

A CURRICULUM FRAMEWORK FOR INFORMAL URBAN AGRICULTURE

by

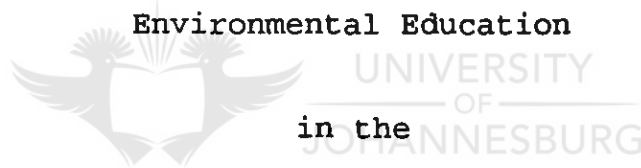
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THESIS

submitted in fulfilment of the requirements for the degree
of

DOCTOR PHILOSOPHIAE

in



FACULTY OF EDUCATION AND NURSING

at the

RAND AFRIKAANS UNIVERSITY

PROMOTER: PROF HG VAN ROOYEN

MARCH 1998

ACKNOWLEDGEMENTS

My sincere thanks to my promoter, Professor HG van Rooyen, for his support, encouragements, time, valuable advice and guidance. Thank you for your confidence in me.

I would like to thank Dr Louise Botha (Director, Research, Technikon SA) and her staff for their assistance with the questionnaire and the coding of the questions. Please accept my sincere appreciation for your help and assistance.

To Dr Ann Müller, a word of thanks for acting as moderator and external coder and co-analyser of the research data obtained from the semi-structured focus group sessions.

Thanks to Mrs FJ de Bruyn for typing the thesis, Mmes S Bodmer, H Mey and A Rheeder for language control and to all the participants of the focus groups.

I would like to thank and express my appreciation to the Central Research Committee for approving the application for research funding for this doctoral study.

To my son Rudi, thank you for understanding my preoccupation with my studies and having to be satisfied with little attention most of the time.

Thanks be to God for giving me the strength to persevere and endure.

SUMMARY

The purpose of this research is to develop a curriculum framework for a distance education course in sustainable urban agriculture, whereby it is envisaged to train the trainers of urban farmers.

The factors which motivated this study are mainly socio-economic and ecological in nature and include the food crisis of the urban poor, unsustainable agricultural practices, malnutrition, starvation, health risks and high population growth in cities.

Sustainability in urban agriculture implicates a need for environmental education and ecological agriculture.

An exploratory and descriptive research design was used in the empirical study to determine the feasibility of an urban agriculture course through distance education. The need for Environmental Education in this course as well as the best media to use for the course were determined.

Secondly, the policies and assistance by local governments to establish an infrastructure for practising sustainable urban agriculture, aimed at improving socio-economic and environmental sustainability, were determined.

In both these cases a quantitative research study was undertaken, using a questionnaire as the data collecting instrument and a research survey as the method of enquiry.

The sampling population was purposively selected. The questionnaires were coded and the data from the closed-ended questions was computer-analysed while data from the open-ended

questions was content analysed, using Kerlinger's method of content analysis.

Thirdly, a literature study was done on the educational philosophies and the philosophical base undergirding this curriculum as well as curriculum design models and sources of change, influencing this curriculum. A curriculum design model was chosen to serve as a theoretical foundation for designing an urban agriculture curriculum.

Finally an empirical study with a descriptive and exploratory research design was undertaken in a qualitative research study to set the curriculum framework for a distance education course in urban agriculture. The research questions in the empirical study were based on the principles of curriculum design.

The researcher and an independent moderator were the data collecting instruments and six semi-structured focus group discussions were used as the method of enquiry. A purposive and convenient non-probability sampling method was used for the selection of target groups.

The sampling population consisted of purposefully selected community leaders and members, employers in the agricultural and horticultural industry, lecturers at a distance education institution, students and trainers in agriculture.

The findings of the research are presented in the style of three journal papers (consult chapter 5).

The research findings in the first paper revealed the feasibility of a distance education course in urban agriculture based on sustainable use of the environment and the inclusion of environmental education in the curriculum. The respondents regarded user-friendly study guides plus

workshops followed by study guides plus video cassettes as the best media for the course.

In the second paper the respondents advised that the most important policies for local government to consider, regarding urban agriculture, are those based on access to land followed by management, sustainability, education and training.

The most important recommendation for assistance by local governments regarding access to land, is to proactively incorporate land for urban agriculture in their town plans and to consult with the community in this regard. A sound infrastructure should be constructed by local governments to accommodate urban farmers to practise sustainable urban agriculture, that could concomitantly improve their socio-economic conditions and help to protect and establish a healthy environment.

The major philosophies influencing this curriculum are pragmatism and existentialism with the dominant educational philosophies being progressivism and reconstructionism.

A literature study was done and the data of the respondents' views on outcomes, learning opportunities and experiences and assessment were content analysed and compared with literature findings in order to develop a curriculum framework for a course in urban agriculture. Content analysis of the audio-taped data was done according to Tesch's method.

The most important results indicated that the course should be aimed at environmental conservation and socio-economic empowerment, based on sustainable ecological-agricultural principles and an interdisciplinary approach. The course should also improve the development of students' competency through improving their practical, problem-solving and critical-thinking skills. The curriculum design model chosen

for this course is eclectic because it responds to different sources of change in meeting new needs of the present and future society.

It also draws from different design-types; mainly learner-centred and problem-centred designs.

Respondents specified a modularised, competency-based, integrated Urban Agriculture curriculum with electives to offer the students a free choice.

Respondents felt that learning opportunities should include practical exposure to the agricultural industry, business and community farms to benefit students' careers. Practical assignments that could contribute to vocational experiences were considered to be good learning opportunities. The application of media and audio-visual aids were regarded as learning opportunities with wide application in distance education.

Respondents indicated that learners should use learning opportunities to acquire learning experiences and develop their critical thinking, problem-solving skills and communication skills.

Respondents recommended that peer-, self-, lecturer-, formative- and summative assessment must occur.

OPSOMMING

Die doel van hierdie navorsing is om 'n kurrikulumraamwerk vir 'n afstandsonderrigkursus in volhoubare stedelike landbou te ontwikkel, waarby daar beoog word om die opleiers van stedelike landbouers op te lei.

Die faktore wat bygedra het tot die motivering van die studie, is hoofsaaklik sosio-ekonomies en ekologies van aard en sluit die voedselkrisis van die stedelike armes, nie-volhoubare landboupraktyke, wanvoeding, verhogering, gesondheidsrisiko's en hoë bevolkingsgroei in stede in.

Volhoubaarheid in stedelike landbou impliseer 'n behoefte aan omgewingsopvoeding en ekologiese landbou.

'n Eksplorerende en beskrywende navorsingsontwerp is gebruik in die empiriese studie om die uitvoerbaarheid van 'n stedelike landboukursus deur afstandsonderrig te bepaal. Die behoefte aan Omgewingsopvoeding sowel as die beste media om te gebruik vir hierdie kursus is bepaal.

Tweedens is vasgestel wat die beleid en ondersteuning van plaaslike owerhede is om 'n infrastruktuur te vestig vir die beoefening van volhoubare stedelike landbou wat daarop gemik is om die sosio-ekonomiese en omgewingsvolhoubaarheid te verbeter.

In albei hierdie gevalle is 'n kwantitatiewe navorsingstudie onderneem deur 'n vraelys as die data-insamelingsinstrument en 'n navorsingsopname as ondersoekmetode te gebruik.

Die proefpopulasie is doelbewus gekies. Die vraelyste is gekodeer en die data van die geslote-endvrae is met behulp van die rekenaar geanaliseer, terwyl inhoudanalise op die oop-

endvrae gedoen is, deur van Kerlinger se metode van inhoud-analise gebruik te maak.

Derdens is 'n literatuurstudie oor die opvoedkundige filosofieë, die filosofiese basis wat die kurrikulum, sowel as die kurrikulumontwerpmodelle en die bronne van verandering wat die kurrikulum beïnvloed, gedoen. 'n Kurrikulumontwerpmodel is gekies om as 'n teoretiese fundering te dien vir die ontwerp van 'n stedelike landboukurrikulum.

