Journal of Sustainable Development in Africa (Volume 9, No.2, 2007)

ISSN: 1520-5509

Fayetteville State University, Fayetteville, North Carolina

The Benefits of Urban Agriculture as A Way of Attaining Sustainable Development in Kadoma, City Of Zimbabwe

Ruwanza Sheunesu

Abstract

An increase in the practice of urban agriculture has been observed on vacant land in many cities of developing countries and Kadoma in Zimbabwe is no exception. This study examine the benefits accrued to the farmers from urban agriculture and was conducted in 2003. A review is also undertaken of the policy response of the Kadoma city authorities and the agricultural extension (AREX) authorities towards the existence of urban agriculture. The results of the study shows or indicate that with the increasing harsh economic conditions being experienced in Zimbabwe, the practice of urban agriculture has increased and is likely to continue. The farmers benefit both socially and economically from the activity. Most farmers used the proceeds form urban agriculture to supplement their food and some have benefited financially. Therefore, the study recommends that the government and city fathers must consider allowing urban agriculture and put legislations that allow the practice to take place. This will be of help in attaining one of the three sections of sustainable development that is economic sustainability in most third world countries. Ways of accommodating the activity as part of the urban land use have to be found.

Introduction

Urban agriculture is on the rise everywhere in the world. The activity plays a vital role to three different groups of people who live in the urban areas (Tinker, 1994). For the poorest of the poor urban agriculture provides access to food and helps stamp out malnutrition. The activity also helps in providing employment to the poor who are not skilled. For the low income, it provides a source of income and high-quality food at a low cost. As for the middle-income families, it offers the possibility of savings. As a result urban agriculture can be regarded as an investment by the urban population, which helps to stamp out poverty and food shortages in the urban environments (UNDP, 1996).

Urban agriculture provides nutrirous food for the urban families. Most urban farmers grow staple food crops or basic crops, which are rich in starch and energy (UNDP, 1996). In Zimbabwe for example most urban farmers grow crops like maize, potatoes and green vegetables (Chaipa, 1994). However the situation is different in developed countries. In these countries they grow crops for the market, or for luxury purpose while in less developed countries they grow crops for consumption. As a result it can be concluded that the benefits of urban agriculture differ from country to country depending on how developed the country is. Other benefits of urban agriculture come in different forms. First, the activity help in creating jobs for the urban unemployment (Wase, 1997). In India, Calcutta for example, about 20 000 people have found jobs by farming on the city's garbage dumps (UNDP, 1996). In some cities, as many as one-fifth of all families are engaged in agriculture, with as many as one -third of these having no other source of income (Wase, 1997).

Urban agriculture also generates income for the poor. According to UNDP, (1996) urban agriculture provides income-generating opportunities for people with low skills and little capital, as well as people with limited mobility, including women and children and the aged persons. It also provides income for those who are already employed in the formal sector but also are involved in urban agriculture. The income they gain from selling surplus produce is then used for other things so as to reduce poverty. In Brazil, urban households devote about 50% of their income to food. According to Wase, (1997) 25% of the above 50% household income comes from urban agriculture.

Another benefits of urban agriculture is that it turns waste from a problem into a resource. For example in Zimbabwe sewage water waste is being used by urban farmers in Mabvuku to irrigate their crops (Mbiba, 1995). This turns sewage water waste into a useable resource. It also reduces public cost of waste management (Zeeuv, 1999). Food waste that should have been dumped at a cost in dumping sites is being turned into feeds for urban domestic animals like fish and pigs. In Calcutta, sewage feed 3000 hectares of lagoons, which produce 6000 tons of fish each year (Zeeuv, 1999).

Urban agriculture has its own disadvantages. According to Chaipa, (1994) when untreated human waste is used as fertilizer, consumers risk contracting diseases like cholera. Also indiscriminate use of pesticides and chemical fertilizers can contaminate local water supplies. As a result of this problem many governments have decided to ban the activity denying cities an important source of food, and economic growth.

Social problems also develop due to urban agriculture. In African countries, children are forced to abandon school and work in the plots. Some children will not cope with the situation where by they

have to go to school and at the same time attend to their schoolwork. As a result these are forced to leave school forever. Children are also involved in the marketing of the produces. Most of the children sell the produces after school, so this will not give them time to do their homework or some time to rest after school.

Despite the contribution made by urban agriculture, scholars and agricultural planners, urban planners and policy makers have largely ignored the activity. They view the activity as having very little economic potential, with local government officials and policy makers at best dismissing it as nuisance and at worst victimizing those engaged in the activity (Mbiba 1995).

According to UNDP (1996) a better solution is to devise policies that encourage urban farmers to keep producing food yet protecting people from key health hazards. Governments have often failed to develop urban agriculture or understand how it works. As a result its economic potential remains largely untapped. It is only by putting simple laws into effect that urban agriculture's potential can be unleashed. According to UNDP, (1996) the sector can become a formidable economic force in the 21st century.

A well-accepted definition by the United nations is that urban agriculture is the growing of crops and keeping of livestock's on urban zones which town planners and urban managers have reserved for uses other than agriculture (UNDP 1996). This definition looks at the utilization of open spaces in urban areas but does not go on to explain the legality of the activity. It also does not categories the different forms of urban activities that take place at different open spaces.

Mbiba (1993) defined urban agriculture as the use of land for agricultural purpose in urban zones which urban managers have reserved or designated for uses other than agriculture. Mbiba (1993) further distinguished two forms of urban agriculture as 'on-plot' and 'off-plot' agriculture.

