Extension Domains among Urban Farmers in Atteridgeville (Pretoria, South Africa)

Mmakolwane J. Maswikaneng, M Tech Student  
Wim Van Averbeke, Professor  
Reinald Böhringer, Principal Lecturer  
Centre for Organic and Smallholder Agriculture (COSA)  
Department of Agricultural Management  
Elsa Albertse, Professor  
Institute of Life Sciences  
Technikon Pretoria, South Africa


Abstract

The article identifies and defines three extension domains among urban farmers in the informal settlements of Atteridgeville. These consist of home gardeners, community-project gardeners, and users of open urban spaces. The extension domains are defined in terms of type of space used for farming, choice of crops and related production practices, access to resources, and the socio-economic characteristics and important agricultural needs of farmers. This information was obtained by means of a survey (n=120) involving face-to-face interviews and a structured interview schedule. The survey was complemented by semi-structured interviews and observations of agricultural activities. The paper concludes by calling for closer involvement of government and public extension in urban agriculture in the study area, because urban farming mainly benefits the poor. Specific constraints, which extension services may help to address, are identified for each of the three extension domains.

Introduction

The United Nations Development Programme (1996) defined urban agriculture as an industry that produces, processes and markets food and fuel, largely in response to daily demand of consumers within a town, city or metropolis, on land and water dispersed throughout the urban and peri-urban area, applying intensive production methods using and reusing natural resources and urban wastes to yield a diversity of crops and livestock. During the 1980s, the importance of urban agriculture accelerated dramatically throughout the world (United Nation Development Programme, 1996). Apparently, this was in response to declining purchasing power and increasing levels of poverty among urban populations (Chaipa & King, 1998). In South Africa, the importance of urban agriculture has also been on the rise. It has developed into one of the ways in which urban dwellers supplement their low incomes (May and Rogerson, 1995 and Rogerson, 1998). Research on urban farming in South Africa showed the majority of urban gardeners to be female (Meadows, 2000; Martin, Oudwater and Meadows, 2000). Generally, they engaged in agriculture to save on household food expenditure, and to generate income through sales of surplus produce. Many South African NGOs and welfare organisations have recognised the importance of small-scale urban agriculture in terms of food security and social function. They promote gardening activities through extension, training and occasional supply of seeds and fertilizers. Town planners and policy makers in South Africa tend to view urban agriculture as a way of prompting economic development. As a result, they favour highly organised intensive production systems (Martin, Oudwater and Meadows, 2000). According to Meadows (2000), this narrow view of urban agriculture may explain the general absence of governmental support to urban farming in South Africa.

In order to provide an efficient and effective support service to a particular group of farmers, their needs, problems, and circumstances must be known and understood (Bembridge, 1991). This knowledge and understanding may be used to identify and define one or more extension domains among the group of farmers being considered. Extension domains are homogenous groups of farmers, who share the same problems, and
possess similar resources for solving these problems (Low, 1986).

**Purpose and Objective**

The objective of the present study was to define and identify extension domains among urban farmers in the informal settlements of Atteridgeville (Pretoria), and the purpose was to encourage various extension support systems to increase and broaden their involvement in urban farming by contributing to the body of knowledge on this sector.

**Materials and Methods**

The study area. The study was conducted in the informal urban settlements of Jefsville, Phomolong, Concern, Vergenoeg, and Brazzaville found along the southern edge of Atteridgeville. This formal African township is situated approximately 19 km west of the centre of Pretoria, the capital of South Africa (see Figure 1). The informal settlements of Atteridgeville came into existence in 1990 on land previously owned by the South African Defence Force (Theron, 2000). During establishment of these settlements, the provision of infrastructure was largely ignored.

![Figure 1](image-url)  
*Figure 1*. Location of the informal settlements (study area) of Atteridgeville south of the formal part of that township (A) in the Gauteng Province (B) of South Africa (C).
At the time of survey, roads still consisted of tracks, there was no electricity, and water supply was by means of a limited number of communal standpipes. The residential plots tended to be small, ranging in size between 100 m² and 400 m². The houses consisted mostly of shacks built from plastic, wood, cardboard, and corrugated iron. There were no sanitary facilities inside the houses, forcing residents to make use of outside pit latrines.

