

DEPARTMENT OF AGRICULTURAL ECONOMICS AND EXTENSION

WORKING PAPER

**URBAN AGRICULTURE, FOOD SECURITY AND THE
ENVIRONMENT:
Socio-economics, Land Use Conflicts
and Cultivators' Views**

**Godfrey D. Mudimu, Shepherd Siziba
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**URBAN AGRICULTURE, FOOD SECURITY AND THE ENVIRONMENT:
Socio-economics, Land Use Conflicts and Cultivators' Perceptions**

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URBAN AGRICULTURE, FOOD SECURITY AND THE ENVIRONMENT

Socio-economics, Land Use Conflicts and Cultivators' Views

By

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Abstract

Crop production on open municipal and undeveloped lands has become a significant source of the food security and indirectly sources of household cash income generation or savings. Advent of economic reforms has exacerbated urban agriculture. This is because of the removal of subsidies on food commodities and retrenchments in the formal employment sectors. These have in turn contributed to falling real incomes and reduced food security status of urban households. Urban cultivation had become an important strategy through which families cope with the impact of the economic structure adjustment programme. Though a widespread practice, urban agriculture is not planned for or supported by other planners and managers as a legitimate form of urban land use. Urban agriculture comes into direct conflict with planning provisions for urban space. This study examines the socio-economics of urban crop on municipal lands, cultivators' views and perceptions on the use of urban space for agricultural activities and related issues in Harare, Zimbabwe. Urban agriculture is used for subsistence maize production. It improves food grain availability, thus increasing household food security and real incomes available for other household requirements as contributes to savings on food expenditure. This is the incentive for cultivation on undeveloped urban land spaces. The study gives empirical insight on the uses of urban space for agricultural activities from the cultivators' perspectives. The findings of the study also show that there is a serious problem of lack of concern for the environment on the part of the cultivators. The majority of the cultivators were aware of but ignored the stream bank regulations. There was general lack of knowledge about the environmental effects of cultivation on the urban environment. Given the importance of urban agriculture to the cultivators and the concern on the environmental impacts, there is need to design extension programmes through which the cultivators would be provided with advice on proper land use husbandry.

1. Introduction

Crop production and livestock keeping are part of the food security system in the urban areas of most countries in Sub-Saharan Africa. They directly provide food and indirectly generate household cash income. A study by Drescher (1994) revealed that close to 40 percent of households in Lusaka, Zambia, relied on the urban environment to gather, or grow, food for home consumption and sale. Lee-Smith (1991) reported that a 1985 study in Nairobi, Kenya, showed that 29 percent of Nairobi households grew crops and 17 percent raised livestock with a total value of US\$17 million. In 1991 Mbiba assessed urban agriculture comprising of dairy cows, maize, sheep and pigs in Maseru, Lesotho, at close to US\$13 million (Mbiba, 1995).

Work in Lusaka by Rakodi (1987) and Sanyal (1987), Mosha (1991) in Tanzania and Freeman (1992) in Nairobi underscored the importance of urban agriculture as source of food and income for low-income households. Mudimu and Chigume (1993) measured the contribution of cultivation on open spaces to household food security and cash income in the City of Harare, Zimbabwe. Maize from these sources provided grain that lasted up to 4 months for some of the households. These translated into savings on household food expenditure (maize grain purchases) of up to US\$15 per month. This is substantial for households whose breadwinners are on minimum wage of US\$100-250 per month and facing food basket needs of US\$20-40 per month.

The advent of economic reforms, in the mid-1980, led to removal of subsidies on food commodities and retrenchments in the formal employment sectors. These have, in turn, contributed to fall in real incomes and a reduced food security status of many urban households.

The vulnerable households have resorted to urban agriculture to grow food crops to sustain their livelihood.

Despite being a widespread practice and its importance, urban agriculture is not considered a legitimate form of urban land use, thus it is not planned for, nor supported by urban planners and managers (Rogerson, 1993; Mbiba, 1994). The reaction of local authorities has been repressive especially in Eastern and Southern Africa (Mbiba, 1994).

Urban agriculture is an issue of debate due to the different perceptions and interpretations of its value and importance by urban planners and managers versus those engaged in the activity. Conflicts in urban land use for food production arise from the different perceptions and interpretations of its value and importance by urban planners and managers versus those engaged in the activity. The former do not recognise it as a legitimate use of the urban environment (Mazambani, 1982). Urban agriculture has not therefore been incorporated in urban planning and neither is it supported (Lee-Smith and Trujilo, 1992, Rogers, 1993). It comes into conflict with the provisions of urban space planning and management. Repressive measures were often adopted to control the situation as illustrated by the actions of the Harare City Council prior to 1992 and other cases reported by Freeman (1991), Lee-Smith and Trujilo (1992), and Mbiba (1995). Those involved in urban agriculture contend that it provides an opportunity for households to improve availability of own produced foods and cash income.