'On-plot' urban agriculture is that which is done within the pegged residential stands. The activity mostly happen during the time when the owner of the stand is generating income to start developing his stand for example before a person starts building his house. Activities involve include the growing of crops like vegetables, livestock's rearing especially poultry and animals like rabbits (Chahwanda 1994). Although the activity generates nuisances in the form of noise, smell, and possible health hazards (Mosha 1991). The activity has widely been accepted by scholars' because it is generally done on legal pegged stands, which are being paid for by the owner to the local authorities.

'Off-plot' on the other hand is that which take place on 'vacant' land, which include Slack land. This is the land which town planners find unsuitable for urban development such as marsh and rocky areas. Service reserves are used for "off-plot" urban agriculture. This is the land on either side of the road, railway line, pipelines and telephone services. Land for future development is also used. This is private and public owned land, which has been planned for development, but which cannot be developed at the time due to lack of resources. It is this 'vacant' land that rainfed crops such as maize, round and groundnuts are grown. The urban poor feel justified by using 'vacant' land, which they regard as idle land (Mbiba 1993).

From a Sustainable development point of view urban agriculture can be one of the means to attaining sustainable development as it provides food to the poor urban dwellers therefore reducing poverty in urban areas. However urban agriculture in more important from a social dimension of sustainable development. Socially urban agriculture is important in improving people's lives by providing food and money for the local people.

Objectives

General objective

The main aim of the study is to investigate the social and economic benefits of urban agriculture in the city of Kadoma.

Specific objectives

The specific objectives of the study are;

- To determine the types of crops grown by the farmers.
- To assess the social and economic contribution of urban agriculture to households.
- To assess the contribution of urban agriculture to employment.
- To examine contributions by local authorities towards a sustainable urban agriculture.

Study area

The city of Kadoma is situated at the southern end of the Mashonaland west province. It has a population of approximately 110 000 and a population growth rate of 3.5% (C.S.O. 2000). It covers an area of 10534 hectares. At the 1992 census 25,15% of the urban population in Mashonaland west, lived in Kadoma. It is the seventh largest city in Zimbabwe.

Kadoma was established around 1901 to serve the mining operations (Mashonganyika 1992). In the early stages of its development, employment was in mining, and to some extent in the transport sector from the small railway station. Kadoma is a center of light industries, which serves the mining community. The work force comprises of young, strong unskilled men who could withstand the demands of the mining operations with minimal instructors or managers from the few settler artisans (Mashonganyika 1992).

Kadoma grew from the small railway station and business center established in 1901. The city attained town board status in 1907. In 1912 Kadoma (Gatooma then) was the countries third largest town in terms of population and trade. Trade was generated from the mining industries that surrounded the city. Employment also came from the cotton that is grown in and around the city. Thus over the years employment in the city has been mostly influenced by the development within the textile industries and the mining industries.

Municipal status was confirmed on the 15th of August 1917. The town holds a regional and national importance, as it is central located on the main rail and road network between Harare and Bulawayo. It is also a communication centre for the east and west areas from Mhondoro to Sanyati and Gokwe. It was letter granted city status on 17th of March 2000.

The employment status of Kadoma changed significantly since the last census of 1992. The unemployment rate is believed to be at about 40% (C.S.O. 2000). This is attributed to the closure of some companies like Associated Textiles and Glass Company. The closures are due to the economic hardships that are facing the country. Some companies have scaled down operations. As a result of the closure of the major companies, unemployment rate increased and people resorted to urban agriculture as a form of employment.

In more recent years the city has seen an increase in the informal sector. Urban agriculture is one of the informal activities that have developed in the city. This activity developed because of a number of reasons. First, the city has not physically grown for the past five years yet population has increased. Second, some companies have closed resulting in an increase in unemployment. These poor unemployed urban people have then resorted to urban agriculture on open spaces as a source of income.

The activity of urban agriculture takes place mostly in high-density areas of Rimuka, Ingezi, Waverly, Munhumutapa and Cotton research area (Figure 1: Location Map). This is because that is where most of the urban poor reside. Approximately 86% of the population resides in these areas (Kadoma city council records, 2003). In this regard the research will be carried out in these areas.

