	4.55%	9.09%	0.00%	23.87%
	Secondary	13.64%	5.68%	5.68%	1.14%	26.14%
	College	7.95%	4.55%	11.36%	2.27%	26.13%
	University	13.64%	3.41%	3.41%	3.41%	23.87%
Total		45.46%	18.19%	29.54%	6.82%	100.0%

Source: Field data

In Table 6 Ajigo, the peri-urban of Bondo town has the highest space for farming and about 24.72% are between 0-1 hectares, which implies small farms and very suitable for UPUagr. Ajigo also has the largest percentage for space allocated for farming and gives it advantage for both livestock and crop production as compared to the other study sites hence when proper farming techniques are used can supply the whole town with fresh food cheaply given the proximity to town. Transport cost also reduced resulting to affordable food and this would enhance food security. Looking at the sizes of farms available, around 66.29% from the study sites are between 0-1 ha and this implies that they are small farms, which contribute to some challenges in terms of the type of farming to be done. This calls for UPUagr that would be encouraged as compared to large-scale farming within this upcoming urban centre.

Table 6: Size or space allocated for the farm

		Size or space allocated for the farm			Total
		0-1ha	1.1-5ha	5.1 and above	
	Ajigo	24.72%	14.61%	2.25%	41.61%
	Nyawita	19.10%	3.37%	1.12%	23.59%
	Barkowino	22.47%	11.24%	1.12%	34.83%
Total		66.29%	29.22%	4.49%	100.0%

Source: Field data

With a percentage of 85.85% owning space for farmland or kitchen garden within the urban centre a justification of UPUagr existing within the Town. Barkowino fully lies within the town where buildings are located and has a percentage of 33.02% space available for farming.

Table 7: Availability of farmland within the study area

		Availability of farmland, kitchen garden or a space for livestock			Total
		Yes	No	N/A	
	Ajigo	34.91%	4.72%	2.83%	42.46%
	Nyawita	17.92%	2.83%	0	20.75%
	Barkowino	33.02%	3.77%	0	36.79%
Total		85.85%	11.32%	2.83%	100%

Source: Field data

Table 8 shows the active age groups that have secured space for farming, that is from age 30 to age 49, which totals to 50.95%. This shows that most of the households depend on these small spaces for farming either as a source of livelihood or income to sustain the household members as that is the age bracket for most families. Land being available in the Peri-urban, Ajigo has the opportunity to practice mixed farming and this as illustrated in Table 9 where both livestock and crop production is done. Land is a key element of urban agriculture, and agricultural land in urban areas suffers unique ecological and economic pressures that rural agriculture does not (Drescher, 2000).

Table 8: Availability of farmland with respect to age

		Availability of farmland, kitchen garden or space for livestock			Total
		Yes	No	N/A	
Age	15-19	8.65%	1.92%	0.00%	10.57%
	20-29	18.27%	0.96%	0.96%	20.19%
	30-39	30.77%	4.81%	0.96%	36.54%
	40-49	20.19%	3.65%	0.00%	23.84%
	50 and above	8.65%	0.00%	0.00%	8.65%
Total		86.53%	11.34%	1.82%	100.0%

Source: Field data

In Table 9, households who were farmers about 44.32% were involved in crop production as compared to livestock production. Ajigo households preferred mixed farming linked to space, which was available to accommodate, both crop and livestock production. Land in urban areas is usually of much higher value than rural farmland, and development pressures can override many forms of land occupancy. Kitchen gardens are another example of urban agriculture. The main objective of a kitchen garden is to provide land for family gardening use. This usually means that the land is divided into smaller plots for individual household users, where each gardener is responsible for maintaining his or her plot. Kitchen gardeners are generally not permitted to sell the products of their labor for profit; most kitchen gardens are for personal use only. Animals are an important physical and financial capital for many urban households. As a regular source of income, they represent a form of savings (Brook, 2000). Within locality with reference to the study sites refered to Bondo town and the three sub locations which included Nyawita, Barkowino and Ajigo.

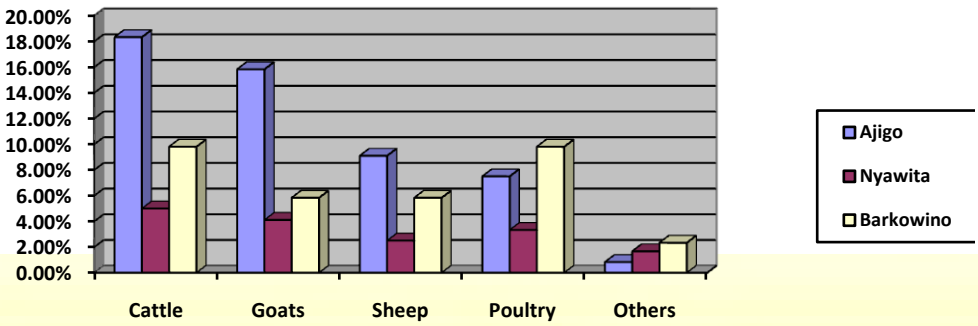
Table 9: Agricultural activity within Bondo Town

		If within the locality what agricultural activity do you do?			Total
		Crop production	Livestock production	Both	
	Ajigo	12.50%	2.27%	28.41%	43.18%
	Nyawita	13.64%	3.41%	5.68%	22.73%
	Barkowino	18.18%	2.27%	13.64%	34.09%
Total		44.32%	7.95%	47.73%	100.0%

Source: Field data

Ajigo being in the peri-urban, and having advantage of large space displays its ability to keep various livestock as shown in Figure 3. This was supported by 28.41% of households doing both crop and livestock production. Cattle need space within the peri-urban region. Goats are suited well with Ajigo as shrubs were available as feeds. Barkowino has an advantage in poultry and being within the town, accessibility to veterinary doctors and shops would make management of such farms quite easy, as drugs are available. Poultry diseases can be checked as fast as possible. Major livestock include

Figure 3: Livestock Production within the study area



Zebu cattle, Angora goats and local sheep were found within Bondo town and the thre study sites. Poultry farming was common within the area of study just as seen in Plate 1 at Barkowino broilers were available and layers and various households within the three study sites did this as a source of income.