This paper contributes to previous research on urban agriculture in Harare. Its contribution is to empirically measure the economics of urban agriculture, linkages with the economic structural adjustment programme (ESAP) and assess the views of the cultivators on the areas of conflicts and attitudes towards urban agriculture.

The paper has seven sections, inclusive of the introduction. The second section discusses the issues of urban agriculture in Harare. The third and fourth sections report the findings of the case study that examines the contribution of urban agriculture to urban population's strategy to maintain household food and cash income security in the environment of economic reforms. The linkage between economic reforms and increase in cultivation on urban spaces is presented in section five. Section six presents the cultivators' views on urban agriculture, alternative land use and their awareness of environmental issues. The last section synthesizes the issues.

2. Urban Agriculture in Harare

Urban Harare covers 55 600 hectares, of which about 10 000 hectares are undeveloped residential and industrial lands and open lands (Mazambani, 1982). The open lands include stream banks, wet lands (which are regulated by the Natural Resources Act of 1975), road and rail reserves and land reserved for recreational and other purposes. It is estimated that 50-60 percent of the undeveloped and open land is under cultivation (Masoka, 1995). Between 1950 and 1980, the area under cultivation increased by 68 percent (Mazambani, 1982) and by 93 percent between 1990 and 1994 (Masoka, 1995). This massive increase is attributed to a number of factors. One factor is the rapid urban population growth since 1980. A second factor is the worsening economic conditions from the mid-1980s coupled with a general increase in commodity prices, especially food. The practice of urban agriculture increased markedly during the post-1991 years due to the economic hardships brought about by the economic structural adjustment programme initiated in 1991. This included cost recovery measures in health and education. These hardships resulted in many urban families turning to urban cultivation as an alternative source of food, to save on food expenditure and raise cash income.

2.1 Rules, Regulations on Urban Agriculture

The Regional Town and Country Planning Act that governs urban planning and management refer to urban agriculture as one of the development activities that is subject to control through statutory instruments. The Urban Council Act, that governs local authorities, gives the

responsible minister discretion to make regulations pertaining to cultivated urban lands. It, however, does not necessarily prohibit urban agriculture. The Act gives power to the responsible minister to clear crops when they are likely to cause fire, or health problems, or if they are unsightly. All these are subjective. Both Acts do not necessarily prohibit urban cultivation on open spaces in the cities.

There is no clear policy against, or in support, or plans relating to urban agriculture of urban agriculture. Past control measures such as slashing of crops were justified on the basis of the Natural Resource Act that controls, or prohibits, cultivation inside 30 metres of riverbanks, or other waterways.

2.2 Land Use Conflicts and Environmental Issues

Local authorities view urban agriculture as demanding a significant proportion of cities' land and having negative environmental and health impacts. The general attitude has been either to deter or to stop the agricultural activity from continuing. The reasons given include: (a) soil erosion which eventually results in silting water sources; (b) negating the provision of open areas which should be used for recreation by residents, (c) re-pegging areas because the boundary pegs were removed by cultivators and (d) the arguments that tall maize plants provide hideaway for muggers. Bowyer-Bower and Tengbeh (1995) measured the environmental effects of urban agriculture on the environment of Harare. They assessed that in cultivated areas the infiltration of rainwater into the soil was reduced on average by 28.5 percent. Soil loss in cultivated lands ranged from 2.5 to 13.7 tonnes per hectare per year, depending on soil type. Cultivation of open spaces and wet lands contributed to loss or change in spatial diversity of species habitat of over 80 percent, reduction of ecological diversity and contributed to a 55 percent loss in tree presence in Harare (Bowyer-Bower and Tengbeh, 1995). These changes contributed to some decline in the aesthetic quality of urban space. All the above changes impact negatively on quality of urban life and increase costs of urban management.

Those involved in urban agriculture contend that it provides opportunities for households to improve availability of own produced foods and cash income and reduces the vulnerability of women and children to food insecurity and negative impacts of the economic reforms (Mbiba, 1995). Most participants are low-income urban residents who grow crops to supplement disposable incomes through savings in food purchases. This frees their budgets for other household needs. In addition, it contributes to better family nutrition that would not have been possible if the family purchased all requirements from the market. Improved nutrition contributes to better family health. It could therefore be argued that if cultivators had more influence on urban land use planning in local authorities, they would make provisions for urban cultivation.