Collection and analysis of data. Data were collected from August to October 2001, by means of a survey. The survey employed face-to-face interviews, which followed a structured interview schedule. A multistage cluster sampling procedure was adopted for the selection of the sample. Aerial photographs taken on the 4th September 1999, on a scale of 1:4 000, were used to count the number of residences (sampling frame), and to delineate 114 primary neighbourhood clusters. These consisted of approximately 100 residences each. From these clusters 12 were selected randomly. Systematic sampling was applied to identify 10 residences within each of the 12 primary clusters. This yielded a total sample of 120 residences, which represented a 1% sample of the total population of 11 400 residences. The interviews sought data on demography, income and expenditure, agriculture and life history of households occupying these residences. The survey data obtained were captured using Microsoft Excel spreadsheets. The Statistical Analysis Software (SAS®) version 8.01, statistical package was used to analyse the data (SAS® Institute Inc, 2000). Additional information was obtained by means of semi-structured interviews and observations of agricultural production activities.

Results and Discussion

General socio-economic characteristics of the study population. Combined, the 120 households that were surveyed counted 532 members, yielding a mean household size of about 5 persons. Of these, 47% were male, 53% female, and 65% formed part of the economically active category of the population, aged between 15 and 64 years old. Nearly all the others (31%) were children. Of the active population, 43% were unemployed (actively looking for work), and 60% of the unemployed were women. More than half of the households in the sample (54%) were engaged in urban farming. On average, farming households tended to be slightly larger (5 members) than non-farming households (4 members). Heads of farming households were 6 years older than

\[ AE = (A + \frac{1}{2} C)^{0.9}, \]

whereby

\[ AE = \text{number of adult equivalents in the household}; \]
\[ A = \text{number of adults in the household (household members aged 15 or older)}; \]
\[ C = \text{number of children in the household (household members younger than 15 years old).} \]
those of non-farming households. In both categories the gender of the head was male in four out of five cases. The marital status of the heads of households in both categories was also similar. In farming households, 65% were married, 29% single, and 6% widowed or divorced. In non-farming households 64% were married, 32% single and 4% widowed or divorced. In both groups the majority of heads of household had at least eight years of formal education.

A comparison of the origin of farming and non-farming households yielded differences that were statistically significant ($P = 0.02$). The origin of non-farming households was more likely to be urban than among farming households, who were nearly all (94%) first-generation immigrants from rural areas. They had arrived in Atteridgeville to look for work or to join their spouses or parents who had migrated to the city. The rural origin of urban farmers was consistent with the finding reported by Van den Heever, Venter, Maphanga, Magoro, Kekana & Van Rooyen (1998). Consequently, it was not surprising that most farmers in the sample obtained their agricultural experience whilst still living in rural environments.

In both farming and non-farming households, income was derived mainly from salaries and wages. State transfers in the form of old-age pensions, disability grants and child support grants were the second most important source of income. Together these two sources supplied 81% of the income of households in the sample. Farming and non-farming households differed significantly in terms of the employment status of the ‘woman of the house’ ($P<0.05$), who was either the female head, or the spouse of the male head. Their unemployment rates were significantly higher among farming households (72%) than among non-farming households (57%). There was also a significant difference ($P<0.05$) between the two groups in terms of the income of the male head of household. This income was higher among farming households (R1 475 month$^{-1}$) than among non-farming households (R1 025 month$^{-1}$). The degree of poverty among households in Atteridgeville was considerable. The majority (58%) of the households in the sample were categorised as poor, 8% were ultra poor, and only about 33% were not poor. Although engagement in farming was proportionally most common among the ultra poor (63%), and least among the non-poor (45%), the differences in the relative frequency of farming among the three poverty categories were not statistically significant. Among the categories of household expenditure, food was the most important (Figure 2).

![Figure 2](image-url)

*Figure 2.* Relationship between adult equivalent income per month and the total proportion of total income spent on food among households in the informal urban settlements of Atteridgeville, Pretoria (September, 2001, $n=120$, R1.00 = US$0.10).*
Among the poorest households, up to 71% of expenditure was on food. Overall mean expenditure on food per adult equivalent amounted to about 40% of total income among both farming and non-farming households. As the adult equivalent income of households approached R1000, expenditure on food dropped to less than 25% of total.

