Impact of the Urban Agriculture Research Study in Zimbabwe

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Abstract

Urban agriculture in Zimbabwe is largely characterised by a harsh economic environment and a prohibitive policy framework. The Economic Structural Adjustment Programme (ESAP) started in 1991 has led to high cost of living for the urban households. In order to lessen the associated effects of economic hardships, most urban households had to seek for alternative coping strategies amongst which urban agriculture is the most common. Studies conducted by ENDA-Zimbabwe showed that between 1990 and 1994 land under open space cultivation in Harare increased by 92.6%. Thus, a total of 9288ha of land were under open space crop cultivation.

Research studies have shown that the practice of urban agriculture cuts across all income groups. Both the poor and the rich are involved in the activity. The main difference is expressed in terms of access to resources and the driving force behind the activity. Most urban farmers point out the importance of urban agriculture in meeting household food requirements and income generation and savings derived from consumption of self-produced food. A household socio-economic monitoring survey conducted by ENDA for the 1996/97 season, confirm the nutritional significance and economic benefits of urban agriculture. The farming households are well off in most respects than the non-farming households. Even after subtracting direct input costs, the farmers have a positive net benefit although marginal.

Despite the importance of urban agriculture to household food security, the activity is viewed by local authorities as detrimental to the urban environment. Common arguments against urban cultivation mainly relate to high rates of soil erosion and chemical pollution of soils and water bodies due to high levels of chemical and pesticide use in crop and vegetable production. However, most of these arguments are not based on empirical data but they are mere presumptions. Recent research work showed that pollution of urban rivers is mainly from industrial effluents and sewerage disposals rather than urban cultivation. The contribution of agrochemicals in water pollution is very minimal.

The absence of clear policies and statutory documents relating to urban agriculture has been

associated with multiple conflicts between the practitioners and urban managers. Besides conflicts arising among the practitioners for instance on matters pertaining to acquisition of cultivation land, these conflicts also arise between urban managers themselves especially on implementing some by-laws restricting open space urban cultivation. In some cases local authorities slashed down immature crops as a mechanism to curb the spread of the activity. This did not deter the growth of the activity as the harsh economic environment left the households with no option.

1.0 Introduction and Background

Cities are viewed as essential engines of economic and social development. With the advent of economic structural adjustment programmes in the developing countries over the last decade, pressure on urban scarce resources has been rising uncontrollably. In Harare, like most other developing cities, this has been exacerbated by increasing rates of rural to urban migration (in search of employment) and the incessant droughts since 1982. The rate of urbanization in Harare is currently estimated to be 4.5% per annum.

Under the economic structural adjustment programme (ESAP), some companies have either been liquidated or engaged in massive retrenchment programmes. Consequently, many employees have lost jobs that marked their major source of livelihoods. Since January 1997, seven firms in the textile industry have been liquidated with sixty more others experiencing serious problems. (Herald, 4 August 1997). These developments and the general rise in the cost of living have led most urban households to engage in informal activities to meet basic household requirements. Urban agriculture (UA) is one such informal activity.

The rise in urban agricultural activities in Zimbabwe is largely attributed to economic hardships (ENDA-Zimbabwe, 1994). It is viewed as a coping strategy by urban households to sustain their livelihoods (ENDA-Zimbabwe, April, 1996; Matshalaga, 1997; Mudimu, 1996), and is considered a spontaneous haphazard activity that is not planned for and hence not supported. Thus, the practice is widely viewed as an illegal activity as is not backed by any statutory instrument.

Urban agricultural activities take place on home fronts or backyards and open public spaces around the city's built environment. The other form of agriculture is the marketing of agricultural produce. This is usually carried out on street corners and some council-designated marketing stalls. On-plot farming is mainly confined to vegetable production of which the *brassica* species of green leaf vegetables is the most common. Rearing of small livestock, mainly poultry, is also an on-plot activity mostly practiced by the middle income households (ENDA- Zimbabwe, April 1996). Open space cultivation (off-plot) largely involves the production of cereal crops such as maize, sweet sorghum, and root tubers such as sweet potatoes. Such crop cultivation is usually on undeveloped land, land not suitable for buildings, infrastructural servitudes, and idle public land.

Off-plot crop cultivation is the main problematic variant of UA in which the practitioners have often clashed with the local authorities over the management of urban environments. While orthodox planning principles view such open spaces as green wedges or 'ecological lungs' of the city, the urban agricultural practitioners view such land as 'idle' and therefore should be put to productive use. The usual response to such practices by city authorities has been the slashing of the semi-mature crops as a deterrent measure to curb the activity. Most agriculturists view such responses as a manifestation of colonial practices where the policies that were in place were designed to serve a few minorities. Consequently, the practitioners have been unyielding and continued with their practices until the local authorities were forced to exercise a certain degree of leniency.

Rees (1997) attempted to explain the reason why urban farming is not seriously considered as a possible urban land-use option. He argues that the industrial approach of short-term economic efficiency, which takes pre-eminency over most public and private life values, has resulted in urban farming in some cities being underrated. With the emphasis on the open market economy, urban farming land has been viewed as a tradable commodity that should compete with other land-uses. Agricultural uses constitute the lowest land values in an urban area and are therefore considered uneconomic.

Most urban managers and planners take little regard of the concept of cities producing their own food as opposed to reliance on external sources. Urban farming is largely viewed as a transitory

activity, which will soon be wiped out of the city environment. This shows that the importance of urban agricultural activities to household food security is little understood.

Recent studies and workshops confirm that UA will remain a recurrent feature of the urban environment and therefore strategies on how to integrate this activity with existing urban land-use systems should be considered seriously (ENDA-Zimbabwe, June 1996; April 1996; Mbiba, 1995). For the poor households, UA is a survival strategy whereas for the better-off households, it is mainly recreational and a source of fresh vegetables. This can also be demonstrated by the dramatic increase of land under cultivation in Harare between 1990 and 1994. ENDA's aerial studies (1994) showed that area under cultivation nearly doubled within a period of four years and 9288 hectares (ha) were under crop cultivation. This excludes on-plot crop cultivation.

The first phase of UA brought out several issues that needed further investigation. The use of agro-chemicals was widespread in off-plot cultivation and such a practice posed risks to human health and soil and water conservation. Off-plot UA was practiced largely on poor soils, which explains why 88.4% of off-plot producers invested in chemical fertilisers despite tenure insecurities (ENDA-Zimbabwe, 1995).

The dangers of chemical use are many: high rates of chemical runoff may encourage apparent eutrophication, affect the health of water and food consumers, and increase plant toxicity and soil acidity beyond plant tolerance. The quality of raw water has been deteriorating over the years with the first signs of eutrophication being noticed in Lake Chivero (then Lake McIlwaine) in 1963. Water is a scarce commodity, but despite this, pollution has been on the increase. Recent large scale fish deaths and the outbreak of the water hyacinth suggested a stressed ecosystem due to high levels of pollution in the lake's catchment area. For the purposes of comparison, the smaller city of Gweru was monitored.