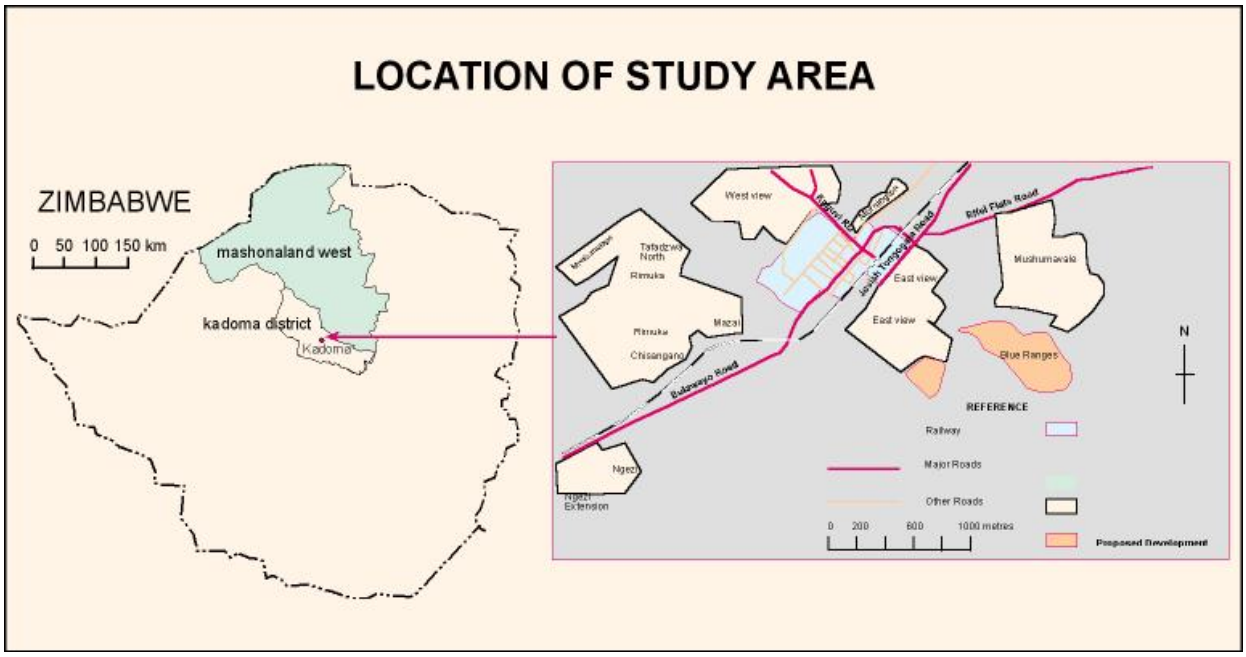

Figure 1: Location of Kadoma City

The city is in agro-ecological region III and the central ecoregion of Zimbabwe. The altitude of the area ranges from 900-1,500m with a mean annual rainfall range of 500-750mm and a mean annual temperature range of 17,5-20 degrees Celsius (Chenje, Sola and Paleczny, 1998).

Methodology

The research used the interview method to collect primary date. Two different sets of questionnaires were designed and interviews were carried out to three groups of people. The first questionnaire was used to interview the farmers found on the plots. The decision to interview the farmers is based on the fact that they constitute the central part of urban agriculture. In this questionnaire answers were recorded in a standard format. The method involves face-to-face interviews with the respondents found on the spot. The reason for using this method is that it gives more accurate information that other methods. The interview technique gave the researcher control over selection of respondents unlike the postal survey method (Sheskin, 1995). It also allowed the interviewer to note some information via observation.

The questionnaire captured a wide range of socio-economic data. Information collected included information on type of crops grown and inputs used. It also collected information on socio-economic background of the farmer so as to get information on factors that motivated them to venture into

urban agriculture. Information on the benefits of urban agriculture, monetary benefits, social benefits, output produced and reasons for engaging in urban agriculture where also asked.

The second questionnaire was designed for Agricultural Research Extension Officers and City Council personal. For these groups an unstructured questionnaire was designed. The questionnaire captured a lot of information on how to improve the activity and legal issues surrounding the practice. The questionnaire focused on planning issues and how the Agricultural research extension and city council personal spread information and knowledge to the farmers.

Sampling procedure

The research used Shaw and Wheeler (1985) method of calculation population to be interviewed. There is need to select a good sample size which will give an unbiased representative portion of the population. Shaw and Wheeler (1985) used the formula below to calculate the sample size.

$$N = \frac{Z^2 * (P)(Q)}{D^2}$$

Where

Z is the standard normal deviation (using 2).
P is the estimated population
R is 1-P (total probability 1 or (100%).
D is the desired degrees of accuracy (using 0,05).

The units in the research are households units. Households were used because it was difficult to count all the farm plots in the city. Apart from that most people own more than two plots so as a result use of farm plot would result in repetition of counting. Due to these shortcomings households were used as the sampling units. The data on household was collected from the city of Kadoma department of housing. The formula by Shaw and Wheeler's, (1985) was then used to determine sample size. Based on the formula the distribution of questionnaires is as shown on Table 1.

Table 1: Distribution of Questionnaires In Relationship To Household Units**.**

Area/wards	**Number of households**	**Proportion of questionnaires**	**Density**
1 Ngezi- old section.	705	22	H
2 Ngezi- extension.	901	27	L
3 Rimuka- ward 3	857	26	H
4 Rimuka- ward 2e	851	26	H
5 Rimuka-ward 4	468	14	H
6 Rimuka- ward 7	298	9	H
7 Rimuka- ward 2w	900	27	H
8 Rimuka- ward 5	886	27	H
9 Rimuka- ward 6	1030	31	H
10 Rimuka- ward 8	934	28	H
11 Munhumutapa	923	28	H
12 Waverly	925	28	H
13 Mshumavale/eastview	865	26	L
14 Westview/town	841	26	L
15 Commercial/industrial	302	10	L
16 Eiffel flats	1488	45	Mixed
Total	**13174**	**400**	

Key:

H *High density.*

L *Low density.*

A total of 400 questionnaires were used in the whole city. Wards were then selected using the method of proportionate representation and random sampling methods. The proportionate representation method used so as to come out with the total number of wards to interview. The wards were divided into two groups that is the low and high-density areas. Total households between the two groups were calculated and the results show that high density had 9893 households and the low density with 3281 households. Rations of the two groups where calculated and they came out as 3; 1, indicating that three wards were chosen from the high density and one ward from the low density

However, one has to note that since Eiffel flats is a mixed density only one quarter of the total household was considered as part of low density. The selection of the four specific wards used in the study was done using the random sampling method.