Ten slotte is 'n empiriese studie met 'n beskrywende en ondersoekende navorsingsontwerp onderneem in 'n kwalitatiewe navorsingstudie om 'n kurrikulumraamwerk vir 'n afstandsonderrigkursus in stedelike landbou daar te stel. Die navorsingsvrae in dié deel van die empiriese studie is gebaseer op erkende kurrikulumontwerp-beginsels.

Die navorser en 'n onafhanklike moderator is gebruik as die data-insamelingsinstrumente en ses semigestruktureerde fokus-groeponderhoude is gebruik as die ondersoekmetode. 'n Doelbewuste en gerieflikheids-, nie-waarskynlikheidsmonster-nemingsmetode is gebruik vir die seleksie van teikengroepe.

Die proefpopulasie het uit doelbewus geselekteerde gemeenskapsleiers en lede, werkgewers in die landbou- en tuinbou-industrie, lektore by 'n afstandsonderriginrigting, studente en landbou-opleiers bestaan.

Die bevindings van die navorsing word in die vorm van drie joernaalartikels aangebied (raadpleeg hoofstuk 5).

Die navorsingsbevindinge in die eerste artikel dui die uitvoerbaarheid aan van 'n afstandsonderrigkursus in stedelike landbou, wat gebaseer is op volhoubare gebruik van die omgewing en die insluiting van omgewingsopvoeding in die kurrikulum. Die respondente het gebruikersvriendelike studie-

gidse, plus werkwinkels, gevolg deur studiegidse plus videokassette as die beste media vir die kursus beskou.

In die tweede artikel dui die respondente aan dat die belangrikste beleid wat plaaslike regerings aangaande stedelike landbou moet oorweeg, dié is wat gebaseer is op toegang tot grond, gevolg deur bestuur, volhoubaarheid, opvoeding en opleiding.

Die belangrikste aanbeveling vir ondersteuning deur plaaslike regerings aangaande toegang tot grond is om pro-aktief grond vir stedelike landbou in hul stadsplanne in te sluit en om met die gemeenskap in hierdie verband te beraadslag. 'n Gesonde infrastruktuur moet deur plaaslike owerhede saamgestel word om stedelike landbouers te akkommodeer om volhoubare stedelike landbou te beoefen wat ook terselfdertyd hul sosio-ekonomiese toestande sal verbeter en help om 'n gesonde omgewing te bewaar en te vestig.

Die belangrikste filosofieë wat hierdie kurrikulum beïnvloed is pragmatisme en eksistensialisme en die dominante opvoedkundige filosofieë is progresivisme en rekonstruktionisme.

Om 'n kurrikulumraamwerk vir 'n stedelike landboukursus te ontwikkel, is 'n literatuurstudie gedoen en data van die respondente se opinies oor leerderuitkomste, leergeleenthede en -ervarings en assessering, inhoudelik geanaliseer en vergelyk met bevindings in die literatuur. 'n Inhoudanalise van die audiokassetdata is volgens Tesch se metode gedoen.

Die belangrikste resultate het aangedui dat die kursus gerig moet wees op omgewingsbewaring en sosio-ekonomiese bemagtiging, gebaseer op volhoubare ekologiese landboubeginsels en 'n interdisiplinêre benadering. Die kursus moet ook die ontwikkeling van studentevaardigheid deur praktiese probleemoplossing en vaardighede in kritiese denke verbeter.

Die kurrikulumontwerpmodel wat vir hierdie kursus gekies is, is eklekties omdat dit aan die verskillende bronne van verandering beantwoord deur aan nuwe behoeftes van die huidige en toekomstige gemeenskap te voldoen. Dit maak gebruik van verskillende ontwerptipes, hoofsaaklik leerdergesentreerde en probleemgesentreerde ontwerpe.

Respondente het 'n modulêre, vaardigheidsgebaseerde, geïntegreerde Stedelike Landboukurrikulum met keusevakke wat aan studente 'n vrye keuse bied, verkies.

Respondente het gevoel dat leergeleenthede praktiese blootstelling aan die landbou-industrie, besigheid en gemeenskapplase moet insluit om studente se loopbane te bevoordeel. Praktiese werkopdragte wat kon bydra tot beroepservaring is as goeie leergeleenthede beskou. Die toepassing van media en audio-visuele hulpmiddels is beskou as leergeleenthede met wye toepassing in afstandsonderrig.

Respondente het aangedui dat leerders leergeleenthede moet gebruik om leerervarings te verkry wat hulle kritiese denke en probleemoplossingsvaardighede en kommunikasievaardighede ontwikkel.

Respondente het aanbeveel dat eweknie-, self-, dosente-, formatiewe en summatiewe assessering moet plaasvind.

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CHAPTER 1

MOTIVATION AND RATIONALE OF THE RESEARCH

1.1 INTRODUCTION

The aim of this chapter is to discuss the socio-economic and ecological motivating factors influencing this study. The statement of the research problem and questions as well as the exposition of the research methodology of the study are stated. The main aim of the study is to design a curriculum that will help to resolve these problems.

1.1.1 Socio-economic factors

One of the most serious challenges facing Africa and the rest of the world is the production of sufficient food and work for its ever increasing population. Half of the world's people and three-quarters of total consumption will be in cities by the beginning of the next century and problems of urban hunger, poverty and environmental degradation can only be expected to worsen (Ratta & Smit, 1993:29). The declining ability of many cities to feed themselves and the deteriorating socio-economic conditions may aggravate this problem. Cities all over the world have people who are experiencing persistent malnutrition and migration and population growth continually create higher demands for jobs and services than the urban system can supply (Smit & Ratta, 1992:7). Freeman (1991:150) found that the primary motive for urban agriculture in Kenya is the overwhelming need for food due to hunger. African cities are among the fastest growing worldwide (Freeman, 1991:3) and food production in Africa is not keeping up with the demand (Rowland,

1993:1-4; cf. Canadian International Development Agency, 1988; as referred to by Lambert & Wilde, 1992:169).

1.1.2 Environmental factors

Inappropriate management of urban areas has grave environmental consequences. Diepeveen (1985:1) regards the poor quality of life and degradation of the bio-physical environment as causes of great concern. This concern is echoed in our constitutional law, which states that every person shall have the right to an environment which is not detrimental to his or her health or well-being (Republic of South Africa, 1993).

There is the danger that the earth will not be able to support all its inhabitants unless we act now (World Environment Day, 1992:20). According to Mollison (1993:2) conventional farming mines the land of its fertility and non-renewable resources.

According to the International Movement for Ecological Agriculture (IMEA) (1990:107) agriculture is a holistic food production system which includes humans, their work and their environment (IMEA) (1990:107). However, environmental degradation is being aggravated to the point where the capacity of many regions to grow food is now seriously threatened due to the undermining of ecologically sound systems of agriculture.

This has reduced food-producing capacity and increased the cost of food (Lambert & Wilde, 1992:169).

1.1.3 Urban agriculture and its advantages

The Brundtland Report (1987) urges governments to support urban agriculture as it could become an important component of urban development by making fresher, cheaper food available and

improving health and economic security (cf. Sanyal, 1987:202; cf. Rogerson, 1992:230-231). It could add more to the green space in cities, clear garbage dumps and recycle household waste. Well-managed wastes can be converted into compost, energy, woodfuel and building material.

At present the main constraints of urban agriculture in South Africa are the lack of access to unproductive urban open spaces and legislative policy by local governments regarding their productive and sustainable use. Addressing these needs will allow urban farmers to incorporate open spaces into the economic structure instead of abandoning them as wastelands of ruin. In Japan urban farmers are given government protection and encouragement through favourable land-use regulations and tax concessions (Freeman, 1991:1).

In Asia and Africa some tribal laws include usufruct principles (Smit & Nasr, 1992:148). Land surrounding airport runways, low-density university areas, military reservations, prisons, hospitals and parks are idle lands in cities which can be utilised for agricultural purposes (Smit & Nasr, 1992:149).

Globally, urban agriculture is spreading and adapting to the changing times (Smit & Ratta, 1992:9). Smit and Nasr (1992:150) suggest the use of household surfaces such as rooftops to grow plants or medicinal herbs (as practised in Santiago) or operate a low-technology hydroponics system (as demonstrated in Bogota).