Eutrophication of the environment occurs when an excessive supply of plant nutrients disrupts ecological processes in water bodies or the soil. Eutrophication was therefore monitored and measured from water and soil samples that were collected from the project sites. Nearly a third of

the off-plot fields were found near streams, swamps or vleis and these situations can lead to pollution through runoff and leaching. The study sought to establish whether the problems of algal blooms, poor sedimentation, filter clogging, dirty colour, and smell and taste disorders could be attributed to the activities of UA. As in most other cities, Gweru and Harare recycle their water, and this has implications on the quality of water and the cost of treatment.

There are two acts law that specifically ban cultivation in environmentally sensitive areas: the Streambank Protection Regulation (Natural Resources Act, 1975) forbids cultivation within 30 metres from a stream; the Water Act (1974) also forbids cultivation to prevent downstream dry season river flows, and reduce erosion along with siltation. However, these bylaws are apparently not stringently enforced, leading to them being blatantly ignored. Based on the findings of Phase One, ENDA embarked on Phase Two of the UA Project.

The overall objective of the first phase of the research study was to document and analyze socio-economic, nutritional and environmental benefits and problems of UA. The more specific objectives included:

1. To determine the extent, spatial distribution and crop types of on-plot and off-plot cultivation in the mid-sized city of Gweru and update data for Harare.

2. To determine the economic impact of UA on urban households.

3. To assess the agro-ecological use effects on water and soil quality, and of UA product safety for human consumption.

4. To assess the overall nutritional impact of UA products on urban households.

5. To survey the environmental awareness of UA practitioners and explain the reasons for the degrading practices, constraints and requirements for curbing such practices.

6. To assist the policy makers with introducing policy changes favouring environmental protection and a fairer distribution of socio-economic benefits of UA to practitioners and consumers.

The household monitoring carried out in the second phase of the research set out to address in more detail the following objectives:

a) To determine the economic impact of UA on urban households (farming versus non-farming).

b) To assess the overall nutritional impact of UA products on urban households (farming versus non-farming) and health implications of the UA products.

c) To identify crop types of on and off plot urban cultivation and activities during the cropping season.

The environmental research centred on assessing the general impact of agriculture on the urban environment. This research sought to verify whether UA was contributing to the problems that were being associated with the cities' soil and water quality. The more specific objectives were to:

I. To assess the ecological impact of UA on soil and water quality,

To identify the impact of urban farming activities on vegetation, including deforestation and afforestation,

To discriminate and contrast soil and water pollution caused by UA and that caused by other sources and,

To estimate the annual average rate of soil loss from a range of cultivated plots.

Major research findings

Socio-economic aspects of UA

The research showed that gardening and cropping are the main agricultural activities carried out by urban agriculturists throughout the year. On-plot gardening is the most common activity being practiced by about 91% of households in Gweru and 65% in Harare. The activity is, however, impacted upon by the coming of the cropping season in terms of competition for land resources. The single most common vegetable grown is rape. Maize is the most common crop grown, in terms of hectarage and contribution to household food requirements.

Nutrition

In terms of the impact of urban farming on household nutrition, the monitoring looked at both farmers and non-farmers earning below Z$850 and between Z$8850 and Z$3000, had three meals per day. The proportion of farmers having three meals was, however larger. For Harare, most farmers had two meals a day whilst non-farmers had three. This was attributed to the fact that most farmers had their fields far away from home and therefore t was not possible to return home every lunch time to consume a meal.

The impact of UA was also assessed by looking at the quality of food consumed by the households. The research showed that for Gweru, the lowest income farming households have more opportunities per month to consume protein-rich foodstuffs than the non-farming households. This may be the result of income savings derived from the consumption of self-produced vegetables and crops. In Harare, there were no apparently clear patterns, but generally farming families fared better in months when household economy was heavily burdened. Discrepancies between farming and non-farming families became less as household income increased. Analysis of the growth rates of children below the age of five showed that children of urban farmers have a higher growth rate in terms of height and weight than those from non-farming households.

Household Income

The practice of urban farming is widely viewed by many farming households as contributing significantly to household income generation and savings. The monitoring exercise actually showed that farming households with incomes below Z$840 per month spend more money on food purchases than non-farming households. This was due to farmers having a high purchasing power derived from the sale of their produce. Such income is spent on the purchase of other foodstuffs such as beef. The consumption of own produce also contributes to household income through savings on vegetables.

Gardening, marketing and livestock production were shown to accrue positive benefits, whilst cropping had a negative cost, which is largely due to labour expenses, climatic risks and lack of appropriate farming techniques. UA can also be seen as fostering the social ties of civil society as households share and pool resources together, especially cropping inputs and during land preparation activities.

Environmental Health

Most metals occurred in levels higher than the maximum recommended daily intake rates by the World Health Organisation/ Food and Agriculture Organisation standards. These varied from 11% to more than 8000% higher than the recommended levels. The levels of heavy metals were highest in rape and least in maize. Generally, metal levels were higher in Gweru samples than in Harare. This may be because Gweru is traditionally a mining area. For Gweru again, levels of heavy metals were higher in vendor samples than in on-plot ones, whereas for Harare, the reverse was true. These findings point towards atmospheric pollution being the major culprit in the contamination of UA produce.

Soil Erosion

The results for soil loss estimation carried out before the agricultural season (Tables 1and 2) show that four out of the six study sites recorded soil losses greater than the recommended target levels of soil erosion. For Harare, all the sites had unacceptable levels. The losses recorded for Highfield (Mangwende Drive) were 64% higher than the tolerable levels, while

those for Highfield (Simon Mazorodze Road) were staggering 266% higher than that recommended. For Meyrick Park (Harare Drive) and Mabelreign (Sherwood Drive), the losses recorded were respectively 17% and 11% higher. In Mkoba and Senga, the losses were within safe limits.

Comparing the results of October 1996 and those of July 1997, the results for the two plots of Highfield and Meyrick Park (Sherwood Drive) remained uncharged. This implied that in these areas, the crop cover resulting from the crops being grown during the agricultural season was negligible. Generally, the rates of soil loss decreased at the end of the agricultural season. This was as expected because in October, the fields had been cleared and were bare, leading to erosion occurring unabated. During the growing season, the vegetation provided a little crop cover resulting in a reduction of soil erosion. At the end of the season when soil loss was estimated, there were many crop residues still in the field, which provided cover for the soils. In July, three out of the six plots had erosion rates that were above the target levels set. In Senga, erosion decreased by 25%, Mkoba by 17% and Meyrick Park by 72%.