2.3 City Council Control Approaches

The City Council of Harare mounted a campaign against urban agriculture and slashed maturing crops, in 1990 and 1991, in an attempt to stop agricultural activities. The response of the cultivators, the majority who were women, was to fight what they considered to be a colonial and male attitude to city planning with regard to alternative urban land uses. This opposition was articulated as a political and economic battle. The women mobilised themselves to lobby their local city councillors and their constituent Members of Parliament for a general change in attitude towards urban agriculture. They contended that they needed the land to grow crops to supplement incomes and food supplies. In their view the open and undeveloped urban lands were under utilised. They resisted and opposed the City Council by continuing their agricultural practice year after year. In response to this persistence and the accompanying political pressure, in 1992 the Harare City Council conceded by allocating some designated land to women operating through organised groups. The groups then formed farming co-operatives. This option gave some residents the right to grow their crops and for the City Council to allocate suitable land and be able to monitor and control the impacts of some urban cultivation. Despite this move, "illegal", or un-sanctioned, cultivation by both members of co-operatives, who have plots outside the identified co-operative lands, and other individuals, who are not members of co-operatives, has persisted. Over the period 1992 to 1995, there has been extensive expansion in the area under cultivation. The demand for land exceeds the supply.

3. Case Study

The case study analyses the socio-economics of urban cultivation in terms of the cultivators' socio-economic characteristics, contribution to food security and the examines the cultivators' views, attitudes and perceptions of the use of the urban space for agricultural activities and related issues. The case study draws from a larger study undertaken in January 1995 to February 1997 to characterise and quantify agricultural activities on open and undeveloped land areas around Harare, Zimbabwe's capital city.

3.1 Data Sources

3.1.1 Selection of Survey Sites

Two methods were used to select the survey sites. A rapid survey of all the open and undeveloped lands was undertaken to identify the extent of cultivation within the boundaries of Harare in December 1995 at the onset of the rainfall season. The observations made were compared with information from aerial photographs taken in 1993 and 1994 to identify sites where cultivation had expanded. On the basis of these observations, nine sites were purposively selected for the survey. Seven sites were in, or around, the high-density low-income suburbs of Dzivaresekwa, Hatcliffe, Sunningdale, Mufakose, Tafara, Mabvuku, and Warren Park. Two sites were within the low-density middle income suburbs of Mabelreign and Ashdown Park.

3.1.2 Sample Selection

There was no population list of individuals, or households, involved in urban cultivation from which to select a sample for the survey. It was decided to interview persons found working in the cultivated plots between 06.00 and 11.00 hours on the day the survey site was visited. This time period is when most operators undertake their cultivation activities. One day was allocated to each survey site. In situations where a group, or family members, were working together, only one person, indicated as either the owner, or operator, or responsible child, or adult was interviewed. Eight research assistants conducted the interviews using a structured questionnaire. A total of 520 persons were interviewed over a 10-day period. Most of the interviewees regarded the study as an opportunity to air their views on urban cultivation. Five persons refused to be interviewed.

Table 1 Profile of Respondents by Survey Sites and Gender

Survey Sites	Female	Male
	No. (%)	No. (%)
Dzivaresekwa	34 (74)	12 (26)
Hatcliffe	29 (64)	16 (36)
Sunningdale	43 (61)	28 (39)
Mufakose	32 (49)	34 (52)
Tafara	50 (62)	31 (38)
Mabvuku	16 (52)	15 (48)
Warren Park	19 (63)	11 (37)
Ashdown Park	33 (40)	50 (60)
Mabelreign	10 (37)	17 (63)
Total	266 (55)	214 (45)

3.2 Results

Due to missing data, there were 480 usable questionnaires from the 520 respondents. As the number interviewed was not based on a representative sample of all cultivators in Harare, the results may not be generalised for Harare, let alone other urban areas in Zimbabwe. The results are, however, indicative. Table 1 lists the respondents by survey sites.

3.2.1 Socio-economic Profile of Respondents

The results elaborate on the socio-economic characteristics of the individuals interviewed their motivation for, assessment and perception of the issues surrounding urban agriculture. The analysis is based on descriptive statistics.

3.2.1.1 Household Size

Table 2 Respondents' Household Size

Household size	Respondents	
	Number	%
0 no family	46	9.6
1 – 3	75	15.6
4 – 6	207	43.1
7 – 9	125	26.0
10 – 18	27	5.6
Mean	5.225	100
Mode	5.0	

The average household size was 5.2 persons. This was made up of family members and kin. Twenty-six (26) percent lived in households of 7-9 persons and about 6 percent in households of 10-18 persons (Table 2). A relatively small percentage, 2 percent, of households consisted of more than 13 members. These sizes, given that most households have one breadwinner or none at all, mean that the dependence ratio is very high. Household size appears to be a factor in undertaking urban agriculture. Households composed of 5-9 members tend to be in the majority. These are most likely to be those under pressure to supplement their food sources and incomes as a survival strategy.

3.2.1.2 Respondents' Marital Status

Sixty-six percent of the respondents were married, 12.3 percent never married, 12.9 percent widowed, and 4.6 percent divorced (Table 3). The proportion of female-headed households was 25 percent of the female respondents.