Advantages of urban agriculture are that it saves energy, transport and post-harvest cold storage costs as these farmers have access to markets close to them. For this reason Drakakis-Smith (1991:51) remarks that urban gardening is cost-effective to the consumer, since it cuts out the need for middlemen. Urban agriculture can reunify migrant families as the wife of a

worker now has access to urban land for cultivation and need not remain in the rural home running a remote farm alone (Freeman, 1991:117). This is important as "women make up as much as 80 per cent of the agricultural labour force in large areas of sub-Saharan Africa" (Freeman, 1991:117). Urban agriculture is important for the psychological and emotional well-being of city dwellers, since it provides contact with nature. The major advantage of urban agriculture is its potential to improve the socio-economic situation of the poor (Rogerson, 1992:230).

A holistic approach aimed at a sustainable city is needed to establish ecological agriculture, address social and economic upliftment, entrepreneurial skills and provide educational opportunities.

Urban community agriculture includes school food gardens which aim to improve the nutritional status and health of school children and instil in them the techniques and habits of growing what they eat. In Latin America the community kitchens (*comedores populares*) have adjacent gardens growing part of what is cooked in the kitchen and served to members (Smit & Nasr, 1992:150).

Schumacher (1993:9) foresees the possibility of evolving a lifestyle, with new methods of production designed for permanence. Mollison (1993:1) sees permaculture as such a system based on ecological models of food production.

1.1.4 Environmental education

It is imperative to educate people to develop, what Roth (1992:8-9) calls, "environmental literacy". He distinguishes between nominal, functional and operational environmental literacy on a continuum of competency, ranging from zero to very

high competency. He sees environmental literacy developed at some form of competency as the primary objective of environmental education so that potential breakdowns in the system will be perceived which could ultimately affect the ability of the biosphere to sustain life.

In order to promote environmental literacy in the poorer, urban sector of the population, a course in sustainable urban agriculture is clearly needed. According to the International Union for the Conservation of Nature (IUCN), the United Nations Environment Programme (UNEP) and the World Wide Fund for Nature (WWF) (1991:138) "sustainable development" or sustainability is used throughout to mean: a development that improves the quality of human life while living within the capacity of supporting ecosystems. According to the World Commission on Environment and Development (WCED) (1987:43) it is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

In the following section, the most important motivating factors for such a course will be identified and discussed.

1.2 REASONS WHY A CURRICULUM IN SUSTAINABLE URBAN AGRICULTURE HAS TO BE DESIGNED AND IMPLEMENTED

The following motivating factors stress the importance of designing and implementing a curriculum that should address these environmental problems in a curriculum framework.

The world over the rallying cry of environmentalists is to "think globally and act locally."

The following is an exposition of the problems that motivated this study:

1.2.1 Food crisis of the poor

The place to begin urban agriculture as a programme towards ecologically sustainable cities is in the low-income neighbourhoods, because they are the fastest growing portions of the Third World cities and have on average the worst environmental conditions (Smit & Nasr, 1992:152).

A greater number of people are hungrier now than ever before, and the numbers are growing (World Environment Day, 1992:21). The need for more food, particularly of high nutritional value, is most acute among the urban poor (Sanyal, 1987:202). It is therefore imperative that the curriculum should lead to the improvement of technical knowledge and skills.

Rogerson (1992:229) sees urban agriculture as a rational response by the urban poor to the inability of the formal economy to provide them with sufficient real income for survival in the city. To address their needs requires mutually complementary policies (Sanyal, 1988:80; cf. Rogerson, 1992:229) and training of competent urban agriculturists.

1.2.2 Demographic factors: Rapid urbanisation

High population density in cities creates environmental degradation and environmental education is necessary to educate people.

According to Rowland (1993:4) the African continent's population growth rate (sub-Saharan), currently 3,1 per cent per annum, is probably the highest ever experienced by the human race and certainly higher than the maxima experienced in South-East Asia and Latin America (cf. Rogerson, 1992:229).

According to Diepeveen (1985:1), the world's population will be 6,4 billion by the turn of the century and 90 per cent of this growth will be in the poorest countries, placing an intolerable burden on the carrying capacity of the human habitat.

Tanner (1970:354) sees population growth as the cause of pollution, depletion of natural resources, famine, extinction of species, loss of identity and even war and racism. As population growth continues to degrade the environment, preserving the world's biological diversity (genetic resources) becomes crucial to future food production (Rhoades, 1991:84).

The inclusion of environmental education seems imperative to address escalating population growth.

1.2.3 Destruction of ecological agricultural practices

Urban environments all over the world are suffering from rapid development, leading to losses of vacant and green spaces. Existing land is being converted into waste dumps, resulting in air, soil and water pollution and the loss of biodiversity (Ratta & Smit, 1993:27; Sesmou, 1991:47).

Unsound farming practices as well as unplanned and neglected urban open spaces may be the cause of environmental degradation. Research reports recommend that urban agriculture be fostered because it increases the efficiency of urban land-use and improves the microclimate in residential areas (Rakodi, 1985:58).

The declaration of the International Movement for Ecological Agriculture (IMEA) (1990:108-109) stresses the devastating impact of modernisation on ecological systems in the Third World

due to agricultural practices and policies. Sesmou (1991:47) and Shiva (1991:57) blame the Green Revolution¹ for the degrading of the Third World environment, leading to increased vulnerability to pests, soil erosion and contamination, depletion of groundwater, reduced soil fertility, micronutrient deficiencies, soil and air contamination, reduced availability of nutritious food crops for the local population (cf. Lambert & Wilde, 1992:176-180). In the absence of these inputs, the "improved high yielding varieties" of seeds perform worse than the indigenous varieties (Shiva, 1991:58; cf. Rhoades, 1991:79).

According to Lambert and Wilde (1992:179), pesticides contribute to soil destruction under monocropping and are implicated in both soil erosion and the declining effectiveness of fertiliser. They add that certain chlorinated hydrocarbon insecticides decrease the content of the necessary amino acid, tryptophan, in maize.

Shiva (1991:58-59) argues that the lower the diversity in an ecosystem, the higher its vulnerability to pests and diseases. Owing to their narrow genetic base, the "high-yielding varieties" are inherently vulnerable to major pests and diseases and a breakdown in resistance can occur rapidly (cf. Vellvé, 1993:64) standardisation demanded by modern agricultural methods is diminishing the number of species and varieties grown.

Large scale monoculture provides a large and often permanent niche for pests, turning minor diseases into epidemics. In addition, fertilisers have been found to lower plants' resistance to pests (Shiva, 1991:59).

The Green Revolution¹ is referred to as the "seed-fertiliser revolution" which has centred around the simultaneous adoption of high-yielding varieties and greatly increased levels of chemical fertilisation. Pesticides have been required to counteract the greater susceptibility to pests and diseases associated with this combination and irrigation is included in the package (Rowland, 1993:14).

According to IUCN, UNEP and WWF (1991:138) nutrients from waste water and fertiliser run-off lead to eutrophication and algal growth, reduce suitability of ground and surface water for drinking, damage fisheries and reduce biological diversity.

Girardet (1992:92) attributes the liberal use of pesticides to consumer demand for unblemished food in standardised presentation. According to Routledge (1990:143), the economic, social and environmental costs of 40 years of chemical, industrialised farming and the unsustainable nature of its methods are becoming increasingly apparent.

Over time pests build up resistance to pesticides (British Medical Association, 1992:15; cf. Reijntjes, Haverkort & Walters-Bayer 1994:14; cf. Shiva, 1991: 59; cf. Pedigo, 1991: 492-97; cf. Lambert & Wilde, 1992:179), which must then be used in ever higher doses to have effect.

Pesticides kill not only organisms, damaging crops, but also useful organisms (Pedigo, 1991: 505; Reijntjes, et al. 1994:14; Lambert & Wilde, 1992:179), such as natural enemies of pests.