Table 1

Rates of Soil Loss from Cultivated Land in Harare and Gweru in October 1996

Site and area type	Crop Type	Soil Conservation Method Used	Plot length and slope	Fm	K	X	I	C	Z (t/ha)	Zt (t/ha)
Senga 5G (Fersiallitic granite)	Maize	None	540m 3%	6	10	2	36	0.12	2.4	5-9
Mkoba 4G (Siallitic granite)	Maize	None	480m 1%	4	4.5	1.15	36	0.12	0.621	5-9
Highfield: Mangwende Drive 5G (Fersiallitic granite)	Maize	None	120m 1.8%	5	235	0.9	45	0.07	14.8	5-9
Highfield: Simon Mazorodze Road 5G (Fersiallitic granite)	Maize	None	180m 4%	5	235	2	45	0.07	32.9	5-9
Meyrick Park: Harare Drive 5E (Fersiallitic basic rocks)	Maize	None	360m 1.3%	7	100	1	45	0.07	7	4-6
Meyrick Park: Sherwood Drive 5E (Fersiallitic basic rocks)	Maize	None	300m 1%	7	100	0.95	45	0.07	6.65	4-6

Key:

Fm = soil erodibility

K = predicted rate of soil erosion from a standard bare plot

X = factor which combines slope steepness and length

I = vegetation factor

C = crop factor

Z = estimated soil loss

Zt = tolerable (target) soils loss

Table 2 Rates of Soil Loss from Cultivated Land in Harare and Gweru in July 1997

Site and area type	Crop Type	Soil Conservation Method Used	Plot length and slope	Fm	K	X	I	C	Z (t/ha)	Zt (t/ha)
Senga 5G (Fersiallitic granite)	Maize	None	540m 3%	6	10	1.6	36	0.12	1.92	5-9
Mkoba 4G (Siallitic granite)	Maize	None	480m 1%	4	4.5	0.975	36	0.12	0.53	5-9
Highfield: Mangwende Drive 5G (Fersiallitic granite)	Maize	None	120m 1.8%	5	235	0.9	45	0.07	14.8	5-9
Highfield: Simon Mazorodze Road 5G (Fersiallitic granite)	Maize	None	180m 4%	5	235	2	45	0.07	32.9	5-9
Meyrick Park: Harare Drive 5E (Fersiallitic basic rocks)	Maize	None	360m 1%	7	100	1	45	0.07	7	4-6
Meyrick Park: Sherwood Drive 5E (Fersiallitic basic rocks)	Maize	None	300m 1%	7	100	0.55	45	0.07	3.85	4-6

From this data, comparisons were made of the relative effects of variables (such as soil type,

geology, slope steepness, cultivation, plot length and crop type) on the amount of erosion caused by the cultivation. The results clearly showed that steeper slopes were more prone to higher rates of erosion because of the faster speed with which surface runoff moves resulting in runoff being more erosive. It was established that most of the fields of urban farmers are on sloping land. This is because most of the sloping areas had been left vacant due to their unsuitability for urban development. The current economic climate has forced people to exploit any vacant pieces of land.

The results of this field study do not illustrate any difference in the amount of erosion attributable to crop type as all the sites were predominantly cropped with maize. What the results show is that all the sites in Harare have unacceptable levels of erosion. This was probably due to Harare having higher rainfall than Gweru, as well as having a higher population pressure. This will continue to increase pressure on the environment as people continue to open new land for cultivation.

The results of the vegetation similarity analysis were from vegetation counts conducted in two plots (A and B) in Mabvuku measuring 200 x 40 square metres each. Plot A was on old field with 100% cultivation while Plot B comprised new fields with uncultivated section. It was observed that in Plot A, *Uapaca kirkiana* was the dominant species and *Julbernadia globiflora* contributed to the bulk of tree stumps. In Plot B, *J. globiflora* was dominant and contributed to the bulk of the tree stumps. The situation in B was as expected in normal circumstances in miombo woodlands. Plot A consisted only of the major miombo species while B had others. This might be due to the loss of the less-adapted species in Plot A as a result of recurrent cutting. *U. kirkiana* was the dominant species probably because it was left deliberately because of its fruit in Plot A since the other species had undergone cutting over a long period. On the other hand, in Plot B, *J. globiflora* was dominant, since clearing was still occurring in an area dominated by miombo vegetation.

Table 3 Comparing similarity between Plots A and B over the monitoring period

Similarity analysis	Apr '96	Oct '96	Dec '96	Feb '97
Overall similarity	90.22%	41.87%	31.51%	21.73%
Similarity without stumps	57.44%	19.44%	24.63%	27.27%
Similarity in deforestation levels	97.36%	47.2%	34.19%	0%

There was no similarity in deforestation levels by the end of February, because in Plot A, deforestation can be said to have been complete as the fields were now well established. Deforestation still occurred in Plot B, but at a rate much lower than that in October and December 1996.

2.0 Areas of impact relevant to the project

The approach to this survey followed closely the "effect-influence-output-impact network" (EIOIN). This was developed and adapted by ENDA-Zimbabwe to articulate the impacts attributed to the IDRC- funded programme. The EIOIN sought to bring out the effects and influences of each activity on the other activities, including the output and external factors, and how these were built up to result in the ultimate impact. Figure 1 shows a model that is a checklist of the stages where impact could be expected. During the writing of this paper, staff found the checklist useful but the models' diagrammatic representation was rather confusing. The major components of the EIOIN are shown as below. With the EIOIN, we were looking for impacts and influences at every stage of the project cycle and each stage had its own interaction with the next stage of the cycle. One of the assumptions of the model is that each activity has an output that could lead to an impact. The model therefore pointed to getting as much detail about the implementation process as possible.

Components of the Effect-Influence-Output-Impact Network

1. Impact of methodologies used when approaching the urban cultivators,

2. Impact of methodologies used during project initiation,

3. Impact of methodologies used during the research survey,

4. Influence of external factors on the methodologies used,

5. Influence of external factors on the project process,

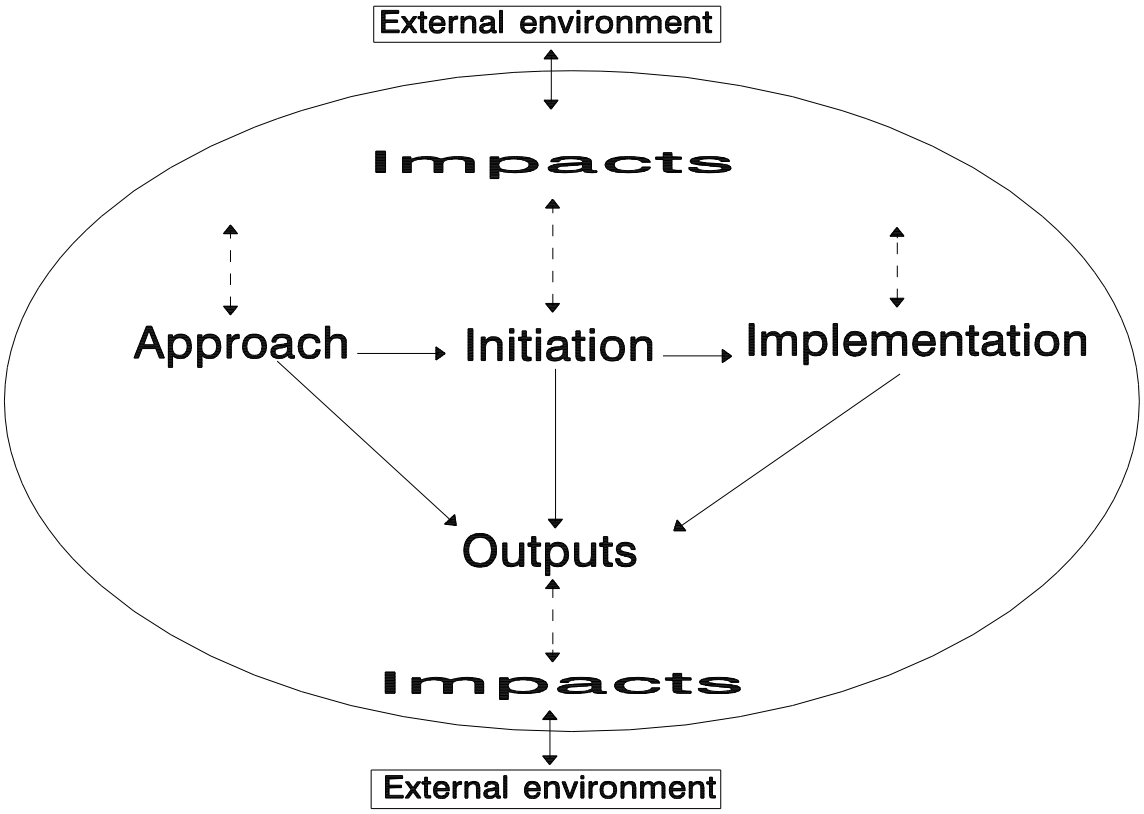
6. Influence of external factors on intended effects/influences (project interventions),