Table 3 Marital Status of Respondents

Status	Female		Male		All Respondents	
	No.	(%)	No.	(%)	No.	(%)
Married	166	62.4	149	69.6	315	65.6
Never married	22	8.3	37	17.3	59	12.3
Widowed	52	19.5	10	4.7	62	12.9
Divorced	14	5.3	8	3.7	22	4.6
Not Applicable ¹	12	4.5	10	4.7	22	4.6
Total	266	100	214	100	480	100

¹Not applicable refers to respondents, mostly children, who were under 18 years and at school.

Table 4 gives a profile of the cultivators by gender and claim to "ownership" of, or access to cultivated plot. By ownership the respondents refer to the fact that they had staked a claim to use the plot on a permanent basis despite the fact that they do not own the land. Overall, the majority of the respondents were women except in the two low-density middle income suburbs of Ashdown Park and Mabelreign. The majority of these female respondents (89.8%) were working on their own plots (Table 4). Ten of the female respondents were operators only on plots claimed by others and seventeen were hired workers.

Table 4 Profile of Plot "Ownership" Status

Gender	Ownership" Status (Number and % of Respondents)		
	Owner Operator No. (%)	Operator Only No. (%)	Hired Worker No. (%)
Female	239 (50)	10 (2.1)	17 (3.5)
Male:			
Spouse's			-
Own	125 (26)	-	-
Other	25 (5)	13 (2.7)	51 (10.6)
Total	389 (81)	23 (4.8)	68 (14.1)

Of the 214 male respondents, 150 (70.1%) were spouses of owners of the plots and 51 (23.8%) were hired workers. These results confirm that women are the predominant owners of the plots and constitute the majority of the operators. Most of the female and male hired workers were employed by landowners in the low-density middle income suburbs. The males are thus involved through assisting their spouses and as hired workers.

3.2.1.3 Respondents' Employment and Occupation Status

Table 5 Respondents' Employment and Occupation Status

	Female		Male		All Respondents	
	No.	%	No.	%	No.	%
Employment Status						
Never been employed	184	69.2	13	6.1	197	41.0
Currently Employed	51	19.2	144	67.3	195	40.6
Retrenched	16	6.0	37	17.3	53	11.0
On pension	3	1.1	14	6.5	17	3.6
Recently left school	4	1.5	4	1.9	8	1.7
Still at school	8	3	2	0.9	10	2.1
Total	266	100.0	214	100.0	480	100.0
Occupation						
Professional	19	37.3	31	21.5	50	25.6
Skilled	11	21.6	52	36.1	63	32.3
Unskilled	5	9.8	33	22.9	38	19.5
Domestic worker	12	23.5	25	17.4	37	19.0
Other (street vendor)	4	7.8	3	2.1	7	3.5
Total	51	100	104	100	195	100

As shown in Table 5, the majority (67.3%) of the male respondents compared to 19.2 percent of the female respondents was in employment. The majority of the female respondents had never

been in an employment outside the home. Those recently retrenched constituted 6% of the female respondents and 17.3 percent of the male respondents.

Of the 51 female respondents currently employed, 58.9 were professional and skilled occupations. Professional occupations included nurses and teachers and other occupations requiring diploma training. Skilled workers included those trained in artisan skills such motor vehicle mechanics, secretaries. Of the 104 employed male respondents, 57 percent were in professional and skilled grades. Those in professional and skilled occupations made up 57.9 percent of the total respondents. Those employed mostly in unskilled and low-wage employment (such as domestic workers) were in the minority (38.5%) of the total population.

4. Economics of Urban Crop Production: Contribution to Food Security and Income

4.1 Motive for Urban Production: Food Security

Table 6 Motives for Undertaking Agricultural Activities

Motive	Respondents %
To grow own food (maize grain)	69.8
To save on food expenses	12.5
To generate cash income from sale or work	12.7
As recreational activity	5.0
Total	100

The motives for urban agriculture are growing own food for own consumption to save on food expenditure and selling surpluses (Table 6). Five percent of the respondents considered cultivation as a recreational activity.

Table 7 Range of Crops Grown and Number of Plots

Crop	Number of Plots per Respondent	Respondents Growing %	Average Plot Size (ha)
Maize	1.639	100	0.30
Sweet potatoes	1.689	47	0.15
Groundnuts	1.393	28	0.015
Nyimo (Bambara nuts)	1.65	23	0.015
Pumpkins	1.41	12	Inter-cropped
Beans	1.67	15	0.015
Total		100	

All the respondents grew maize, the staple crop in Zimbabwe. On average they had 1.65 maize plots (Table 7) located in sites within their residential suburb. The average area planted to maize was 0.300 hectares. About 30.8 percent and 46 percent of the respondents expected to harvest 1 to 3 and 4 to 6 bags (50kg bags) of maize, respectively. Table 8 gives the expected group mean output. The weighted average was 5.08 fifty-kg bags of maize. Those respondent households who harvested 10 and above bags had high output either because they had large plots or owned several plots.