Types of agricultural production and use of inputs. Urban farming in the informal urban settlements of Atteridgeville was limited to the production of crops and vegetables in home gardens, group-gardens, and open urban spaces. Vegetables were produced in home gardens, and also in community group-gardens, established on land assigned to schools, clinics and cemeteries. Crops were grown mainly in open urban spaces, such as roadsides, and private land, made available to the community by its owners. Production in open urban spaces was limited to summer. In terms of participation rate, farming in home gardens was by far the most important, being practiced by about 83% of urban farmers. About 12% of the urban farmers were growing crops on urban open spaces, and 5% participated in group-gardens. The average size of a home garden plot was 25.9 m², that of an open urban space was 350.9 m² per individual, and the area of community garden land was 195.7 m² per individual member (Table 1). The size range was narrow for all three types of plots. Crop selection by farmers was influenced by type of production. Home gardeners preferred maize, Swiss chard and onions. The main crop grown in urban open spaces was maize. In many cases it was intercropped with dry beans, pumpkins and melons. In gardening groups, the most commonly grown crops were beetroot, tomatoes, carrots, cabbages, green peppers and lettuce. On average, the productivity of urban agriculture in the study area, measured in monetary terms per unit area, was highest in home gardens (R1.58 m⁻²), followed by community gardens (R1.07 m⁻²) and open urban spaces (R0.61 m⁻²), as shown in Table 1.

Table 1

Size and productivity of three types of urban agricultural production units in the informal urban settlements of Atteridgeville, Pretoria (2001; n=65)

<table>
<thead>
<tr>
<th>Type of space</th>
<th>Mean size of individual units (m²)</th>
<th>Size range of individual units (m²)</th>
<th>Mean monetary value of production per unit area (R m⁻²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home garden</td>
<td>25.9</td>
<td>8 – 70</td>
<td>1.58</td>
</tr>
<tr>
<td>Urban open space</td>
<td>350.9</td>
<td>180 – 560</td>
<td>0.61</td>
</tr>
<tr>
<td>Community garden</td>
<td>195.5</td>
<td>167 – 250</td>
<td>1.07</td>
</tr>
</tbody>
</table>

On average, urban farmers increased their household income by R70.11 per year, or R5.84 per month. Most of this income was in kind, because all the produce from home gardens and urban open spaces was consumed at home (Table 2). The main reason for the absence of sales by home gardeners and users of open urban spaces was that the quantities produced did not provide for a surplus. Sales of produce occurred only in community garden projects. This explains the particular crop selection characteristic of these projects.

Table 2

Mean value of annual production per individual production unit and allocation of produce by farmers in the informal urban settlements of Atteridgeville, Pretoria (2001; n=65)

<table>
<thead>
<tr>
<th>Type of space used for agriculture</th>
<th>Value of produce (R)</th>
<th>Value of home consumption (R)</th>
<th>Value of gifts (R)</th>
<th>Value of sales (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home garden</td>
<td>41.11</td>
<td>41.11</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Urban open space</td>
<td>213.14</td>
<td>213.14</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Community garden</td>
<td>210.67</td>
<td>163.29</td>
<td>0.00</td>
<td>47.38</td>
</tr>
</tbody>
</table>
Water is an important input in urban agriculture (Lee-Smith and Lamba, 1991). In the study area, home gardeners used water from standpipes to irrigate their crops. This sometimes required water to be carried to the gardens in buckets or tins. In community gardens farmers usually had access to water from taps, free of charge, enabling them to practise irrigation by means of hosepipes. Production in urban open spaces was entirely reliant on rain, which only falls during summer in the Pretoria region. The use of chemicals (fertilisers and pesticides) was largely limited to community garden projects, and even there it was not widespread. Besides seeds, which were often saved from the previous harvest, and the hiring of a tractor to prepare the land, users of urban open spaces did not use inputs. Home gardeners used organic household waste and crop residues to increase or maintain the fertility of their soils. Crop residues were also used. In all cases these were obtained from the farmers’ own gardens. About one in five home gardeners purchased seed from shops, and 45% used seeds from the previous harvest. The rest obtained them from relatives or friends. Tools used in home gardens and community gardens included hand hoes, spades, rakes and forks.