7. Influence of project interventions on the project process and

8 Influence of the project process on the output.

Following a lot of debate after the research survey, the EIOIN was refined and is presented graphically in Figure 1. The principles remained the same: at each stage of the project, there will be an interaction with the external environment (effects) of the activities being undertaken (input) and the results (outputs).

Figure 1 The Effect-Influence-Output-Impact Network



Human resources development

Four members of staff, three men and one woman, received training in the use and application of Geographic Information Systems (GIS). The GIS ArcInfo software package

was used to measure the actual urban land under cultivation. This knowledge was used in the mapping of UA in Gweru. However two of these members of staff have since left the institution, one to private industry and the other to do further studies at the University of Zimbabwe. The former member of staff at the university used the work done on UA by ENDA-Zimbabwe as the basis for his proposal to enter the Masters Programme in the Department of Rural and Urban Planning.

The project also sponsored one ENDA-Zimbabwe employee to study for a Masters degree in Environmental Policy and Planning. The thesis was based on a study of the impact of urban governance on UA. The thesis title was "An investigation into the potential role of cultivators in the reform of open-space cultivation in Harare." Within the institution, the UA team developed further skills in data management and the use of the Statistical Package for Social Scientists (SPSS) package in analysing and interpreting data from the socio-economic survey. There were masses of data generated from the household socio-economic survey that required in-depth adeptness with a statistical package. Hence, training of the UA team in SPSS was conducted. The training duration was two weeks. The project co-ordinator was able to develop management skills, which lead to him being appointed Acting Manager of the Research, Development, and Consultancies Division by the end of the second year of the project.

Members of staff also benefited from training in the use of survey equipment, namely the use of dumpy levels. This knowledge has also been transferred to staff of other agricultural projects, such as the co-ordinators of the Community Drought Mitigation Project and the Community Management of Wetlands project. The survey equipment was used to estimate the levels of soil loss from the UA plots. A total of seven research assistants were recruited for the duration of the study to help administer the household questionnaires, and collect soil and water samples. Training was intensive and centred on the project background, objectives, questionnaire techniques, interview approaches, pre-testing of the questionnaire and its review.

The impacts are sometimes difficult to articulate, largely because most of the staff who attained skills on the project used these skills to seek positions elsewhere that were more

lucrative. However, their legacy was, in most cases, sufficient for those remaining staff to continue with the implementation of the project. One way of looking at this movement is that when people left the institution, training was not lost to the system. Rather, this training was creating a pool of experts in the field of UA, both in the institution and in the country and hence human resources development was not only limited to the ENDA-Zimbabwe.

The project allowed the staff to gain multiple skills. Staff who had previously only a rudimentary knowledge of chemistry became familiar with industrial standards for raw effluent and wastewater. This was through the water analyses carried out to determine the amount of pollution in the urban water sources. The work on heavy metals was also an added insight to the staff. Staff became familiar with the chemical elements of the periodic table, especially the heavy metals. In addition, staff was also familiarised with plant nutrients, toxicity and deficiency levels and their symptoms.

2.2 Institutional Capacity Strengthening

A computer, digitizer, colour plotter and printer were purchased to draw maps showing the extent of UA, and to word process the research findings and produce project documents. Other projects have also made use of the colour plotter and this has enhanced mapping presentations throughout the institution. Other uses of the computer and colour printer have included the production of quality certificates for internal programs. In terms of income saved through the internal production of certificates, it is estimated that at US$1 per certificate we have saved about US$30 per training course and probably more than US$300 over the last two years. Project documents from the first and the second phases have been widely distributed to the libraries and resource centres of other institutions and non-governmental organisations (NGOs). The work done by ENDA-Zimbabwe on UA has helped put it on the map of Zimbabwean NGOs and this has resulted in the organisation being widely recognised as one of the leading organisations in the country.

When the project began there was a general negative attitude towards UA. Some members of the city councils were suspicious as to our intentions and wary about having a relationship with other NGOs and us. The fact that we proceeded to engage in debate with the councils

based on empirical findings has placed UA in a better light. It has also reduced some of the misconceptions about the work of NGOs.

There have been four reports, and three workshops held on the subject. These reports include:

UA in Harare (1994). ENDA-Zimbabwe. Harare, Zimbabwe.

UA in Zimbabwe: Realities and Prospects (1996). ENDA-Zimbabwe. Harare, Zimbabwe.

UA: Results and Recommendations of a Household Survey Conducted in Harare (1996a). ENDA-Zimbabwe. Harare, Zimbabwe.

UA in Gweru: Results and Recommendations of a Household Survey Conducted in Gweru (1996b). ENDA-Zimbabwe. Harare, Zimbabwe.

Proceedings of a one-day workshop on UA in Gweru (1996). ENDA-Zimbabwe. Harare, Zimbabwe.

UA in Harare: Household Nutrition, Economic Costs and Benefits (1997a). ENDA-Zimbabwe. Harare, Zimbabwe.

UA in Gweru: Household Nutrition, Economic Costs and Benefits (1997b). ENDA-Zimbabwe. Harare, Zimbabwe.

Environmental impact of UA in the cities of Harare and Gweru (1998). ENDA-Zimbabwe. Harare, Zimbabwe.

Environmental and socio-economic impacts of UA Workshop (1998). ENDA-Zimbabwe. Harare, Zimbabwe.