Table 8 Expected Maize Output

Respondents %	Expected number of 50 kg bags	Group Output 50kg bag	Mean	Period consumed at 0.435kg per person per day
30.8	1 – 3	2.20	50.6	1.7
46.0	4 – 6	4.60	105.7	3.5
12.5	7 – 9	7.99	183.7	6.1
6.5	10 – 12	10.44	240.0	8.0
4.2	Above 12	14.45	332.2	11.1
100.0	Weighted average	5.08	116.7	3.9

4.2 Time, Labour and Input Use

Cultivators were in their plots from early in the morning (05.00 to 10.00 hours) and late afternoon (15.00 to 18.00 hours). The time worked per day ranges from one to four hours, with an average of three hours per day working in the plots (Table 9). Land preparation, planting, weeding and where applied fertilizer application, were cumulatively completed in three days. Harvesting lasted 2 to 5 days. Given that the average plot sizes and family size, it expected that all operations would be completed within short periods.

Table 9 Input Use and labour time

Input	Respondents Applying		Quantity/Number Used			Mean Cost Z\$
	No.	%	Mean	Mode	Std. Dev.	
Seed (kg)	480	100	10.80	10	1	10.00
Basal fertiliser (kg)	262	54.6	34.24	50	42.05	15.81
Top dressing fertiliser 9kg)	134	27.9	45.12	50	45.41	16.36
Hired male labour	71	14.8	1.456	1	1.181	25.00
Hired female labour	21	4.4	1.80	1	0.98	25.00
Labour use:						
Hours worked per day	-	-	3	2.5	1.5	
Total pre-harvest labour days	-	-	3	4	2	
Total harvesting labour days	-	-	2.85	3	0.89	
Average number persons working	-	-	3.45	3	2.66	

Sources: Survey, 1996

As indicated in Table 9, 54.6 percent of the respondents applied basal fertilizer while 28 percent applied top-dressing fertilizer. The fertilizer and seed were purchased from local general dealer shops and vendors who sold these in smaller packets. A number were using seeds from previous harvest, given by friends or relatives. On average cultivators spent \$15.00 on a basal fertilizer and \$16.00 on top-dressing fertilizer. Ninety-two (29.2%) of the cultivators hired labour to carryout various operations, mainly land preparation and weeding. Hired labour charged \$25 per 6-hour day.

4.3 Saving on Food Expenditure

At a weighted mean output of 5.08 bags, each respondent family would have 254 kgs of maize grain available for own consumption. Taking the mode family size of 5.0 and assuming that the average daily intake of maize meal of 435 gram per day per person (Jayne and Rubey, 1992) 254 kg would last for about 117 days (Tables 8 and 10). This represents about 3.9 months of maize grain supply and constitutes 32 percent of annual maize meal requirements. These results are consistent with findings of other researchers (Sanyal, 1986; Mbiba, 1992; Jayne and Rubey, 1992). In Lusaka, Zambia, Sanyal (1986) estimated that about 33% of food consumed

by poor households came from urban cultivation. Households harvesting 8 bags are able to meet 50 percent of their annual maize grain requirements.

Table 10 Net savings from maize production

	Expected Output Levels						
Total output: (50kg bag)	1	2.2	4.6	5.08	7.99	10.44	14.45
Days expected to last @ 0.435kg	22.0	50.6	105.7	116.7	183.7	240.0	332.2
Months expected to last	0.8	1.7	3.5	3.9	5.9	8.0	11.1
% of annual grain requirement	6.30	13.86	28.97	31.99	50.32	65.75	91.01
Value of grain @Z125/bag	125	275	575	635	998.75	1305	1806.25
Milling costs	9.72	21.39	44.72	49.39	77.68	101.50	140.49
Value of milled purchased grain	115.28	253.61	530.28	585.61	921.07	1203.50	1665.76
Costs							
Seed	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Fertiliser							
Compound D	0.00	0.00	100.84	153.27	201.67	252.09	252.09
Ammonium Nitrate	0.00	0.00	143.26	143.26	286.51	358.14	358.14
Total Fertiliser Costs	0.00	0.00	244.09	296.53	488.19	610.23	610.23
Labour							
Pre-harvest	129.38	129.38	161.72	161.72	161.72	202.15	202.15
Harvesting & post-harvest	12.50	27.50	57.50	63.50	99.88	130.50	180.63
Total labour costs	141.88	156.88	219.22	225.22	261.59	332.65	382.77
Total production costs incl. labour	161.88	176.88	483.31	541.75	769.78	962.88	1013.01
Total production costs less labour	20.00	20.00	264.09	316.53	508.19	630.23	630.23
Net value with labour	-46.60	76.74	46.97	43.86	151.29	240.62	652.76
Net value without labour	95.28	233.61	266.18	269.08	412.88	573.27	1035.53

Sources: Calculated from Tables 8 and 9.