Nyawita contributes highest in both maize and beans production. This was attributed to the proximity to the agricultural offices. The offer of agricultural extension services in terms of good farming practices and provision of fertilizers to improve soil. Ajigo's low return despite having space was due to poor farming practices and not accessing agricultural services. The Maize yield was 14bags per hectare during the long rains season depressing further to five bags per hectare during the short rains season. The subsidized fertilizer at National Cereal Produce Board was not available during the short rains season. Table 10 illustrates the average level of production of various crops grown within Bondo Town and the three study sites.

Table 10: Average level of production in Kgs/ha within the study area

	Maize	Beans	Cassava	Sweet potatoes	Millet	Sorghum
Ajigo	1540	1042	315	270	400	700
Nyawita	1812	2272				
Barkowino	1174	692				100

Source: Field data

This unpredictable rainfall pattern makes farming difficult for farmers. Planting time cannot be determined effectively to enable good yields. Drought and floods mostly affects crops and lead to poor returns. In 2007 where rain was adequate, as in Table 11 there was an increase in production in all crops with exception of beans, groundnut and sweet potatoes. Constraints to UPUagr basically is climate, the table shows the rainfall distribution

Table 11: Rainfall Trends for the Last 5 Years

Year	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
Rainfall (mm)	1,093.4	1,606.3	1,652.4	1,241.1	1,385	1,102.3
Remarks	Intense but for only few days in second half	Adequate but intense during short rains leading to flooding & destruction of crops.	Adequate	Adequate during long rains. Intense during short rains but ceased early leading to 75% crop failure of short rains crops.	Erratic in both seasons although quite substantial in quantity. This lead to poor crop performance	Adequate during long rains season. Intense during the early parts of the short rains but ceased too soon leading to 60% crop failure.

Source: Bondo district Annual report 2010

Intensity: The short rains were quite intensive in the months of September-October receiving a total of 273.5 mm distributed over 27 days during this period. The driest month was January with 14.8mm. The total rainfall received during the year (2010) in the district was 1,102.3mm on 115 rainy days as displayed in Table 12. This shows that rain is inadequate for proper farming and other ways of getting water through water harvesting, irrigation must be ventured at, and other types of farming methods such UPUagr can be used to enhance food production. Just as climate, related problems affected the three study sites; it is the same way Kenya was affected causing a decline in food production

Table 12: Rainfall distribution (2010)

Month	Jan	Feb	March	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Amount (mm)	14.8	126.9	188.9	156.3	98.3	29.6	47.5	69.2	132.2	141.3	47	50.3
No of Rain Days	2	8	14	18	10	6	5	10	13	14	9	6

Source: Station- Bondo Water Supply (Maranda Division)

The Table 13 shows the overall performance of the district with reference to the year 2010. The three study sites are part of the district and their contribution is part of the returns. With regard to perennials, only cassava met the target. The three study sites contributed 315kgs/hectare to 1040kgs/hectare and this is 30% contribution. This shows a lot of contribution of the three study sites towards food production within the district.

Table 13: Production level of Perennials

CROP	TARGETS			Production Tons	Value Million Kshs.	Achievements			Production Kgs/Tons	Value Kshs.
	Area young (ha)	Area Mature (Ha)	Yield T/ Ha			Area young (ha)	Area Mature (Ha)	Yield T/ Ha		
Mangoes	12	40	15	600	1.3	90	40	10	400	0.8
Oranges	6	20	12	240	4	4.7	20	8	160	3.2
Bananas	8	20	20	400	0.7	7.5	20	15	300	0.3
Pawpaw	3	20	20	400	3	2.6	20	10	200	2
Lemons	3	15	20	300	3	2.8	15	10	150	2
Cassava	20	30	25	750	2	84	52	20	1040	2.1

Jatropha	20	1	10	10	-	18	2	5	10	

Source: Bondo District Annual Report 2010

Tables 13 and 14 give the production level of the whole district. The study site were part of the Sub County. Compared to the Sub County, the three areas contributed to 4626kgs/hactare out of the total 9450kgs/hactare in maize production. This implied that farming within the urban and peri-urban region had a lot of impact. There was still deficit of 5050kgs/hactare as per the target. Targets were never met implying food scarcity. The study site being the main centre of the Sub County should be able to produce more if UPUagr can be adopted, if proper planning is done and appropriate policies implemented

CONCLUSIONS AND RECOMMENDATIONS

Based on the finding of the study, the following conclusions and recommendations were made:
The intensification of extension service, provision and creation of special programmes regarding urban and peri-urban agriculture by both Government and Non Governmental Organizations, in order to enhance food security. Local authorities to assume a more strategic function by increasing effectiveness in urban planning and land management, anticipating population growth and urban expansion. Maximizing the use of resources while minimizing the negative effects of UPUagr, with regard to socio-economic and environmental conditions. This can be done by exerting greater control over that expansion. A Proposed agricultural landscaping zoning concept for Bondo town is given in Ttable 36, which can assist planners and local authority to come up with strategies for integrating UPUagr into planning.

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