This has resulted in a core of people within urban councils who have developed an interest in seeing progress towards the legalisation of UA. Even central government has shown an interest in this topic, as demonstrated by the active participation of local authorities (councillors) and the Department of Physical Planning at the UA workshops held by ENDA-Zimbabwe. In a workshop organised by ETC International and ENDA-Zimbabwe in 1996, ten of the twenty-seven participants were from the urban councils. This at least indicates that there was some interest towards the subject.

2.3 Effectiveness of local partnerships with other institutions or organisations

Partnerships were established with the University of Zimbabwe's Department of Food Sciences, which assisted in designing the research to determine levels of heavy metals in UA products. Two former employees also managed to use some of the research findings on UA as bases for their postgraduate studies.

Some success was also met within local government. In 1997, the Harare City Council set up an UA Committee comprising various stakeholders. These stakeholders included NGOs such as ENDA and Environment 2000, which is an environmental pressure group. The Wildlife Society of Zimbabwe, Ratepayers and Residents Associations, Department of Agricultural, Technical and Extension Services (AGRITEX) as well as municipal and district officers are represented in this committee. The mandate of the UA Committee is to keep an update of the activities of UA on open spaces belonging to the city council. The committee meets every time there is an urgent need, otherwise meetings are held on a monthly basis. Some of the issues debated on include illegal streambank and natural vlei cultivation, enforcement of bylaws related to illegal cultivation and the control and management of urban farming areas.

2.5 Added Value of a Multi-Disciplinary Approach

A multi-disciplinary approach was adopted in order to go beyond the conventional characterisation of the extent of UA. This multi-faceted approach wads used to assess the socio-economic and ecological impacts of UA. The research looked at household nutrition, socio-economic costs and benefits, and environmental impacts. The benefits of this holistic approach were that none of the different aspects of UA were treated in isolation in order to address the specific objectives as specified in the project proposal. The methodologies employed were aerial photography, household questionnaire, transects, soil and water analyses, erosion determination, crop descriptions, analysis of UA products and vegetation.

In addition, the team was comprised of experts in various disciplines. These were an urban planner, a biologist, a socio-economist, an environmentalist and a cartographer who were

involved in various aspects of the study.

Aerial Photography

Air Survey Company conducted an aerial survey over the City of Gweru. The photographs were digitised using the Geographical Information Systems (GIS) ArcInfo software package. This enabled the measurement of the actual land area under crop cultivation. The mapping of the extent of UA provided maps that were much needed. Although for Harare some maps had been produced in the early eighties, these needed to be upgraded, as was done in 1994. For Gweru, the maps produced in 1996 were the first of their kind. In Gweru, the area under cultivation was found to be 2257 hectares, whereas for Harare it was 9288 hectares. For Harare, this represents 8.8% of the total land area of the city and an increase in UA since 1990. For Gweru, the area under cultivation represented 8.8% of the total land area for the city. This shows that UA activities are continually expanding in Zimbabwean cities. Prior to the ENDA-Zimbabwe study, no other institution or individual had undertaken determining the actual or potential rates of soil erosion attributable to UA.

Household Survey

A preliminary household survey that led to identification of monitoring households was carried out in August 1996. It was considered important for household monitoring to take place in areas where field environmental monitoring was being conducted. The assumption was that activities within the household are related to the environment in the cropping fields. The preliminary survey was conducted across the suburbs to identify and select monitoring households. A street-by-street random number sampling procedure was used in the process.

Main areas of monitoring were:

Socio-economic changes within the household

This addressed demographic, social and economic changes within the household during the month. The actual household costs and benefits of UA were calculated each month.

Household Nutrition

Using a monthly questionnaire, changes in the diets of households were noted. The growth rates (height and weight) of children under the age of five years in both farming and non-farming households were measured during the monitoring period.

Environmental Impact Assessment

Transects

The main method used for the environmental monitoring was that of transects. Transects are based on general observations on a broad range of specific factors and this research placed special emphasis on soils, water, crops and vegetation.

Soil Sampling

Soil samples were collected using an auger from the top 15-cm of soil. Where an auger could not be used, soil clods were collected in sealed plastic bags from the surface. Transects were walked along a catena and samples collected where change was noted on the surface in colour, texture or degree of wetness. These samples were then sent for analysis based on agricultural and environmental criteria. Analysis was carried out for:

Recommendations were then made to improve the productivity of the soil in terms of crop production.

Water Sampling

Water samples were collected in plastic bottles at the sources in the transect sites. Wherever possible, water was collected at the beginning, the middle, and the end of the rivers. The results of the analysis were analyzed using World Health Organisation (WHO) standards for drinking water and the city council's Wastewater and Effluent standards. The main emphasis was assessing the gravity of the contribution of inappropriate farming practices to pollution of the water bodies.

Erosion Determination

Erosion determination was done using the Soil loss Estimation Model for the Southern

Africa (SLEMSA) (Elwell, 1981). This model was developed using four different systems: crop, climate, soils and topography. SLEMSA assigns values to variables gathered from field information and combines them to estimate actual sheet erosion from croplands. SLEMSA is based on modeling principles under which the complexities of the "real world" system are simplified to provide a means of providing soil loss in tons per hectare per year. The SLEMSA equation is:

Z = KCX (t/ha/per)

Where is C is described the protection of the soil through vegetation against the erosive forces of the rain and is determined through seasonal rainfall energy (E) intercepted by the vegetation (I). K is a predicted rate of soil loss from a bare plot in tons per hectare from standardised plots. It depends upon seasonal rainfall energy (E) and the erodibility of the soil (F). The X factor adjusts the soil loss estimates for different slope steepness (S) and length (L) and the factor C for differences in vegetation cover. Soil loss from cropped lands (Z) is then calculated from the formula.

The results on results potential rates of soil erosion from UA plots were the first of their kind in the country.

Crop Descriptions

The crop descriptions were first carried out to enable us to fit in the crop variable in the SLEMSA equation gives specific values for various crops because ground cover influence erosion to a large extent. For example, sweet potatoes have more ground cover than maize and so more erosion is expected in fields planted with maize that with sweet potatoes. We also looked at crops to give us a general overview of the type of crop production in which urban farmers in the transect areas were engaged in.

Vegetation Analysis

Vegetation Analysis was carried out periodically by looking at the presence and absence of different plant species in the successive monitoring sessions in all sites except Mabvuku. In

Mabvuku, two plots were compared in terms of woody species composition in order to assess the effect of opening up areas for cultivation and the implications of deforestation.

For this study, a relatively less computationally-demanding approach was opted for which uses a coefficient of similarity where the contribution of each species is weighted by a measure of its abundance. This is the Czekanowski coefficient of similarity, calculated as:

$S = 2 \sum_I \min (x_i - y_i) / \sum_I (x_i + y_i)$ (after Motyka *et al*, 1950; Bray and Curtis, 1957).

Where S is the similarity coefficient and (x_i, y_i) are relative amounts of species x and y. This is then expressed as a percentage by multiplying by 100.