Shiva (1991:59) points out that over centuries the fertility of the Indo-Gangetic plains was preserved through treating the soil as a living system, with soil-depleting crops being rotated with soil-building legumes. But now marginal land or forests have been cleared to make way for the expansion of agriculture, rotation has been abandoned, and cropland is used to grow soil-depleting crops year-in, year-out. He sees the result of such agricultural intensification as a downward spiral of agricultural land to wasteland.

Effective policies and sustainable agricultural methods need to be developed for urban agriculture in order to prevent destruction of the environment and should be addressed in the curriculum.

1.2.4 Social and economic factors

In a statement drawn up by IMEA (1990:107-108), the primary cause of hunger is seen as a history of unjust social and economic systems which, frequently in combination with ecological degradation, have marginalised the poor and deprived them of the means to eat.

A benefit of urban cultivation or city farms is that it facilitates community and social exchange, and provides the setting for face-to-face interaction (Sanyal, 1987:202).

IMEA (1990:109) states that modernising agriculture:

- undermines the confidence of farmers in their own abilities and traditional knowledge;
- breaks up family farms and farming communities, impoverishing the social life of millions and fermenting growing social alienation;
- increases rural-urban migration and rural depopulation;
- increases (in many cultures) the burden on women as they have been displaced from their central role in food production; and
- transforms independent farmers into often poorly paid and overworked plantation and industrial workers.

According to Aina (1990:195-196), it is not merely the mismanagement of resources that constitute the degradation of the urban environment in the Third World, but rather the

degraded and immensely impoverished quality of life. He sees the greatest significance to human settlements revolve around having access to strategic resources and basic needs which include: land, stable livelihood, education, health, water and other services. Support for urban gardening could relieve current constraints on expanding production, access to land and security of tenure (Rakodi, 1985:58).

1.2.5 Malnutrition, starvation, famine and health risks

The vast majority of urban cultivators pursue farming in the urban environment out of sheer necessity, the alternative being the threat of hunger, malnutrition, and even starvation of the cultivators and/or their families. According to the IMEA (1990:107) we are now witnessing famine in Africa on a near continental scale, with two out of three countries affected. The produce and revenues of urban agriculture constitute a much-required source of income and nutrition for the urban poor and especially for the growing numbers of women-headed households in the African city (Rogerson, 1992:231).

Food starts losing nutritional value from the moment it is picked. If food is produced far away from the cities, urban dwellers will have to be satisfied with a less healthy product.

Malnutrition is widespread in Africa, particularly among small children, and it has been estimated that one child in ten dies before the age of 12 months, while almost 20 per cent die before they reach five years (Rowland, 1993:3).

Niland (1989:13) points out that hungry, apathetic children can hardly learn to read and write, let alone care for the earth.

Targets set by the United Nations to eliminate severe malnutrition, and reduce moderate malnutrition by 50 per cent by the year 2000, will mean that most countries will need to reduce malnutrition by around 5-7 per cent a year to meet this target according to the International Union for the Conservation of Nature and Natural resources (IUCN), the United Nations Environment Programme (UNEP) and The World Wide Fund for Nature (WWF) (1991:24).

The IMEA (1990:109) states that the impact of modern agriculture on nutrition and public health includes a reduction in the nutritional quality of food and a greater incidence of pesticide poisonings. In 1983, the World Health Organisation estimated an annual global figure of two million pesticide poisonings, including some 4 000 fatalities (Girardet, 1992:92). Of the thousands of people poisoned yearly by pesticides, about half of them are in the Third World (Reijntjes, et al. 1994:14).

Pesticides can damage the human central nervous system, the respiratory system as well as the digestive system. They also have the potential to damage the skin, eyes and mucous membranes (Shirreffs, 1982:164). These health hazards may be attributed to careless handling of the chemicals or failure to read the instructions.

A survey carried out in 1990 by the Consumer Association in Brittain found that half the people who bought organically grown food thought it was better for their health, and one in six thought it was better for the environment (British Medical Association, 1992:122).

According to Purdey (1992: 53), symptoms akin to those of myalgic encephalomyelitis have been linked to chronic exposure to vegetables treated with organophosphates. In his opinion,

the increased incidence of neurological and psychiatric disease in the Western world could be linked to the increasing residues of organophosphates in foodstuffs, water supplies and air.

Raloff (1989:133) summarises the Natural Resources Defense Council's report that cancer risks from pesticides are higher in children under the age of six than the Environmental Protection Agency's criteria for children.

Contamination of groundwater due to nitrate fertiliser is associated with health hazards to humans, causing brain damage or suffocation and gastric and stomach cancers (Bottcher, 1991:9).

1.2.6 Economics

The first step to reducing one's dependence on the monetary system is to produce as much food as possible (Soderland, 1993:4).

Urban agriculture can provide food and income to many entrepreneurs. It produces jobs and enterprises, and improves economic security (Smit & Nasr, 1992:152). Developing countries in Africa are heavily dependent on their agriculture, both to feed the population, and to provide capital and impetus for other forms of development (Rowland, 1993:2-3). Most urban agriculture is small-scale and intensive, yet in several large Chinese cities, over 85 per cent of the vegetables consumed by their populations are grown within the municipal boundaries (Drakakis-Smith, 1991:53).

Insufficient income is the primary reason for urban cultivation (Sanyal, 1987:200). Urban cultivation is an efficient strategy: with minimal expenditure, supported by family labour and

indigenous technology, it fulfills a basic need of low-income families whose access to resources and markets is severely restricted (Sanyal, 1987:202; cf. van Vuuren, 1988:4; cf. International Movement for Ecological Agriculture, 1990:109).

Times of scarcity and high unemployment invariably encourage urban farming (Girardet 1992:140). Girardet cites a food-production scheme (Ashram Acres in Britain) as an example where people derive both therapeutic and economic value from growing fruit and vegetables organically.

Urban agriculture should be based on a design or methodology which uses as little economic input as possible. According to Mollison (1993:1), the aim is to create systems that are ecologically sound and economically viable, which do not exploit or pollute, and are therefore sustainable in the long term.

Girardet (1992:166) mentions that the European Climate Alliance gives financial support to indigenous communities to help them protect their forests and set up sustainable farming systems based on traditional techniques. This may be an incentive for indigenous South African communities in cities to practise sustainable urban agroforestry.

1.2.7 Drought

Water conservation practices should be addressed in the curriculum as persistent drought conditions plague the African continent.

In many African countries where dry conditions persist or intensify (Rowland, 1993:31), rainfall is a limiting factor for farming. The urban environment has a constant supply of waste water available from the community which can be treated and used

for urban agriculture. Recycled water costs less (Holmberg, Bass & Timberlake, 1991:24) and fertiliser inputs are reduced because of nutrients present in waste water (Batchelor, 1994:6).

Urban waste water, less purified than needed for human consumption, can be used in aquaculture for the production of fish, crustaceans and waterplants. This prevents the depletion of water resources and other global ecosystems of these organisms.

In South Africa, drought periods are well-known and solutions must be found to make optimum use of the available water. In drought-prone areas water-conservation techniques are of particular importance (Reijntjes, et al. 1994:105; cf. IUCN, UNEP & WWF, 1991:141). Risks of poor harvests must be minimised by adapting all management factors to the low rainfall situation (Rowland, 1993:69).

Farmers can influence the availability of water in the soil by improving soil structure and storage capacity by managing organic matter, decreasing evaporation with mulching and by increasing infiltration into the soil through water conservation, small scale irrigation or water harvesting (Reijntjes, et al. 1994:72).

Soil erosion is probably greater in Africa than any other continent due to the drought in the Sahelian belt and the South-West. Declines in crop production due to erosion can range from 15 to 100 per cent (Lambert & Wilde, 1992:180).

In Rhoades's (1991:102) opinion, the future of farming in Nigeria's dry northern region depends on finding drought-resisting land races of sorghum and millet. Urban agriculture

in South Africa should also rely on drought resistant cultivars as far as possible.