Using random sampling each ward was assigned a number. From these numbers that is a total of 16 wards (i.e. 4 from low density and 12 from high density) a number was picked randomly. The result showed that Mshumavale/eastview ward (100 questionnaires) was chosen among the low density and for the high-density Rimuka ward 8 (108 questionnaires), Munhumutapa (108 questionnaires) and Ngezi old section (84 questionnaires).

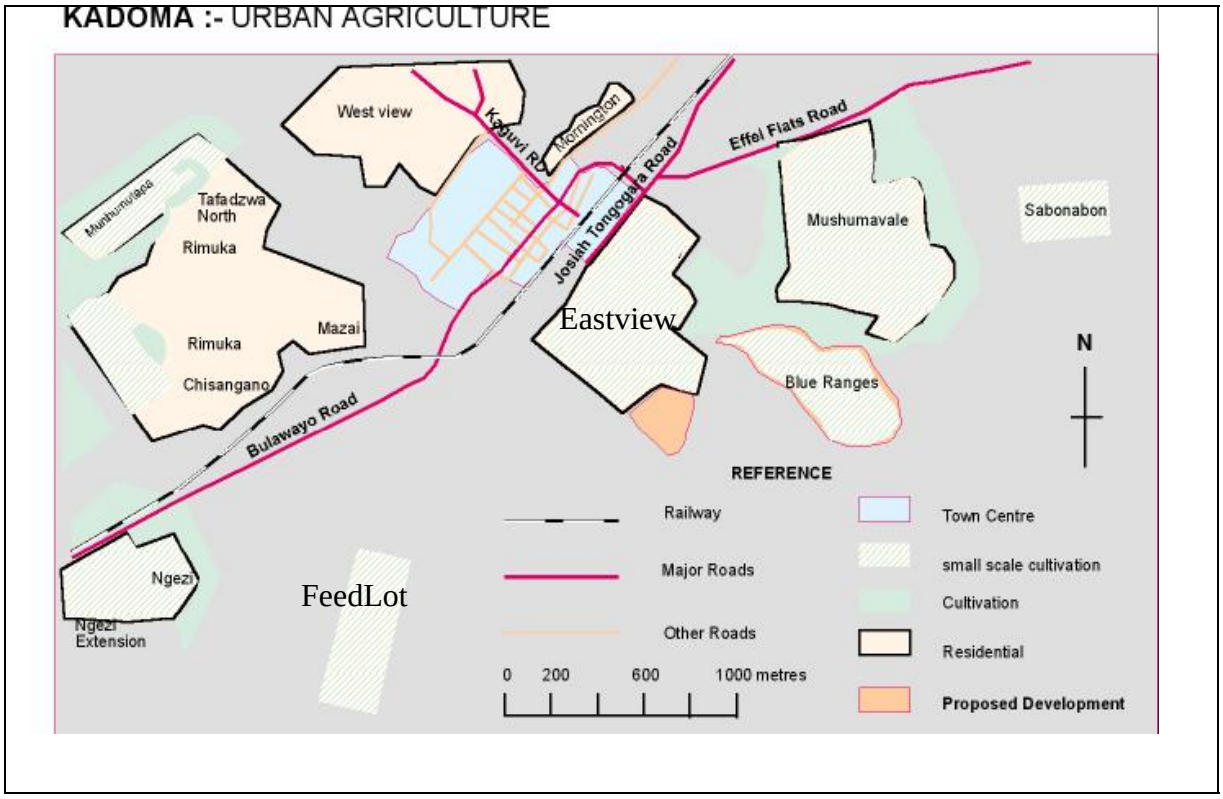

Figure 2: Areas where urban Agriculture is taking place

However although households were used to calculate number of questionnaires to be used the actual interviews were carried out on people found on plots that area adjacent to the selected wards. The interviews were carried out on the people who were found on the plots. This implies that the first person to be met in the field was the one to be interviewed. For example for the 108 questionnaires allocated for Rimuka ward 8, it implies that the first 108 persons to be met on the fields were the one's interviewed. This method seems to be more accurate than any other since it concentrated on people who are found working on the plots. The problem with other methods like the one of counting plots is that, it is difficult to find the demarcations of the plots so one cannot count accurately. Apart from that a lot of people own more than one plot so the process of counting

will only become repetition. The method of interviewing people in the households units was not used because the people who might be interviewed do not practice urban agriculture at all. Therefore under these conditions the method used in this survey seem to be the most accurate and precise. It therefore gives reliable and correct information about the phenomenon. The information can therefore be used to make accurate decisions.

Due to the fact that some of the farmers who where interviewed were not aware of the actual farm sizes, approximate field measurements were carried out. A tape measure was used to measure field sizes. However, in some incidences where the tape measure was not available approximations where carried out that is by counting of steps.

Detailed observations were also carried out. Observations were done to note the types of crops and types of people employed on the fields.

The work was carried out from mid-December when people were weeding crops up to the end of February, when the harvest time begins. Most interviews were carried out soon after the rains. This time was conducive as most people where found on their plots.

Results

Analysis of questionnaire showed that, 61.3% of the cultivators are females and 38,7% were males. In general therefore women dominate the activity and are in control of what they plant and produce. In almost all the four wards women dominate urban agriculture

A total of 61% are employed in jobs ranging from street-sweepers, nurses to teachers and use their free time to cultivate in their fields. Only 39% of the cultivators are not formally employed and these people sometimes are engaged in some informal activities such as vending and cross-border trading. These figures indicate that the urban cultivators engage in the activity in order to supplement their incomes. Their incomes must be inadequate to meet the basic requirements of the households.