Analysis of Heavy Metal Toxicities in UA Products

Vegetables (maize, rape and tomatoes) were collected in Harare and Gweru. Samples were collected from a total of seven suburbs. These samples came from on-plot gardens and street vendors who had sourced the vegetables from a non-urban market. This was to enable the practitioners to make a comparison between levels of heavy metals in urban and non-urban products. The work on heavy metal toxicities in products of UA provided the first quantifiable results for the cities of Harare and Gweru.

2.4 Gender Sensitive Analysis

The household monitoring carried out by ENDA-Zimbabwe was not gender- focussed; rather it was gender-neutral. The research did not consider the fact that although women comprise the majority of the practitioners engaged in UA, their needs have so often been neglected in the planning of research and urban settlements. This situation is not only found in Zimbabwean cities, but in most developing countries. Moser (1995) in an attempt to explain why most urban policy remains "essentially gender-blind" argues that policy makers are much concerned with development control mechanisms rather than empowerment of the urban women. Having said that, the data from the household questionnaire was, however,

disaggregated by gender. At the time of analysis, certain gender issues came to light as discussed below.

Gender implications in urban farming

The activity of UA can be viewed in terms of gender relations within a society. In Zimbabwe, as in most other African countries, crop and vegetable farming is culturally viewed as the domain of the women. Farming was historically practiced in the rural areas. As most of the men migrated into urban areas in search of off-farm formal employment, this meant that farming in the rural areas was entirely left at the hands of the women. This also had significant impact on the land use practices within the urban environments. Agriculture was never seen as a viable land-use option for the open spaces in the cities and towns.

Besides the fact that the participation of women in UA may be viewed as a cultural norm, it is largely the need to meet household food requirements that pushes women to violate urban planning by-laws. Matshalaga (1997) pointed out that women are the principal actors in the aspects of household food security. Their roles in this aspect include actual food production, acquisition, preparation, and management of food stores. As food purchases became more expensive due to removal of subsidies and the concurrent decline in real wages, the women had to devise coping strategies in order to ensure food security within the household.

However, UA should not be solely viewed as a mechanism to ensure the availability of sufficient food to the household. Urban farming also amounts to saving on income that could be used on food purchases. Maxwell (1995) argues that urban farming can be a means of protecting other sources of women's income especially where allocation from husbands to meet household needs may be insufficient.

In a study conducted by Mudimu (1996) it was pointed out that women are the main participants in UA, as they are not formally employed as the men are. The women farmers spend an average of five to six hours in the fields usually at peak periods of land preparation and weeding. Most women gain the support of their husbands whereas few men are found

against the activity as they view agriculture as the image of poverty. Men also view UA as having marginal returns.

This underlines the fact that urban planning and management should conform to emerging socio-economic challenges to ensure the sustainability of the urban environment. Planners should consider gender implications in the design of urban settlements. Most of the cultivation activities take place within the homesteads and on open spaces adjacent to the residential areas. As women are the main practitioners in these agricultural activities, the issue of distance becomes important, as they are also involved in other household chores, which include childcare.

2.5 Leverage of Non-Centre funds

ENDA was also fortunate to receive non-IDRC funds in currency to strengthen the original project achieved. ETC International and the Dutch government sponsored the first national workshop on UA workshop in June 1996. In addition, the Dutch embassy provided Z$20.655 to supplement the amount budgeted for the computer and digitizer. However, even after this contribution, there was still a deficit, which ENDA footed. Without the additional contribution from the Dutch embassy, it would have been very difficult to purchase the equipment that was very much needed. Acquiring this equipment turned out to be worthwhile, although the indirect benefits may not have been immediately obvious at the time. This was because the equipment has also been utilised for ENDA projects in other divisions such as the Training Division and the Sustainable Natural Resources Management Division.

2.6 Methodological and Scientific Advances

The issue of heavy metal toxicity in UA products is of particular importance because of their exposure to potential pollutants (that is, polluted soil, water, and air). Crops grown in urban areas are often an important pathway for heavy metals into the human body. Heavy metal toxicity is a function of a number of factors including initial body levels, total dietary intake, absorptivity of the metal, interaction with other metals, body weight, sex and age. This made

the whole research on heavy metal toxicity more complicated but still very relevant.

The results of the nutritional analysis were rather alarming as shown below:

Table 1: Percentages by which metal levels in UA crops exceed maximum recommended intake rates (Harare)

Metal	Rape - Gardens		Rape Vendor	Maize - Fields	Maize - Vendor
Zinc	29	-	-	-	
Nickel	1648	1578	386	384	
Copper		-	-	-	-
Cobalt	2502	2395	452	722	
Manganese		5776	7098	271	1108
Cadmium		2572	2453	607	631

Table 2: Percentages by which metal levels in UA crops exceed maximum recommended intake rates (Gweru)

Metal	**Rape (Gardens)**	**Rape (Vendor)**	**Tomato (Gardens)**	**Tomato (Vendor)**
Lead	458	7560	-	-
Zinc	111	361	194	262
Nickel	1175	1678	677	879
Copper	41	214	81	58
Cobalt	2413	3238	806	672
Manganese	8746	6587	4873	3603
Cadmium	2206	3212	1135	1258

It must be pointed out that the levels observed in all samples are those of unwashed and uncooked samples and the effects of washing and cooking have not yet been investigated and hence more work still needs to be done. The findings of this research however pose the

following questions:

1. "What really are the sources of the pollutants and what is the contribution of each of each source towards the heavy metal levels found in UA crops?"

The possible sources vegetables samples from on-plots are: gardens, rubbish pits close to gardens, corroding zinc structures such as chicken pens and fences, soil on which they are grown and the water used for irrigation. For vendors, possible sources are exhaust fumes, and stagnant water in metal containers used to wash vegetables or keep them cool.

2. "Do pre-cooking preparations and the cooking process itself reduce the levels observed such that when these crops are taken the total heavy metal intakes do not exceed recommended levels?"

In the developed world, metal pollution into the environment has been showing a downward trend. By contrast in the developing world, it has been on the increase. The main reasons for this are:

- Inadequate financial resources force the countries to rely on technologies that are often obsolete and pollution prone.
- Environmental regulations are either lax or ineffectual.
- Industrial operations that cannot meet the strict environmental regulations in the developed countries tend to be relocated to the developing countries.

This, therefore, calls for more stringent measures to combat pollution and further research on the risks and possible impacts of heavy metal toxicity in UA products.

2.7 Result utilisation by non-research entities for specific interventions for policy

Most of the views on open space cultivation given by the planners in the City of Harare, had, until the research study carried out by ENDA, been negative. That open space cultivation

causes land degradation and interferes with planned development programmes of the City of Harare were the most commonly shared views by the planners in the Harare City Council. This was because they were not aware of the results of the studies carried out by ENDA-Zimbabwe that showed the extent and magnitude of this degradation.

One common and negative view, that open space cultivation interferes with the planned urban development of the housing, commercial and industrial sectors seems to be based on the traditional school of thought that defines urban areas as those where agricultural activities are absent, while rural areas are defined by the existence of agriculture as the major activity. That Harare uses this traditional school of thought in its view of "urban" and "rural" was reinforced by the Department of Housing and Community Services' view that Harare has no land for agriculture. While this department acknowledges that there are open spaces within the cities borders, it argues that land should not be allocated to agriculture.