**Extension domains among urban farmers in the study area.** Women did most of the farming in the study area. Of the 65 urban farmers in the sample, 86% were female and 14% male. In most cases (51 out of 65), it was the unemployed spouse of the male head who did all the farming. In a few cases (12) the male head assisted with preparation of the land. There were also 18 cases where children assisted their mother with watering and weeding during weekends and holidays. Urban farmers in the study area were categorized according to type of space used for agriculture. Important personal characteristics of farmers in the three categories are presented in Table 3.

**Table 3**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Home garden (n=54)</th>
<th>Urban open space (n=8)</th>
<th>Community garden (n=3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>42*</td>
<td>57*</td>
<td>53*</td>
</tr>
<tr>
<td>Female headed (%)</td>
<td>7*</td>
<td>63*</td>
<td>100*</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Employed (%)</td>
<td>17</td>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>- Unemployed (%)</td>
<td>72</td>
<td>37</td>
<td>67</td>
</tr>
<tr>
<td>- Pensioners (%)</td>
<td>11</td>
<td>50</td>
<td>33</td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- &lt; 4 years (%)</td>
<td>7*</td>
<td>38*</td>
<td>67*</td>
</tr>
<tr>
<td>- &gt; 4 years (%)</td>
<td>93*</td>
<td>63*</td>
<td>33*</td>
</tr>
</tbody>
</table>

* Significant = p<.05

Generally, the characteristics of home gardeners were different from those of farmers in the other two categories. Home gardeners were female, young, unemployed, relatively well educated, and part of male-headed households. They combined home gardening with their reproductive role in their households. Their main need was for improved access to water, both for domestic and agricultural purposes. Other needs included space-saving production techniques, such as vertical growing systems, and information on appropriate soil fertility and pest control management. Home gardeners constituted the first of three extension domains that were identified in the study area. In most cases they could be reached by means of written extension messages, because they were functionally literate. Community-project gardeners and users of open urban spaces had similar personal characteristics. Both groups consisted mainly of women older than 50 years, who were unemployed, poorly educated, and head of household. In both cases they used agriculture to supplement incomes derived mainly from state transfers. Despite their similar personal characteristics, the separation of
community-project gardeners and users of open urban spaces into two extension domains was necessary, because their production systems were so different. The main need of community gardeners was for improved security of tenure over the community-garden plots. They also expressed the need for a full range of appropriate production practices enabling increased productivity in irrigated vegetable production. In the case of users of open urban spaces, the main need was for appropriate soil fertility management and pest control practices for use in mixed summer cropping. Farmers in these two domains were usually not functionally literate, calling for ways of communication other than by means of written messages.

Conclusions and Recommendations

The results of the study showed that farming in the informal settlements of Atteridgeville was widespread, mainly for household consumption, and not very important in terms of its contribution to total household income. Urban farmers in the study area consisted mainly of unemployed women, who were usually poor, and who had gained some experience in agriculture before their arrival in the township from rural areas. Three extension domains were identified among urban farmers, namely home gardeners, community-project gardeners, and users of open urban spaces. Farmers in each of these domains had particular needs related to agriculture. Extension services need to consider the educational status of the farmers in of the groups when preparing information packages and educational materials, because differences were apparent. As in other urban centres in South Africa, growth in urban farming in the study area could benefit from closer involvement of government and public extension. At the time of this study their involvement was limited to a single group-garden project. The study showed that urban agriculture mainly benefited poor people. The relatively small material benefits derived from urban agriculture by participants should not be viewed as a reason for ignoring its overall importance. Van Averbeke and Mei (1998) pointed out that small-scale urban agriculture presented physical and social benefits also, especially to elderly people farming in a group context.

Acknowledgements

The authors thank the National Research Foundation of South Africa and Technikon Pretoria for their financial support of this study.

References