1.2.8 Other factors relating to the elderly, women and children

Among the problems often cited by the elderly are: the desire to purchase food in smaller units; transportation difficulties in getting to supermarkets; concern about safety or venturing out in bad weather; inability to carry grocery packages; unsatisfactory quality of foods available; and insufficient income to pay high prices or travel expenses. Food co-operatives and community gardens counteract these negative factors, save money for the elderly and increase their self-esteem (Houseman, 1983:20-21).

Urban agriculture forms part of a strategy designed to improve the income of women in particular. Women are responsible for the main agricultural tasks in urban areas in much of Africa and few wage jobs are available to them due to inadequate access to education (Rakodi, 1985:55-57).

The introduction of cash cropping instead of sustainable crop production in the Solomon Islands and Tonga has had a negative effect on women, including decreased leisure time, fewer opportunities to earn money, and an increased birth rate (children help with the greater workload) (Rennie, 1991:5). Reijntjes, et al. (1994:98) reveal that the most important component of the survival economy of Kenyan women farmers is their knowledge of wild and cultivated indigenous plants and of ways of growing, conserving and processing them. These plants are resistant to drought and diseases, do not need special fertilisers and have high nutritional value.

1.2.9 A need for education

Constraints on some urban and rural farmers may include a lack of education, extension services and sustainable farming practices. Current education systems in South Africa need a new philosophy of empowering learners to demonstrate competence in practice in order to improve their living standards and contribute towards the national economy. An education that is "success-based in philosophy and outcome-based in practice" (Spady & Marshall, 1991:427) is necessary.

In the Reconstruction and Development Programme document of the African National Congress (ANC) (1994:61) it is stated that women are denied education and training opportunities because they are female. However, according to Freeman (1991:79) and Sanyal (1984:119), women are the major food producers in large cities in Africa. It is therefore important to allow them open access to education and training opportunities.

The White Paper on Environmental Education (1989:5) for promotion of actions at all formal education authorities concerned with non-formal and formal education sets out the following objectives:

- To make the population aware of how environmental elements interrelate and the need for a healthy environment for the survival of mankind
- To motivate people to accept responsibility for the environment and to cultivate the necessary knowledge and values in order to find solutions for identified problems

The IUCN, UNEP and WWF document (1991:5) states that sustainable living must be the new pattern for all and that we need to ensure that education programmes reflect the importance of an

ethic for living sustainably. The goals of action plans should be to explain why a sustainable society is essential and to provide all citizens with values, knowledge, skills and incentives to help them achieve and flourish. They suggest that formal education should not try to supplant traditional educators, but work with them and use all available media, emphasising that face-to-face and audiovisual means of communication should be used in areas of low literacy.

To meet the needs of sustainable agriculture, radical rethinking about agricultural education is urgently required (Reijntjes, et al. 1994:131). They contend that the responsibility, leadership, innovation and creative skills of students will be enhanced rather than stifled, if they are given greater learning autonomy. To achieve these goals, they believe curricula development needs to be more flexible and learner-centred as opposed to teacher-centred. In their view, curricula should focus on "praxis" - practice informed by critical theories and achieved through conscious commitment to methodological enquiry.

Lambert and Wilde (1992:175) propose a shift in the emphasis of education and research, *inter alia*, and a change in technological orientation if African countries want to strengthen their domestic food production capacity.

Education programmes are needed to make people aware that water is neither limitless nor free and should be protected against pollution (IUCN, UNEP & WWF, 1991:140). It seems clear that there is a definite need for a curriculum which provides education and training in sustainable urban agricultural practices.

1.2.10 Conclusion

The above-mentioned factors and discussions represent an effort to indicate why a curriculum in urban agriculture is needed. It should provide the education and training necessary to address these problems.

The importance of education in alternative, sustainable methods of urban agriculture for the improvement of the socio-economic and ecological problems was emphasised. These identified problems seem to justify implementation of other cultural practices which will not harm the environment or deplete the resources upon which we depend.

A curriculum is therefore needed to teach people skills based on sound ecological principles that may assist in the quest for the ultimate goal of sustainable urban agriculture.



1.3 STATEMENT OF THE PROBLEM AND RESEARCH QUESTIONS

The research design and sequencing of the entire study is depicted in figure 1.1

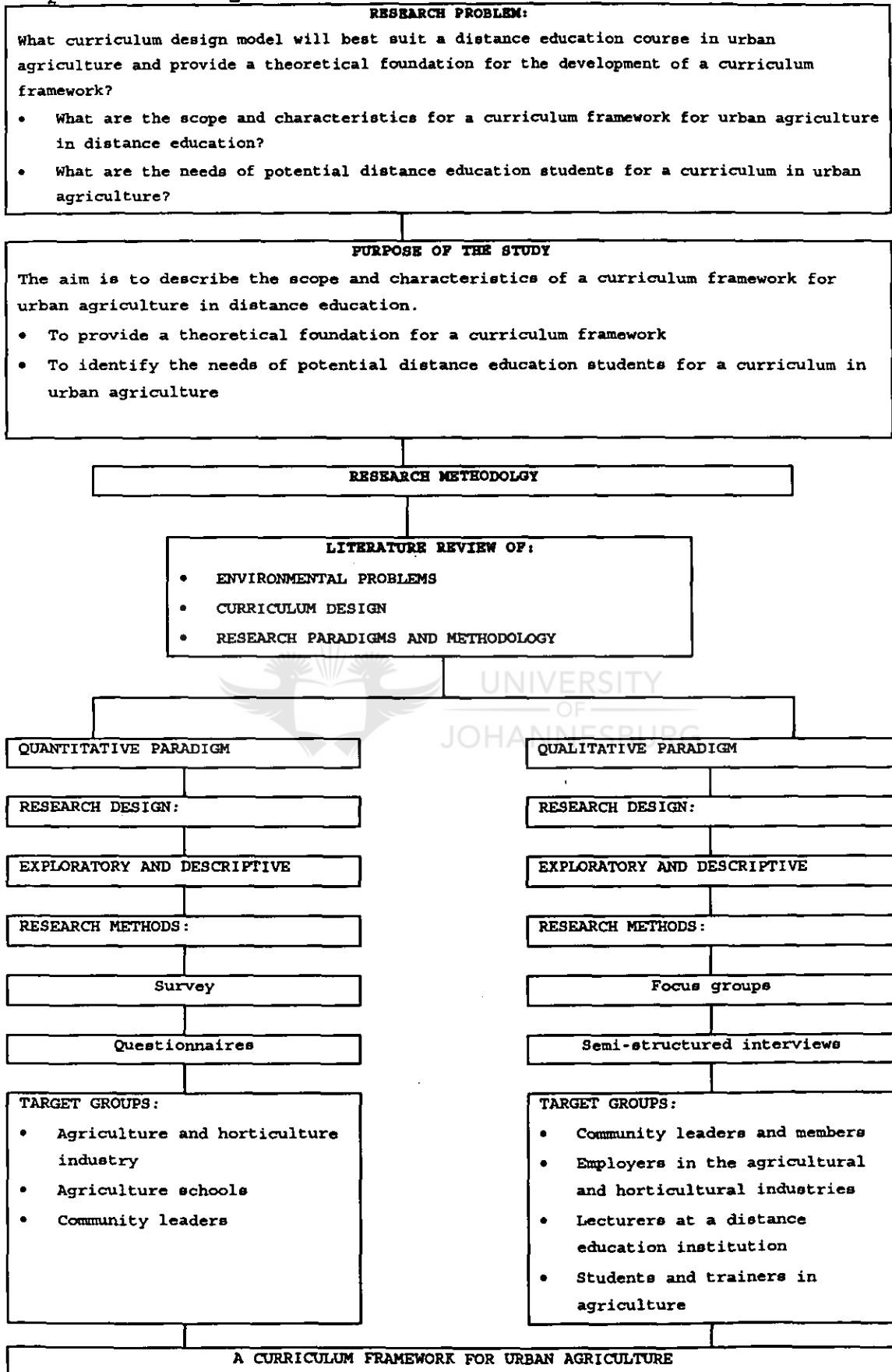


Fig 1.1 An outline of the research design

1.4 OUTLINE OF SUBSEQUENT CHAPTERS

In Chapter 2 the focus is on distance education and the adult learner. Environmental education in the context of adult education, as well as international trends in environmental action programmes, will be explored.