However, planners in the Council's Health Department, the Town Planning and Co-operatives Sections now see the positive aspects of open space cultivation; that it provided food, incomes and informal employment to the cultivators. This was achieved through various consultative meetings with the directors and officials from the following departments: Engineering and Works, Town Planning, City Health, City Valuations, Co-operatives, and Housing and Community Services.

Difficulties have been encountered in that council officials will co-operate during discussions, but fail to implement the recommendations or commit themselves in writing. Progress with local authorities, though slow, has set in motion a process that will, in future, see UA being acknowledged as a viable land-use option. The attitude of the local authorities has somewhat hampered progress pertaining to policy shifts that regard UA as a viable urban land-use option.

Within central government in Zimbabwe, natural resources planning and management relevant to agriculture is largely done by the Ministries of Agriculture, Local Government, Regional and Urban Development, and Environment and Tourism. Discussions with planners in the responsible departments within each of these ministries shows that these departments

do not have mandates for natural resource planning, use and management in Harare.

Discussions have shown that central government is not entirely opposed to open space urban cultivation in the cities of Harare and Gweru. A general view expressed by the above central government departments is that city council should develop and recommend to central government a desired position for recommendation and approval. In line with this central government position, the Environment and Education Committee in 1992 passed a resolution to allow open space urban cultivation in Harare. The Harare City Council was then asked to develop the specific implementation mechanisms for this activity in consultation with other government departments. However, this recommendation was neither gazetted nor publicly debated in both parliament and city council. Furthermore, the basis for this policy shift in favour of open space urban cultivation seems to have been based on the sympathy of the members of the Environment and Education Committee for cultivators. Policies enunciated to date are merely rhetorical since people cultivate of-plot areas in any way they see fit.

The results of our research showed that the following elements were present in quantities that were too high for human consumption, irrigation use or to support aquatic life: manganese, potassium, iron and sodium. They are potentially harmful to humans as they pose a health hazard. Through efforts by ENDA to disseminate the results of our research, it was reported that the City of Harare is seeking a "speedy promulgation of stringent anti-pollution bylaws, an imposition of hefty fines against polluters to protect the city's sewers, sewage treatment works and water" (The Herald, August 16, 1997).

4.0 Overall Evaluation of Determinants

Institutional and Legal Framework

UA in Zimbabwe subsists in an environment governed by a plethora of fragmented and uncoordinated legislation dealing with environmental issues. At the time that the research was carried out, there were 18 pieces of legislation administered by at least eight different ministries that have a bearing on environmental management. This has made it difficult for the implementation of comprehensive urban environmental planning and management systems. Most pieces of current environmental legislation date back to the colonial era, and as such are not adaptive to the current and emerging socio-economic and environmental problems in urban centres.

Central Government Level

The Ministry of Mines, Environment, and Tourism is responsible for all issues relating to the management of natural resources. The Department of Natural Resources within the Ministry is critical for natural resource management countrywide. This department derives its statutory mandate from the Natural Resources Act, Chapter 150. The department offers secretarial services to the Natural Resources Board (NRB). The board is supposed to exercise general supervision over natural resources. The Natural Resources Act gives the Board powers to order any occupier, owner or user of land to implement any conservation measures it deems necessary.

The Department of Natural Resources also has a mandate to influence other government departments and agencies to work with provincial authorities and the public to conserve and enhance environmental quality. The Research and Technical Branch within the department is concerned with environmental monitoring and research. The Extension Branch promotes environmental awareness whereas the Inspectorate oversees compliance with environmental regulations as under the Natural Resources Act. The Streambank Protection Regulation under this Act stipulates the no cultivation should take place within thirty metres of a streambank.

However, the department's activities have been largely concentrated in the communal areas

and have been ineffective in the area of urban environments. This could be due to the multiplicity of players involved in urban environmental management and planning.

Ministry of Local Government, Housing and Public Construction

This ministry oversees and regulates all council activities, in both rural and urban areas. These councils ultimately have jurisdiction over their areas and are responsible for projects or activities carried out in their areas.

The Department of Physical Planning within the ministry derives its mandate from the Regional, Town and Country Planning Act (RTCPA), 1976. The jurisdiction of the department as stipulated in the Act is to oversee and take charge in:

> "The co-ordination of the planning of regions, districts, and local authorities with the object of conserving and improving the physical environment and in particular promoting health, safety, order, amenity, convenience and general welfare as well as efficiency and economy in the process of development and improvement of communication". (Preamble; Regional, Town and Country Planning Act, 1976).

Enshrined within its mandate is the protection of public interests and powers for local authorities to issue development permits and prepare master and local plans. The department gives advice to local authorities, approves, and monitors their plans. It also recommends change of use for any state land where there is a demonstrable need. However, the RTCP Act in its definition of urban development (section 22, subsection (b), paragraph (iii) states that use of urban land for agricultural purposes does not constitute land development (Government of Rhodesia, 1976). The Urban Councils Act (section 235 (1)(j), gives the Minister of Local Government the authority to make regulations prohibiting or regulating cultivation in local government area (Government of Zimbabwe, 1995).

Although these acts do not explicitly prohibit urban cultivation, they paint a negative picture of the activity.

Local Authorities

Local authorities are partly the creation of central government linked through the Ministry

of Local Government, Housing and Public Construction. Through this Ministry, central government imposes controls, monitors, and interferes with operations of local government on matters of urban land, housing and finance.

Urban council activities in Zimbabwe are also governed by the Urban Councils Act (1995). Urban councils are supposed to provide certain activities to areas under their jurisdiction ranging from the provision of utilities to the engagement in certain types of economic activities. These functions can be described as the regulation and development of land, and the provision of public infrastructural services.

Local authorities play a very crucial role in safeguarding the environment of the areas under their jurisdiction. They articulate government policy and implement government regulations and standards relating to certain aspects of the environment. The Urban Councils Act (1995) empowers local authorities to formulate their own by-laws. However, these by-laws should not contravene the enabling legislation. Thus, powers of local authorities to enact regulations governing the urban environment are still curtailed by higher statutory and ministerial powers.

From time to time the Harare City Council, for instance, sets up some committees to deal with particular environmental issues, such as the Environmental Management Committee. However, most of the committees formulated to date have been to try to curb the issue of 'illegal' urban cultivation rather than to seek ways to promote and improve on the activity. In December1997 for instance, the Harare City Council formulated an UA Committee whose main recommendation at its first meeting was to slash all maize crops within the stipulated 30m distance from streams. Such recommendations are yet to be executed.

Besides the Regional, Town and Country Planning Act, the Urban Councils Act and the Natural Resources Act the other Acts directly impinging on UA include the Water Act and Public Health Act. The Ministry of Agriculture, on the other hand, has a significant role to play especially through AGRITEX.