Most of the respondents interviewed have an age range of between 30-39 (31%) years old and between 40-49 constituting some 15%. The reason is that these two age groups constitute the main working class. They are the ones who provide for the families. As for those above 70 years only 11% practice urban agriculture whilst 6.6% are between 10-19. This drop is due to the fact that they are the groups of people who are still at school and that most of them were not interviewed since in most cases it was the elderly who where interviewed. Children help in the cultivation and

observations show that for every 6 people found on a plot, 3 of them where of school going. Results also show that families with high households were the once practicing agriculture. Most respondents' acknowledged having households of more than 5 persons.

In terms of education levels attained most the results show that, urban agriculture is not just an activity of the unschooled or illiterate as many people are inclined to think. Of the interviewed 56,2% are secondary school graduates with 'O'or 'A' level and 30,1% either hold a degree or diploma in some field of study. Only 11,7% of the interviewed cultivators had not received any formal education

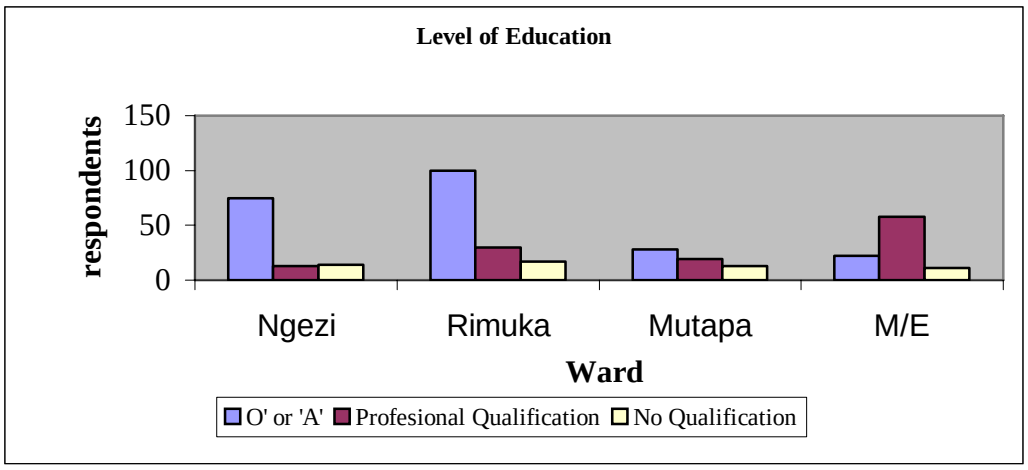

Figure 3: Education level Attained By The Cultivators.

The monthly household income of the cultivators is very variable. The monthly household income embraces income from formal employment. Of the total people interviewed 44,3% have monthly incomes of less than Z$50 000 (2003 results). Thus constitute the lowest income group. The interviews revealed that the amount of money is inadequate to meet the basic needs of a family living in urban areas where most of the goods and services are paid for. Taking for example a hypothetical situation where there is a family of five including parents. That family would need at least two loaves of bread per day and these would cost approximately Z$800.00 per day.

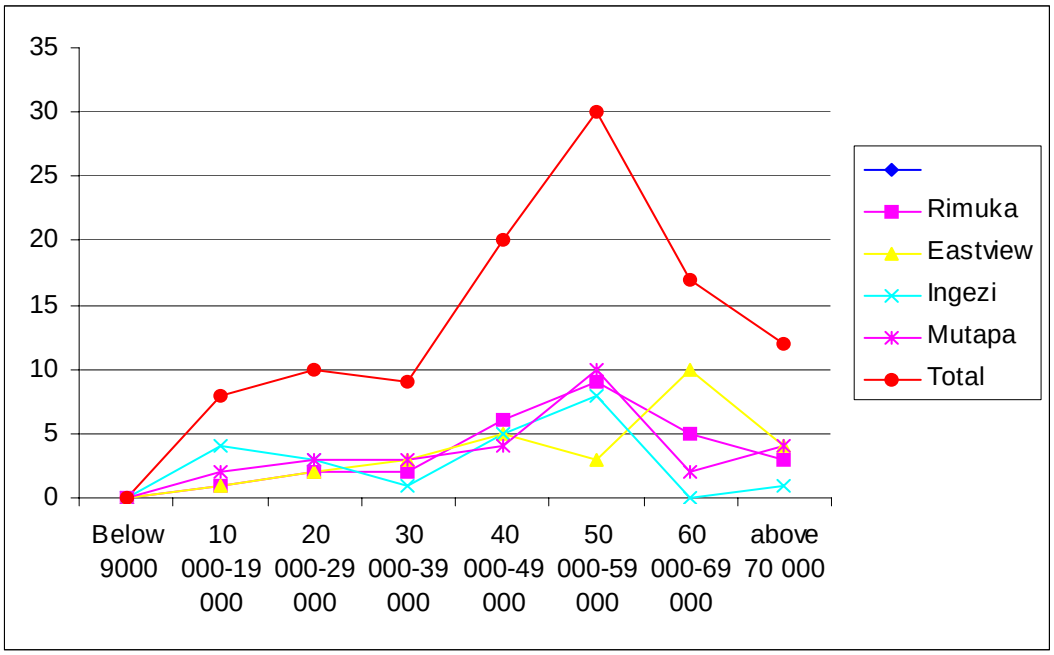

Figure 4: Incomes of Cultivators.