Table 10 gives the output value, costs and net savings for the various expected output levels. The expected output is valued at the 1998 maize grain price of \$35 per 18kg (or 20-litre bucket) in the local open grain markets in high-density suburbs. Production costs included seed, fertilizer (both basal and top-dressing). The average milling cost is \$3.50 per 18-kg bucket used at local hammer mills. Transport cost was excluded as most people take their maize grain to hammer mills in their neighbourhood on bicycles, in wheelbarrows or on their heads. Labour is valued at the prevailing wage rate of Z\$4.66 per 6-hour day for hired hands.

The net amount saved is obtained by subtracting the production and milling costs of the maize grain into maize meal as shown in Table 10. If imputed labour costs are included, net saving per household ranged from Z\$76.74 to Z\$652.76 for the range of expected output levels. When imputed labour costs are not taken into account, the net saving ranged from Z\$233.61 to Z\$1035.53. Even for families harvesting one bag, they save \$95.28 if labour is not taken into account. Thus a household gains by producing own maize meal. At the weighted average of 5.08 bags, the amount saved is equivalent to \$67.27 per month. In 1993, Mudimu and Chigume (1994) found that the saving on food expenditure reached up to \$100 per month. \$67.27 buys 10.35 bread loaves at \$6.50 per loaf.

Other crops grown, such as pumpkin leaves, beans and sweet potatoes, also contribute to reducing household food expenditure and generated some cash from sales received. Relish crops mainly vegetables like pumpkin leaves and beans save on daily food expenses particularly during the rainy season. Sweet potatoes are eaten as bread substitutes in the months immediately after harvest, May to July.

4.3 Cash Income for Sale of Excess Grain

Those households who harvested 10 and more bags expected to sell 50 percent of the output due to either lack of storage or to forestall loss to weevils. The grain was sold to neighbours and on the open market. If 5 bags were sold at the average open market price of \$35.00 per 20 litter (18kg) bucket, the cultivators stood to gain about \$260.00 net of production costs (labour excluded). Thus the few who sold excess maize received cash incomes that augmented household incomes.

5. ESAP and Increase in Urban cultivation

The year respondents started urban cultivation could be use to determine the link between ESAP and urban cultivation.

5.1 Period Respondents Started Cultivation

Table 11 gives the different period's respondents started urban cultivation.

Table 11 period respondent started urban cultivation

Period started	Respondents %
1956-1979	15.5
1980-1990	28.4
1991-1995	56.1
Total	100%

Source: Survey (1996)

A break down of the respondent sample by the periods they started urban cultivation shows that 56% started cultivating between 1991 and 1995 (Table 11). This finding agrees with those of Mbiba (1995) and Drakakis-Smith (1995). This cannot be attributed to the increase in rural-urban migration whereby new city immigrants open up plots as 58.7 percent of the respondents were house owners while only 22% were lodgers and the rest were children or other relatives of house owners. This means that families that used not to cultivate were prompted to cultivate in the past five years. The fact that most (56%) started after 1991 (when ESAP was introduced) could reflect that economic hardships associated with ESAP have prompted more people to join urban cultivation.

5.2 Linkage to Retrenchments

Table 12 Retrenchment and period started cultivation

Employment Status of household head	Number	Year started cultivation			
		Prior 1991		After 1991	
		No.	%	No.	%
Currently employed	195	75	38.5	120	61.5
Retrenched	53	17	34.7	32	65.3
Pensioner	17	24	75.0	8	25.0
Never employed in the past 5 years	197	120	60.9	77	39.1

Source: Survey (1996)

A substantial number of workers, in both private and public sectors, were retrenched as a result of ESAP. Retrenchments result in loss of wage income. Family affected could have

resorted to urban agriculture in an attempt to either source a means of livelihood or to diversify sources of income. As shown in Table 12, of the 53 retrenched respondents, 65.3 percent began urban cultivation in the period 1991 to 1995 compared to 34.7 percent who started in the pre-ESAP period. A cross tabulation of the employment status of household head by the period the family started urban cultivation (before or after introduction of ESAP in 1991) suggests a linkage between retrenchments and urban cultivation.

A Chi-square test of the dependence/independence between the employment status and period cultivators entered open space cultivation, was done. The Null Hypothesis that there is no relationship between the two classifications was rejected in favour of the alternative hypothesis that there is a relationship between the two at 5 percent level of significance. This further supports the notion that the time people started cultivating is related to the employment status of the household head.