Non- Governmental Organisations (NGOs)

There are a number of NGOs playing an important role in environmental management. Leading NGOs in the field of environment include ENDA-Zimbabwe which has been carrying research into UA and advocating for policy changes; Environment 2000 has been involved in a number of projects ranging from waste management to educating urban communities on various aspects of the environment; and ZERO which has carried out research into various environmental problems.

It is however, unfortunate to note that no NGO, government institution or local authority department is actively working with the urban micro-farmers with a view to improve farming practices. This would ensure that conservation mechanisms are put place and productivity is boosted. In some cities such as Mutare and Gweru, the Ministry of Agriculture's department of Agricultural and Technical Extension Services (AGRITEX), and the Zimbabwe Farmers Union (ZFU) have in the past worked with the urban farmers to improve their farming practices. However, such efforts were not sustainable as there was no explicit legal backing.

Politics of Urban Cultivation

The practice of urban cultivation cannot be divorced from central and local authority politics. As the activity is closely linked with the economic hardships associated with ESAP politicians and urban managers in general are in a dilemma to implement existing regulation measures as pointed out in the existing statutory instruments and by-laws. The subject of discourse evolves around humanitarian ethics vis-à-vis 'urban' legal requirements.

The history of crop slashing as a regulatory measure dates back to as far as the early 1980s. This however, has been characterised by shifts of council policy between accommodation of the activity or undertaking repressive measures. Urban councils have generally tolerated the activity in periods of drought and economic hardships. However, no consensus has been reached within most council structures.

Some city councillors and Members of Parliament in Harare, particularly those in high-density low-income areas have encouraged the activity in their respective wards or

constituencies and yet they have not dared to advocate for policy changes. Politicians have been seen to be double faced; in their areas of operations (constituencies) they are sympathetic to the plight of the farmers and yet in council chambers and parliament they are silent or supportive of regulations prohibiting open space cultivation.

At a workshop bringing together some urban managers, politicians and micro-farmers a vital question was posed; "Are political statements policies?" This was in reference to a situation where some farmers had their maize slashed by council officials after having been given a green light to cultivate by their Member of Parliament.

Towards an Enabling Environment

Various attempts to rationalise the activity have often been futile due to conflicting decisions within the city council's departments, the governing statutes and the relevant government ministries. The absence of a clear policy framework has hindered the development of UA.

In 1992 a resolution to allow open space cultivation was passed by Harare's Environmental and Education Committee, comprising Harare City Council's Department of Housing and Community Services, NRB, and Central government departments of Natural Resources, Physical Planning and AGRITEX. The Harare City Council was tasked to develop the specific implementation mechanisms for the activity in consultation with the aforementioned departments.

The Department of Natural Resources was tasked with the identification of land suitable for cultivation, whereas AGRITEX was tasked with constructing conservation measures and the City Council would allocate land to the cultivators. This proposition never took off due to alleged political interference by local politicians in land allocations and handling of the offending cultivators (Masoka 1997).

Urban cultivation co-operatives

These are regarded as semi-legal cultivators since permission to cultivate was granted by the Harare city council. The city council initiated these 'co-operatives' in 1986 as a move to try to control and organise the activity of cultivation. This was also consistent with the country's

pursuance of the socialist ideology, which favoured creation of co-operatives. Nevertheless, the resultant structures were not co-operatives per se, but more appropriately, groupings of cultivators with the sole purpose of gaining access to land.

Cultivation land was apportioned free of charge on a short-term lease basis. The co-op members were supposed to renew their leases on an annual basis. This was never fully complied with in subsequent years as some cultivators continued to cultivate annually without pre-consultation with the city council.

At one incident, in February 1989, council workers slashed about 12 hectares of the maize crop near maturity. This included the fields of a local co-operative that had obtained permission from the ward councillor (Herald, February 20, 1989). The council was thereby obliged to compensate the co-op members for the slashed maize.

The Simon Pitt Incident

This is a case of a councillor within the Harare City Council representing a low density, high-income suburban location. In April 1997, the councillor sanctioned and funded the slashing of three hectares of the maize crop close to a stream within his area of jurisdiction. Most of the fields belonged to locally employed domestic workers. The councillor was merely acting on the recommendations of a local community based environmental conservation group.

The Executive Mayor of Harare was not amused by the attitude of the councillor and ordered the councillor to compensate for the slashed maize. The councillor was however, adamant that he had acted according to the existing regulations. The matter was to be brought before a disciplinary hearing.

In the last couple of years, the Mayor of Harare has been sympathetic to the plight of the cultivators. For instance, in 1996, the Mayor acquired six 000 tonnes of maize seed to distribute to some councillors for their constituencies (Financial Gazette, December 5, 1996). However, the Mayor of Harare and City Council's Environment and Development Committee argue that UA need to be organised and management structures should be set up

if the activity is to be sustained. Cultivators also need training in appropriate methods of agricultural production and conservation of the natural environment.

Conclusion

The very nature of the research was pertinent to the quality and relevance of the results obtained. The policy arena was not favourable to the promotion of UA, since the activity was deemed as illegal. As detailed in the legal and institutional framework, the study was launched against a background of social, political and institutional disharmony between the practitioners and the local and central government authorities. Institutional linkages were established through continuous dialogue in feedback workshops and through the UA Committee. The institutions included: Ministry of Local Government, Rural and Urban Planning, Ministry of Agriculture, Ministry of Environment and Tourism, Ministry of Health, Department of Health in the City Municipality and the University of Zimbabwe. This increased the diversity of ideas available to reach a workable policy recommendation and open further avenues for research. The way forward for ENDA lies in developing and implementing a practical model for UA. This can be done in partnerships with other stakeholders, such as city council, AGRITEX, and the Natural Resources Board. This model can be tested in pilot cities before being replicated elsewhere. ENDA also intends to pursue further the issue of heavy metal toxicities in urban products. The research design could look at centering at unwashed and washed samples, and comparing vendor, garden and supermarket samples.**Bibliography**

1. Bowyer-Bower T.A.S and Tengbeh G. 1995. **The environmental implications of illegal) UA in Harare, Zimbabwe.** Working Paper No. 4 of ODA Research Project R5946.

2. Chaipa, I. and King, B. 1988. **Urban agriculture in Zimbabwe: Nature, Significance, and Prospects.** Paper presented at an International Conference on Urban Policy in Southern Africa.

3. ENDA-Zimbabwe, 1994. **UA in Harare.** Harare, Zimbabwe.

4. ENDA- Zimbabwe, 1996a. **UA in Zimbabwe: Realities and Prospects.** Proceedings of a National Workshop held at Mandel Training Centre, Harare, Zimbabwe.

5. ENDA-Zimbabwe, 1997b. **UA in Gweru: Results and Recommendations of a household survey conducted in Gweru.** Harare, Zimbabwe.

6. Maxwell, D.G. 1995. **Alternative Food Security strategy: A Household Analysis of UA in Kampala.**

7. Mbiba, B. 1995. **UA in Zimbabwe**. Avebury, Ashgate Publishing Limited, England.

8. Moser, C.N. 1989. **Gender Planning in the Third World: Meeting Practical and Strategic Gender Needs.** World Development, Volume 17 Number 11.