Therefore per month approximately Z$24000.00 would be needed for purchasing bread which is almost half the salary. The remaining Z$26 000.00 has to be stretched to cover such requirements as school fees, transport, food, rent and hospital fees. The problem of the inadequacy of such money is further compounded by the reduction in the value of the Zimbabwean dollar by inflation. Inflation is currently stands at 268% (2003). Therefore this group of people has to find ways of supplementing their income in order to make ends meet.

Many of the interviewed cultivators have as a result, joined the informal sector of which urban agriculture is a part. The research showed that urban cultivators with monthly household income of Z$50 000-70 000 form the largest group of 44.3%. These people with monthly household incomes greater than Z$70 000 (11%) can be considered to be fairly well off than the lowest income group of cultivators earlier discussed.

When some of the people in the highest income group where asked why they are involved in urban agriculture. They said that urban agriculture provides them with a cheaper source of green mealies and also maize for mealie-meal. These are the same reasons given by the lower income group.

The tools used for tilling the land consist of only hoes, none of the interviewed cultivators said they used machinery such as tractors. Inputs were mainly in the form of seeds purchased from local shops, from the city centre or stored from the previous season's harvest. Amount and quantity of seeds used depends mostly on the area that was planted and inter-spacing that was used. For

most of the farmers it was difficult to estimate the amount used as some of then bought the seeds at illegal markets or are given by relatives.

However of the interviewed cultivators the majority of the farmers 86,2% used an average of 10-29kgs of seeds.

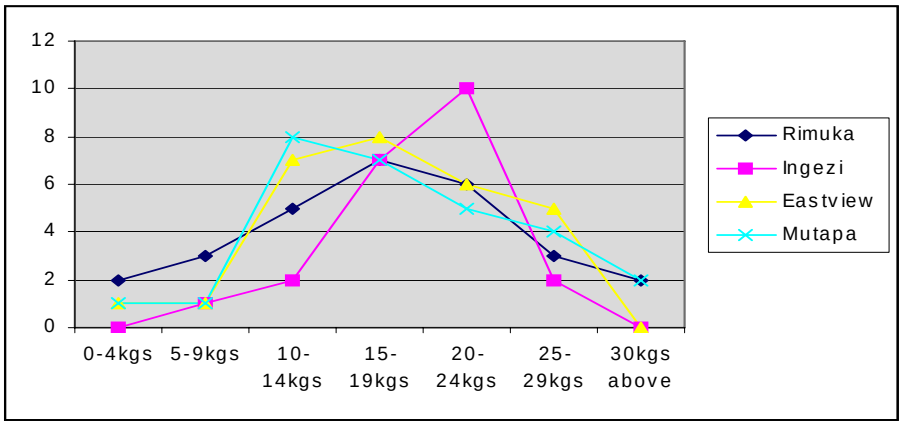

Figure 5: Seed inputs

Apart from that 20% used hired labour. The majority, about 80% used family labour. In most fields visited, one could find an average of six persons and all were family members. By observation, three of the six are still school children although they were not interviewed.

Only 3% said they used agrochemicals such as herbicides and pesticides. The rest 97% said that purchasing such inputs was a luxury for them. However approximately 39% (156) of the interviewed cultivators, admitted that they use fertilizers like compound D or Ammonium Nitrate. The rest 61% (244) said that they did not have the cash to buy fertiliser. There was a marked difference in the quality of crops between those who used fertiliser and those who did not. Crops were fertilizers was applied had better yields.

The plots cultivated are lands reserved for future development, recreational lands, underdeveloped land like wetlands and roadsides or land at the edges of existing development. The cultivators used stones or earth embankments to delimit plot extant, at the time of the survey (December 2002). The size of plots varies from small plots of less than 0,5 acres to large ones of 2,5 acres. Most people 25,5% have average plot sizes of 1-1,5 acres, followed by those with between 1,5-2 acres constituting 20%.

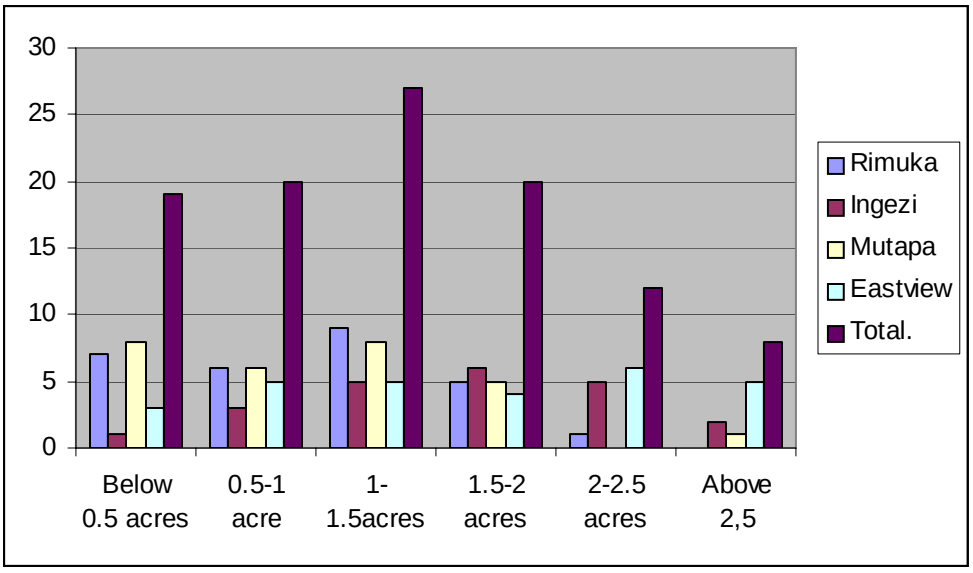

Figure 6: Plot Sizes.