Table 12 reveals a link between formal employment and urban cultivation. The majority (61%) of those respondents who had never been in formal employment in the past five years started cultivation in the pre-1991 period. This shows that urban cultivation is an activity through which unemployed residents of the city sustain themselves.

6. Attitude to and Awareness of Issues Regarding Urban Agriculture

This section reports on the findings of the case study regarding the respondents' attitude to and awareness of the issues raised by urban planners and managers regarding urban agriculture.

6.1 Access to Land and Views on Urban Agriculture

Table 13 How Plots Were Accessed

Method of Access to Plot	Respondents	
	Number	%
First to claim plot	199	41.5
Allocated by City Council	51	10.6
Through farming group	32	6.7
Allocated by land owner (church, school, factory)	21	4.4
Given by friend or relative	111	23.1
Renting	1	0.2
Bought	1	0.2
Not known (i.e. respondent child or hired worker)	64	13.3
Total	480	100

Table 13 shows that access to a plot for cultivation has essentially been by staking a claim to a piece of open land. Some of the respondents accessed land through farming groups that was allowed to operate, or were allocated land by the City Council in 1992. Plots were also obtained through donations from relatives or friends. A very small percentage (0.4%) of the respondents rented or bought plots. Such cases appear to be under reported. The sale and leasing of plots indicates that there is a market for the urban spaces for crop cultivation. This underscores the value attached to land for cultivation.

The majority of the respondents (73 percent) were of the view that it was permissible to cultivate (Table 14). Fifty-five percent admitted that they cultivated without any form of permission, 30.2 percent and 15.0 percent had some form of permission from the City Council and rightful owners of the land, respectively. Those with City Council permission were members of co-operatives allocated land around 1992.

Table 14 Respondents' Perception of Legality of Cultivation

Respondents' Perception	% Respondents
Allowed to Cultivate:	
No	19.0
Yes	72.5
Do not know	<u>8.5</u>
	100
Who granted permission:	
None	54.8
City Council	30.2
Rightful Owner	<u>15.0</u>
	100

Table 15 Respondents' Views on Why Cultivation should be allowed

Why Cultivation should be allowed	Respondents %
For food production	56.0
Income generation	5.8
Land is idle	15.2
To clear the land	4.8
For employment	7.3
No land in rural areas	1.5
Recreational activity	<u>9.4</u>
	100

Fifty-six percent of the respondents were of the view that cultivation on available land should be allowed to enable food production (Table 15), because the land was idle (15.2 percent) and for recreational activities (9.4 percent). Cultivation was considered as providing opportunity for income generation and employment. Some respondents (1.5%) would want urban cultivation to be allowed, as they do not have access to land in rural areas.

6.2 Views on Alternative Land Use

Table 16 Respondents' View on Alternative Uses of the Land

Alternative Land Use	Ranking									
	1		2		3		4		Indifferent	
	No	%	No.	%	No.	%	No.	%	No.	%
Housing	320	66.7	69	14.4	9	1.9	1	0.2	81	16.9
Factories	81	16.9	223	46.5	21	4.4	19	4.0	136	28.3
Recreational	12	2.5	28	5.8	85	17.7	160	33.3	195	40.6

The ranking of alternative use of the lands under cultivation (Table 16) suggests that respondents gave more weighting to building residential accommodation followed by

factories. This is a reflection of the two problems facing the urban population, namely shortage of accommodation and high rate of unemployment. The use of some of the lands for recreational facilities such as parks, playing fields, etc. received very low ranking. This suggests that the respondents did not consider this as appropriate use of the urban spaces, given the need for urban agriculture.

6.3 Environmental Impact Awareness

Table 17 Awareness of Illegality of Stream Bank Cultivation

Awareness	%
Not aware	18.1
Aware	81.9
Specific Knowledge:	
Accurate	9.2
Wrong	9.8
Vague idea	16.0
Ignorant	20.0
No response	45.0

	100.0

The main concern about urban agriculture, by the City Council planners and managers, is the environmental impact and the resultant cost for urban environment management. The major issue has been on cultivation in wet lands in catchment areas and along stream banks protected by the Natural Resources Act of 1975. Cultivation of these areas contributes to silting of river systems and city water reservoirs. The respondents were asked about their knowledge and assessment of the issues. Table 17 shows that there is a high degree of awareness of the prohibition of stream bank cultivation. However, 65 percent of respondents were either ignorant, or could not specify, that cultivation was not allowed within 30 metres of the river/stream bank. Only 9 percent had accurate knowledge, or information.

Table 18 Awareness of Environmental Impact of Cultivation

Environmental Problem	Respondents %
None	54.2
Soil erosion	30.0
Destruction of vegetation	3.1
Silting	8.1
Other	<u>4.6</u>
	100

With respect to specific environmental problems due to urban cultivation, 54 percent of the respondents appeared unaware of the environmental impact of their activities as indicated in Table 18. For those indicating awareness, soil erosion was the main problem identified by 30 percent of the respondents. Other prominent problems identified were destruction of the natural vegetation and silting of waterways.