In chapter 3 the principles of curriculum design and sources of change will be discussed. Underlying philosophies and design types influencing the curriculum and leading to a specific model of curriculum design will be discussed.

The accent in chapter 4 will mainly be on the empirical study which includes the research design and methodology of both the quantitative and qualitative research paradigms used.

Chapter 5 will include results, a data analysis and a discussion. This will be done by means of three research articles.

Conclusions and recommendations will be presented in chapter 6, including curriculum guidelines for an urban agriculture course, focusing on outcomes, content, learning experiences and opportunities and assessment. Further research proposals will also be addressed.

1.5 SUMMARY

In this chapter the motivation factors for a course in sustainable urban agriculture were discussed. The research problem, questions and methodology were stated and an outline of the research design given. In the following chapter the needs of the adult learner and the capabilities of distance education will be discussed.

CHAPTER 2

DISTANCE EDUCATION AND THE ADULT LEARNER

2.1 AIM OF THE CHAPTER

The aim of this chapter is to look at distance education and its capabilities to ensure quality education which will enable adult learners to achieve mastery learning¹ and acquire the required learning outcomes for success in their future careers.

Before designing an urban agriculture curriculum through distance education, one should take note of the characteristics, needs and expectations of the adult learner and the capabilities of distance education. This chapter's contribution to the curriculum framework is to determine the requirements of distance education for this curriculum framework, cater for the needs of adult learners and give students support to large numbers in a flexible way.

2.2 WHAT IS DISTANCE EDUCATION?

2.2.1 Distance education

Distance education can be defined as an educational system that includes some face-to-face education combined with learning at a distance. (Greyling, 1996:103) She sees distance education as a mode of delivery, including both distance learning and distance teaching. It enables students to learn while being separated from their lecturers in space

Mastery learning¹ is an educational strategy that provides a core of educational activities through which students should acquire determined skills and an array of diversified learning opportunities (Keegan *et al.* 1993:128).

and time, but guided by them (Rowntree, 1994:29) with the assistance of interactive study guides, mentors, tutors, contact courses, workshops, telephone conversations, and multi-media that may include broadcasting or electronic technology integrated with the printed medium. Willis (1993:4) sums it up by stating that distance education takes place when a teacher and student(s) are separated by physical distance, and technology (for example voice, video, data and print) is used to bridge the instructional gap. Distance education allows the students freedom to study from home, or wherever they wish, in their own time, when they want and at their own pace (cf. Rowntree, 1994:29). Other advantages of distance education include its economy of time and space (fewer buildings are required). Lecturers can be responsible for many more students from all parts of South Africa and beyond.

Rumble (1992:87) indicates that this flexibility in distance education offers distinct advantages in costs savings for employers; staff do not have to be released from work to participate in courses. In addition, distance education allows for large numbers of students to be trained relatively cheaply, cutting costs for governments. Students have the advantage of studying while being employed.

Recently higher education has seen a strong trend towards democratisation of education or more open learning (Ross, 1993:115). The South African Institute for Distance Education (SAIDE, 1994) is committed to open learning² and facilitates the development of quality distance education and its initiatives in South Africa. They see open-learning as being free from restriction on educational opportunity, al-

Open learning² usually involves self-study and learner-support which include mentors, tutors, other learners, people at work or councillors (Rowntree 1992:83-88).

lowing all people access to affordable life-long education where, when and how they require it. Distance education is seen as the vehicle that provides the mechanism for an open-learning society and allows multiple exit and entry levels. Ross (1993:124) states that open learning institutions must have a value-driven leadership steered by the same values represented in the organisation's mission statements.

Technikon South Africa is a career-focused co-operative education institution within a flexible higher learning system that will, in collaboration with its partners:

- Provide broad affordable access to quality flexible learning opportunities to lifelong learners
- Use appropriate technology effectively for open and distance learning, delivery and service provision
- Engage in research and community outreach programmes
- Play a transformative role in higher education in South Africa
- Provide decentralised learner support systems
- Pursue values of integrity, excellence, respect, tolerance, loyalty, honesty and dedication

Open learning reflects a world-wide paradigm shift from teaching to learning (Lategan, 1996:67). For this reason outcomes-based education fits in with open learning, because of its emphasis on student learning (cf. Killen, 1996:5; cf. Capper & Jamison, 1993:429).

SAIDE sees the concept of open-learning as part of the reconstruction of education for a democratic South Africa.

Governments throughout the world are looking for vocational education to contribute to the implementation of their economic, labour market and industrial policies (Foks, 1992:3). It is clear that distance education technicians should strive to provide participative, life-long vocational education to the workforce, subjected to continuous change as markets, technology and industry change and people require new skills at different stages in their working careers.

According to Moore (1996:54-55) flexible learning in South Africa integrates the advantages of co-operative (work-integrated) education and training, open learning, distance education, face-to-face tuition and technology-enhanced learning. In this system he sees the function of the lecturer as stimulating critical-thinking and understanding and guiding the learners to solve real-life problems and applying knowledge. Foks (1992:1) predicts that many groups in South Africa will look increasingly to vocational education to help meet the social, economic, industrial and political change and challenges which the country is facing. He believes they will expect services which are flexible, client-oriented, timely and responsive, whilst guaranteeing recognised standards. He sees distance education strategies as having much more to offer vocational education in meeting these challenges in an educationally and cost-effective way.

2.2.2 The role of distance education in a new system

Distance education systems need to provide developmental opportunities to employed persons aiming to support national productivity and provide quality education in terms of national standards at a reasonable cost and to utilise the entire system (all distance education institutions) to meet these needs (Moore, 1996:54). According to the SAIDE Work-

shop Paper 3 (1994), the concept of open learning in distance education allows for notions which include flexibility in learning, lifelong learning, the recognition of prior learning, the removal of unnecessary barriers to access, learner support and learning quality.

The rationale for open learning is to "support strategies to educate large numbers of students rapidly and efficiently" (Lategan, 1996:67; cf. Strydom, 1996:2). Fixed curricula, access policies and governance structures are dogmatic approaches to education, although many South African institutions are still in this grip (Lategan, 1996:67).

According to him academic quality assurance should ensure a sound education, and establish a learning community. Both quality assurance and open learning must contribute to the full personal development of each learner and to the social and economic development of the nation (Lategan, 1996:70).

According to Moore (1996:56-57) this flexible learning system is characterised by an outcomes-based approach to learner activity, leading to the accessing and application of knowledge, development of problem-solving skills and usage of a variety of technologies. He sees distant education methods contributing to such a system in South Africa but cannot in their present form address massification of education, demands for access, success and efficiency.

Greyling (1996:104) sees the role of distant or contact institutions with an open learning approach not only to be flexible, but to provide in learner success, focus on learner-centredness and access, learner needs, to provide multiple learning-centres, remove learning barriers and to move towards structural change.

2.3 A PROFILE OF DISTANCE EDUCATION STUDENTS IN SOUTH AFRICA

Before planning a curriculum for urban agriculture through distance education, one should take note of the characteristics and expectations of adult learners. This may help to make distance education systems more appropriate and direct learning towards the desired end results.

A significant number of learners in distance education are in full-time employment and are adults (Moore, 1996:54). According to Rowntree (1994:40) knowledge about learners may help to prepare package learning material that relate to their needs and plan programmes, support and delivering services to suit individual needs. If the content or process of instruction does not meet their needs, learning will have very little meaning to them (Lourens, 1993:65).

Twenty years of practical experience convinced Andrew (1996:27) that adult education should be directed by the learner, and based on the learner's desire to learn, but should be facilitated by the lecturer and the educational institution for real learning to take place. Rebel (1996:115) points out that the majority of adult Germans do not attend adult education courses because they associate it with school, stress, pressure, frustration, assessment, tests and content with little significance for their later lives. Rowntree (1994:56) suggests that adult learners be told what the intended outcomes for the course are so that they can organise their work accordingly or decide whether it is indeed the course they need for their vocation.