All the respondents showed that they grow maize. This is because maize is the staple food in Zimbabwe. Cultivators in Munhumutapa actually remove other crops and plants maize during the rain season, so that they have a chance to water the maize. Irrigation or watering increase yields because their plots are closer to their houses.

Crops grown in most areas are mostly rainfed crops as there is no water available for watering the plots. The crops include maize, pumpkins, and groundnuts, round nuts, local sugar cane *(ipwa)* and sweet potatoes.

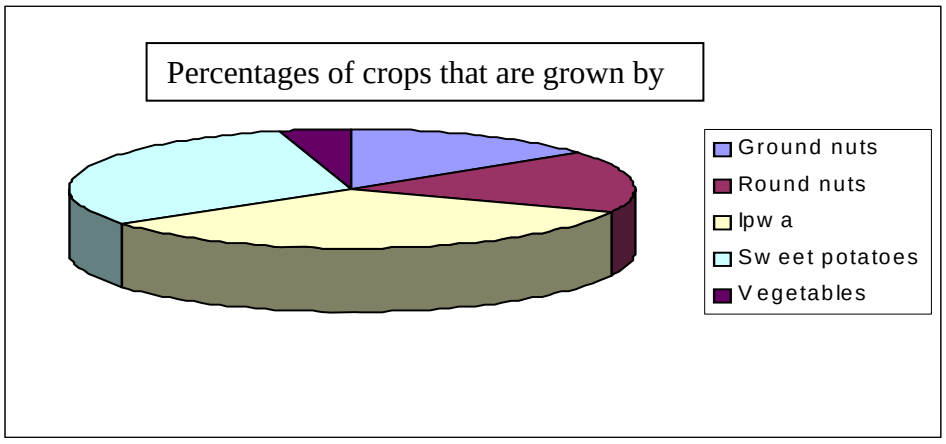

Figure 7: Quantities grown by farmers**.**

In terns of yields 34% have harvested between 5-9 bags (50kg bags) of maize. This group of people constitutes the largest proportion of the urban cultivators followed by those who harvest between 10-14 bags of maize 33%. Only 9% harvest more than 20 bags of maize. The other crops harvested in fairly large quantities are groundnuts (unshelled), and sweet potatoes. These average about three bags.

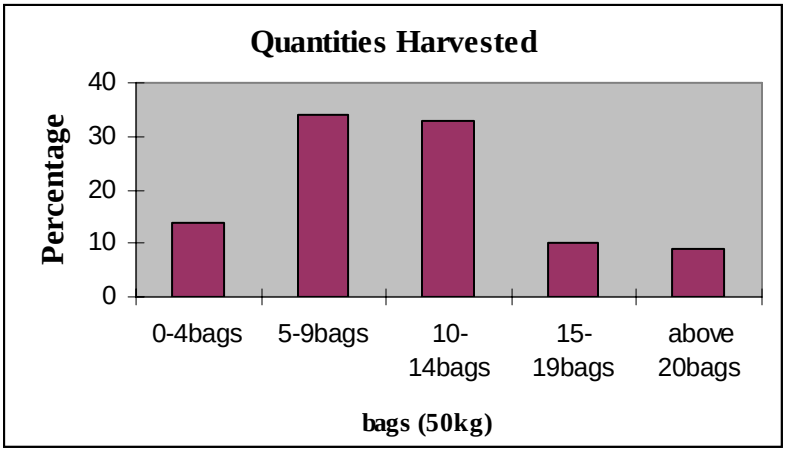

Figure 8: Quantities harvested

The vast majority of the cultivators 70,6% of the interviewed cultivators grow maize for consumption. Only 26,4% indicated that they both consume and sell their produce. None of the cultivators grow maize for selling only. This show that, for those who sell part of their maize produce, that maize must be the surplus or they are forced to sell their produce due to the hard economic conditions. On the question of the proportion they sell, none of the urban farmers could be certain of just how much they sell. This is because some are forced to sell so as to get money for other things, but the quantities are not recorded.

The maize is sometimes sold as green mealies and when it is dry. The facilities available for marketing include the grain marketing board, the municipally built sheltered flea markets and the open-air markets stalls. They get a considerable sum of money, some even said the money can be used to meet the school fees requirements of all their children. However others sell there surplus to G.M.B at the given government rate.

The other crops such as roundnuts and groundnuts, and vegetables are rarely sold, these are mainly consumed at home. Sweet potatoes are used as a substitute for bread. For the urban cultivators, this is a way of saving their hard-earned household income by reducing expenditure on food items.

Conclusion

A summary of the findings shows or confirms that women dominate the activity. The study indicates that the beneficiaries of urban agriculture are not in the categories of the urban poorest only. The rich and educated are also involved in the activity. They are actually economic and social benefiting from the activity. The benefits come in the form of cash or in the form of the food that they get. The activity also employs a considerable numbers of people in the form of hired labour. Most of the farmers consume their output at home. The study results show that for those who sell, most do not sell their output to the G.M.B but they prefer to sell alongside the roads and to friends. Most plots are small. On average, there are 1 acre to 2 acres. From these small plots outputs is as high as 15-20 bags (50kg bags) are harvested.