6.4 Source of Knowledge and Information

Table 19 Sources of Knowledge

	Radio	Neighbour	Relatives	Past knowledge	Children	Other	Total
Fertiliser type	6.7	2.7	2.0	77.3	0.6	10.7	100
Fertiliser rates	4.7	3.3	2.0	79.4	0.6	10.0	100
Seed type	5.3	6.0	2.0	82.7	0.7	3.3	100
Seed rate	5.3	2.0	0.7	85.3	0.0	6.7	100
Planting time	10.7	30.3	2.7	47.3	0.0	9.0	100
Planting methods	10.3	11.0	2.0	68.0	0.0	8.7	100
Chemical use	52	1.3	0.0	35.3	0.1	11.3	100
Soil erosion	44.7	1.3	0.0	47.3	0.7	6.0	100
Stream bank cultivation	74.7	1.3	0.0	18.7	0.7	4.6	100

The most prevalent source of knowledge for agricultural practices is past knowledge with the exception of stream-bank cultivation and chemical use where the radio is the main source (Table 19). The predominance of past knowledge, as an information source, clearly indicates that most urban cultivators have rural roots where agriculture is the source of livelihood.

Table 20 Environmental Information Sources

Information Source	Respondents %
None	39.5
Media	17.2
School	14.7
Background from rural area	7.8
Other people	7.8
General knowledge	6.5
City Council campaigns	4.0
Past knowledge from working on farm	1.5
Self-help Clubs	1.1
Total	100

About 40% of the respondents indicated that they did not have any access to environmental information (Table 20). For those reporting access to some information, the media and schools provided constituted major source of environmental information. City Council campaigns ranked lowly.

7. Conclusion and Policy implications

Urban agriculture is used mainly for subsistent maize production. It improves food grain availability, thus increasing household food security and real incomes available for other household requirements. Thus urban cultivation saves on food expenditure and augments household incomes. This is the incentive for cultivation on undeveloped urban land spaces.

This study has presented evidence showing that the rapid expansion in urban cultivation in the period 1991 to 1995 could be attributed to the effects of economic reforms initiated in 1991. As a result of ESAP, the urban population faced economic hardships due to increase in prices of basic food commodities (bread, maize meal, and milk), education fees, transport costs and retrenchments. As reported by Drakakis *et al.* (1995) immediately following devaluation and removal of subsidies in 1991, the price of maize meal, bread and milk rose by 14%, 32% and 13% respectively. The urban populations turned to urban cultivation for food security; savings on food expenditure and cash income generation from sell of surplus produce. Urban agriculture thus alleviates some of the economic hardships that worsened with the advent of ESAP.

Current urban planning byelaws and concepts regard urban agriculture as an inappropriate urban land use. Thus, the City Council discourages the practice. The cultivators acknowledge that their activities are not supported by urban authorities nor sanctioned by owners of the land, mainly the City Council. However, they regard the activity as necessary and the risks as worthwhile to sustain the livelihood of the families in face of economic difficulties.

The fact that some land is lying idle was given by respondents as a justification for their utilization of such land. Regarding alternative use of the lands under cultivation, the respondents gave more weighting to building residential accommodation followed by factories. This is a reflection of the two problems facing the urban population, namely shortage of accommodation and high rate of unemployment. Given the need for urban agriculture, the respondents did not consider as appropriate the use of the urban spaces for recreational facilities.

The majority of the cultivators were aware of but ignored the stream bank regulations. There was general lack of knowledge about the environmental impacts of cultivation on the urban environment. There are no formal programmes in place to provide information on landuse practices. Most of the cultivators use information based on agricultural knowledge and practices gained from past activities in rural areas.

Two factors will determine the future of urban space for agriculture. One is the increase in urban population that is likely to lead to increase in proportion of the population in the low-income bracket. The second is the continued economic hardship due to retrenchments, unemployment, and continued increase in cost of living. These factors will continue to make urban agriculture an important source for food. Due to these factors, local authorities should support cultivation on certain open lands. A clear policy on urban agriculture, as a significant land use, needs to be formulated. The Department of Agricultural Extension and Technical Services (AGRITEX) and the Community Services Department of the City of Harare should design a programme to provide information and extension on husbandry practices that minimises environmental degradation should be developed. Schools could be used as channels of information and education on environmental impacts of urban agriculture as well as proper land use management practices. The cultivated plots and silted waterways could be used as practical demonstrations for school programmes. The University Faculty of Agriculture could develop an outreach extension programme through farm field-schools whereby students and staff could provide training and advice on proper husbandry to the urban agricultural producers. The programme could be used for student field attachments or internship.

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