Many learners find studying on their own rather lonely and have difficulty in maintaining their motivation without a support group (Greyling, 1996:102; cf. Sangweni, 1996:93). Wiechers (1990:59) reports that anxiousness of studying in isolation, absence of supportive face-to-face lecturing and fear of assessment of their work can result in hesitancies to submit assignments.

Adult learners often show a lack of self-confidence and they underestimate their learning ability (Lourens, 1993:35).

The majority of potential adult learners in South Africa are inadequately equipped to take full advantage of an open learning education system, which requires a measure of self-direction due to a lack of electricity and being at lower levels of education and of social structure (Sangweni, 1996:93).

Ineffective outdated learning methods and techniques cause a syndrome resulting in adult learners despairing of their success (Rebel 1996:116). He indicates that learning must fulfil expectations so that highly motivated adult learners, with good learning competence and substantial prior knowledge as well as less-privileged learners, obtain optimal conditions for learning.

Adult education philosophy is aimed at self-directed learning (Richey, 1992:102). According to Robinson and Taylor (1983:359), the andragogical model of learning, described by Knowles (1980) is based on self-directed learning by the student with the emphasis on the processes of learning in contrast to the content model used in a traditional teaching situation. The andragogical model stresses the importance of letting adult students choose for themselves, learn by

experience, and direct their own lives. It also subscribes to allowing students to participate in democratic learning situations by sharing responsibility in course planning.

To achieve the outcome of self-directedness in adult learning, Richey (1992:102) suggests group-directed or individual-directed delivery techniques. She explains that group-directed methodology includes group discussions, role playing and simulations and individual-directed approaches include computer assisted instruction and interactive video training which differ strongly from the former instructor-directed methods. In distance education tutors can apply group - directed methodologies with students during contact sessions, while individual-directed approaches can be applied continuously.

By integrating the training of learning strategies into the development of a learning environment, self-directed learning could be encouraged (Rebel 1996:52). He suggests that co-operative forms of learning with changing learning tasks for the individual learner, together with motivational help, improve learning and attitudes in favour of self-directed learning and self-confidence.

De Lange (1996:84-85) regards emergent learning (knowledge that emerges and is created within the learner) as autocatalytic or self-organising and sees problem-solving as a way in which emergent or innovative learning may be accomplished in an open learning environment. The higher the level of learning competency reached during youth and adulthood, the higher the developed learning capacity is and will remain so (Rebel, 1996:115).

Robinson and Taylor (1983:261) see the mature individual as having a large store of experiences on which to found new knowledge. Therefore experiential learning will provide an opportunity for further development.

Robinson and Taylor (1983:362), see adults' orientation to learning as life-centred: therefore the appropriate units around which adult learning should be organised are life situations, not subjects.

When planning a distance education, urban agriculture, curriculum one should take note of the expectations of students, their diversity, their aims, goals and objectives for the course, relevant learning content, learning experiences and opportunities, support systems, media for delivery of the course and how to evaluate the course to ensure self-directed learning and success.

2.3.1 Characteristics of adult learners

Richey (1992:11) sees self-directedness and problem-oriented descriptions as personality characteristics of adult learners (andragogues). Research by Lourens (1993:26) supports this and adds that they also see themselves as responsible for their own decisions.

According to Rebel (1996:116), adult learners have different learning styles (auditive, optical-visual, verbal-abstract etcetra) due to the extensive individualisation of people. It is therefore necessary that distance education institutions change their learning environments to accommodate different learning styles.

Adult distance education students are often highly motivated, expect high expectations of their teaching and are looking for fulfilment (cf. Frances, 1990:37; cf. Torres & Mendez, 1989:210).

2.3.2 Needs of adult learners

Needs of adult distance education students vary. There may be a need for social interaction, emotional support, enhancement of self-esteem, a desire for acquiring new skills, the attainment of the necessary qualifications and having the availability of mobile libraries (Lourens 1993:175).

The adult student has a deep psychological need to be self-directed and to mature as his/her self-concept moves from one of dependency to one of increasing self-directedness (Robinson & Taylor, 1983:359).

The fact that adult learners differ in age, previous learning experiences, skills, their development stage, as well as social and educational background, indicates that ample provision be made for different styles and pace of learning.

2.3.3 An andragogical approach in distance education

According to Nasta (1994:55), approaches to adult learning are founded upon an andragogical model of learning. This model is driven by guiding principles for designing and delivering a curriculum in which the self-motivation and self-directedness of adult learning are the most critical.

For adult learning to be successful, the learner not only has to reflect on the content, but be actively involved in it. Pragmatism features strongly in a practical distance

education course, because much of the research is applied research, which includes active, practical problem-solving activities (cf. de Lange, 1996:85).

Rebel (1996:50) points out that learning should lead all human beings from having skills to competence.

In adult education the curriculum designer has to recognise the andragogical approach in vocational education. "A vocational curriculum is a changing curriculum" (Nasta, 1994:11). The curriculum must therefore allow for flexible, life-long, and project-driven learning experiences dominated by learning styles which will suit adult learners. The curriculum content must relate to the learners' work, life experiences and socio-economic conditions. Nasta (1994:98) sees the notion of life-long learning as being founded upon the premise that individuals learn throughout their lives, through activities at work, at home, in the community and through the formal educational system. The aims of life-long learning can be manifested in creating a learning society.

Most successful adult, distance education students may be regarded as metalearners. According to Slabbert (1993:39), metalearning is the activity of a learner who is aware of his/her learning process and who can intentionally plan, execute, monitor and assess his or her learning.

According to Nasta (1994:100), the capacity of an educational provider to accredit prior learning is dependent upon a curriculum which is modular, outcome-based and which allows learners to gain credit for prior achievement.

2.4 DIFFERENCE BETWEEN DISTANCE-DELIVERED INSTRUCTION AND FACE-TO-FACE TEACHING

Residential and distance education institutions of higher learning in South Africa have been under pressure to utilise their present infrastructure more efficiently to provide in the need for mass delivery of education and training (Greyling, 1996:102; cf. Moore, 1996:54; cf. Lategan, 1996:67).

Greyling (1996:102) proposes alternative teaching-learning programmes to address escalating non-traditional learner populations, the development of a self-study learning culture, student unrest, increasing demands for further study and the elimination of barriers to do so.

In traditional contact teaching situations lecturers receive visual cues as to the receptiveness of the students (confused, enthusiastic, bored, frustrated, interested). The adaptations to the delivery of the course content can then be made or remedial teaching can be done during a specific lesson (Willis, 1993:6).

Contact teaching also offers many opportunities for lecturer-student interaction (encouraging comments, concerned intervention, personal interest) inside and outside of class. No technological linkage or written communication is needed in contact teaching.

In contrast, distant lecturers do not receive visual cues from students in a class situation and spontaneity, rapport and lecturer-student interaction are lost (Willis, 1993:7). Self-study materials (packages) help the learner learn with less help than from face-to-face teaching, by using a vari-

ety of media and technology, to enable learners to learn when and where they choose and at their own pace (Rowntree, 1994:16).

Contact teaching is less independent and individualised. However, according to Willis (1993:16), research conducted in the United States showed no significant difference in learner outcomes between correspondence and conventional face-to-face instruction.

According to Rowntree (1994:195) open learning costs about half the expense of running a conventional in-house course.

Distance education reaches a wider student population than contact teaching and assists those students who are already in a vocation or who are unable to attend on-campus classes (cf. Greyling, 1996:102).

Teaching at a distance is challenging and depends on learning material and support services at decentralised centres, infrastructure at the main campus, instructional facilities, media and technology. The media of delivery should fit the instructional design, the content and the experience level of the students. Willis (1993:4) states that distance education programmes should be planned with an attention to detail, often exceeding that required in traditional, face-to-face teaching.

Distance learning is enhanced when feedback is informative and timely, and study facilities are available. Effective distance education requires the dedication of lecturers, students, facilitators, support staff and administrators. In traditional contact teaching, interaction is mostly between students and lecturer. Distance education is co-

operative in nature and liaises with industry (Technikon South Africa, 1995:4).