These results indicate that urban agriculture to a larger extent helpful in achieving all the three dimensions of sustainable development that is social dimension, economic dimension and environmental dimension. From social dimension urban agriculture has proved to be of help in providing food, and improving in health of people from the harvests they consume and from an economic point of view in providing employment, and money and environmentally from using waste material, whereby waste material is used and also use of idle land. Therefore the research concludes that urban agriculture must be seriously considered as on of the measures of achieving sustainable development and Millennium development Goals.

Recommendations

The research recommends that government and Local councils must permit urban dwellers to practice urban agriculture through legalizing it as it help urban people. However laws and by-laws must be put in place to monitor use of open spaces and prevent use of sensitive areas like wetlands. Allocation of pieces of land for urban farming must be through council and registered so as to monitor use.

However they is need to improve on record keeping by the farmers. As shown in the findings, most of the farmers do not keep the records of what they are doing. This implies that they are no cost benefit analysis. For the activity to be more profitable the farmers must keep records of what they are doing and when they did it.

Research in the area of urban agriculture must be done especially on the environmental impacts as this will help planners and policy makers enhance the opportunity for citizens to produce crops inside the city as well as ensure preservation of land and other resources such as water.

Proper marketing strategies must be developed. Most farmers sell their produce randomly and along roadsides. So as a result the country does not benefit from the activity since no money will go to the government. Therefore new and proper marketing methods must be diversed. The new methods must insure that the country benefit.

References

Berry, B.J.L. (1980); Urban environmental management planning for pollution controls, Prentice Hall, New Jersey.

Burt, T.and Haycock,C.(1991); "Farming and Nitrate Pollution", Geography Vol 76, No 330 pp60-63.

Chahwanda, S.N. (1994); Social and Environmental Impacts of Urban Agriculture; A case of Harare. Dissertation submitted in the Department of Geography.

Chaipa, I. (1994); Agriculture and the Urban planning Dilemma in Harare, Zimbabwe, Zimbabwe education Trust, Harare.

C.S.O (1995); Zimbabwe combined Demographic Analysis Report.

Drakakis-Smith, D (1990);"Food for thought", Urban food distribution system in 3rd world, in Potter, R.B and Salam, A.T (eds), Cities and development in the third world. Mansell, London Journal No 57.

Eberlee, J. (1993);"The neglected industry of Kenyan cities" IRDC Reports, Vol 21, No 3, pp17-18.

Forster, T.E. (1997); The role of the living landscapes as an element of sustainability in Asian cities during the 21st century. City farmers, Canada's offices of Urban Agriculture.

Freeman, D. (1991); A city of farmers; Informal urban agriculture in open spaces of Nairobi, Kenya. McGrill University Press.

Kadoma Municipality (2002); Department of Housing and Planning, (City of Kadoma).

Mazambani, D. (1982); Aspects of Peri-urban cultivation and deforestation. (Unpublished MPhil Thesis submitted to the Geography Department, University of Zimbabwe.

Maxwell, G.D. and Seesaw, S. (1994); Urban agriculture in Africa " The case of Kampala, Uganda, African center for Technology studies, Nairobi, Kenya.

Mashonganyika, S. (1992); Urban solid waste in Kadoma; (Unpublished dissertation submitted to the department of Geography.

Mbiba, B. (1992); Urban agriculture, Urban management and the urban poor, Issues and dimensions for research- Harare Metropolitan. Workshop on Gender research on urbanisation, planning housing and everyday life (Gruphel) 30th march-2rd April, Zesa training house centre, Harare, Zimbabwe.

Mbiba, B. (1993); Urban agriculture in Zimbabwe, Testimonies of women from Warren park suburbs, Harare, (Gruphel) workshop Zimbabwe. Women's Resources center networks (ZWRCN), 288A Herbert Chitepo Avenues, Harare.

Mbiba, B. (1994); institutional responses to uncontrolled urban cultivation in Harare, prohibitive of accommodative; Environment and Urbanisation. Vol. 6(1).

Mongeot, L. (1993); Urban food self-reliance; significance and prospects; IRDC report.

Mosha, C. (1991); Urban farming practice in Tanzania. Review of Rural and Urban Planning in Southern and Eastern Africa No 1 pp83.

Mudimu, G. Chigume,S and Muchopa,S,(1994); Paper 4, Urban Agriculture, One day Seminar, Department of Rural and Urban Planning University of Zimbabwe.

Paradza, D. (2000); AREX Officer Responsible for Peri-Urban Agriculture in Kadoma City.

Rakodi, C. (1988); Urban agriculture, Research question and Zambian Evidence; The Journal of modern African Studies, Vol 26, No 3 pp 495-515.

Shaw, G. and Wheeler, D. (1985); Statistical techniques in geographic analysis; Wiley.

UNDP (1996); Urban farming helps combat poverty, Malnutrition. Press release by UNDP 13 February 1996 New York.

UNDP (1999); Cities, People and Poverty; Urban development co-operation for the1990's- A UNDP Strategy paper. UNDP New York, USA.

UNDP (1991); The urban environment in developing countries. UNDP New York, USA.

Wase, K. (1997); Resources on urban agriculture No 42 ARID lands newsletter.

Zeeuv, H. (1999); Urban Agriculture Program; An Overview. City Farmers Canada's Office of Urban Agriculture.