The adult student is concerned with the demands of adult life, with the concomitant social and financial pressures and with maintaining of a place in a real community, as opposed to the sheltered environment of the conventional undergraduate (Smith & Kelly, 1987:160).

Moore (1996:58) states that the idea of face-to-face teaching as the normal mode of teaching at formally recognised institutions will have to give way to the idea that learning can take place in many other ways and contexts. Greyling (1996:102) suggests mixed-mode teaching-learning as an alternative, particularly to provide increased learning opportunities and to deliver many quality graduates rapidly and cost-effectively. She refers to mixed-mode teaching-learning as a "half-way house" between part-time or full-time courses providing guided self-study and applying open learning strategies.

Moore (1996:58) suggests that various options within a flexible learning system be considered to address demands for access, success and efficiency.

From a private distance education sector point of view, Andrew (1996:27) regards counselling and courses that meet learners' needs important in ensuring career development for the individual learner. He also regards success (cf. Killen, 1996:5), flexible approaches to access and starting times, emphasis on learner-paced learning and a respect for the individual learners; self-motivation and self-discipline and principles of lifelong learning to be inclusive of all modes of learning. These include mixed-mode, flexible and

open learning. Keegan (1993:41) points out that the difference between distance education and face-to-face teaching can be bridged by using new technologies in distance education to conduct live lecturer-student and student-student exchanges, irrespective of geographical distance. Netech, Ubuntu Edunet and Africa Growth Network (AGN) are technological systems currently used in distance education in South Africa. These systems allow for individualised, interactive learning by students with direct remedial intervention from the lecturer where necessary. This provides a means to address the above-mentioned problems and the shortcomings of past distance education delivery. Rowntree (1994:55) concludes that an open programme can include all the learning approaches used in conventional teaching plus a few that aren't.

2.5 CAPABILITIES OF DISTANCE EDUCATION

Distance education not only allows wide access to education, it also reaches the entire country and beyond its borders, fulfilling in the government's "vision to open the doors of learning and culture to all" (Government Gazette, 1994:9).

An integrated learner-centred distance education (ILCDE) model of Technikon South Africa strives to take the distance out of distance education and focuses on learner satisfaction, learner support on a decentralised basis, quality courseware relevant to the needs of industry and students, efficient product and delivery systems and capacity building (cf. Kaufman, 1984:240).

Instructional support services for the ILCDE approach include a tutoring system, facilitators, multi-media, mail, telephone, an efficient library service, face-to-face meet-

ings with the lecturer for practical skills training, laboratory experiments, field trips and decentralised learner support, while the introduction of interactive technology is presently being investigated.

Modularised curricula allow students greater flexibility of choice and can be configured to provide new combinations of modules with minimum effort (cf. Rowntree, 1994:62 & 234). Modules containing learning objectives, self-assessment exercises and summaries assist students in evaluating their own performance at a distance (SAIDE, 1994:2). The ILCDE model also permits further flexibility by allowing more than one examination and registering opportunity per year, providing students the freedom of writing examinations or enrolling when they are ready (SAIDE, 1994:6).

Distance education based on an open learning philosophy, is committed to help learners acquire independence and foster autonomy (Rowntree, 1994:61).

Distance education is the key to mass delivery of education and training that needs to occur within a quality framework policy and needs to contribute to technological developments for improving its standing in the world (Naidoo, 1996:138).

The report of the National Commission on Higher Education (NCHE) envisages a single, national, co-ordinated system of higher education (NCHE, 1996:9).

Technikon SA, Vista University and the University of South Africa have established the Confederation of Open Learning Institutions of South Africa (COLISA), to serve as a basis for collaborative ventures to ensure quality and efficiency of distance education and cost-effective provision of educa-

tion and training (Department of Education, 1996:25 & 68). Collaboration may include the sharing of courses, developing new courses, sharing of facilities and the delivering of programmes and synergies of an administrative, research and practical nature.

Generic modules of a particular subject could be developed jointly, while modules dealing with specifics could be individually developed.

Standardised module descriptions in terms of agreed learning outcomes and assessment criteria should be ensured by the South African Qualifications Authority (SAQA) (ANC, 1994:7).

Certain South African universities and technikons have formed alliances with overseas universities to obtain international acceptance, which indicates that the establishment of norms and standards for distance education providers should be supported (Andrew, 1996:30).

Co-operation with residential institutions regarding the provision of courseware could involve the institutions own lecturing staff and/or external courseware experts to enhance capacity and produce highly specialised courseware.

These joint endeavours will also empower residential institutions to deliver multimode, flexible services and reduce the contact time per student and increase independent learning (Technikon SA, 1995:10).

Distance education is seen as transforming education by offering high quality education to more people throughout their entire lives, using less money (Department of Education, 1996:33).

2.6 QUALITY ASSURANCE FOR DISTANCE EDUCATION

A set of quality standards needs to be developed for distance education to improve and assure quality, with the emphasis on competency-based outcomes.

The notion of quality does not offer benchmarks against which to measure or define it (Harvey & Green, 1993:11). Kamper (1996:98) sees quality as being determined by the client and assured by strategies that monitor and improve quality performance in terms of effectiveness and efficiency of service. Lategan (1996:67) defines academic quality as fitness for purpose within a specific context and proposes that it be determined by a person or body according to goals or objectives (cf. Jessup, 1994:5).

Quality assurance is more than offering a sound education, but to maintain and improve the quality of life, which is the ultimate goal of lifelong learning (Lategan, 1996:69). The South African Qualifications Authority (SAQA) Act, passed in October 1995, enables South Africa to develop its own National Qualifications Framework (NQF) to enhance quality of education and training, create an integrated national framework for learning achievements and facilitate career paths, access, success and contribute to social and economic development and personal development of learners (NQF Network, 1996:1).

Standards for education should be embedded in a national quality assurance system that prescribes standards and gives scope for continuous improvement, incorporating international standards such as ISO 9000 and self-evaluation (Dept. of Education, 1996:vii).

They envisage the transition to quality standards for distance education in terms of course design to be based on the required learning outcomes.

Quality assurance and open learning should contribute to the full personal development of each learner and the social and economic development of the nation at large (Lategan, 1996:70).

The focus on outcomes will enable learners, providers and employers to know what the requirements are for completing an education and training programme (NQF Network, 1996:5).

According to Jessup (1994:16) competence must meet performance criteria, which should be stated with sufficient precision to allow unambiguous interpretation by awarding bodies, assessors trainers and candidates.

Principles that underpin qualifications in terms of the NQF are that they be credible both in South Africa and international, provide learning pathways, be relevant based on outcomes, flexible to be gained anywhere, accessible, responsive to the changing needs and diversity of society, reflective of the needs of learners and providers, effective, efficient and appropriate (NQF Network, 1996:8). They indicate that generic skills be transferable so that learner's achievements be recognised across providers.

Recognition for prior learning enables people of all ages, backgrounds and attitudes to receive formal recognition for skills and knowledge they already possess (NQF Network, 1996:36).

Standards for quality assurance underpinned by "fit for the purpose" outcomes may lead to a competent workforce.

2.7 MULTIMEDIA USED IN DISTANCE EDUCATION

2.7.1 Multimedia and technology addressing learner problems

Distance learning and technology-supported learning are both forms of study where student and lecturer are not present on the same premises and where study is systematically and deliberately supported by technology (Rebel, 1996:118). Media do not represent an outcome; they are tools serving a function or an educative purpose, providing learner-support and facilitating learning (Keegan, 1993:309-312).

Recent trends in distance education are shifting towards a cost-effective, integrated instructional delivery system, using electronic technology in tandem with print for didactical efficiency and independent learning.

Multimedia refers to the capacity to transmit information in many forms (text, data, graphic, video and audio) (Keegan, 1993:30).

Problems experienced by distance education students (social isolation, geographical distance between learner and tutor, motivational support and communication difficulties) can now be overcome by interactive multi-media (cf. Keegan, 1993:41; cf. par. 2.3.2). Rebel (1996:118) sees applications of technology-supported learning (computer conferencing, audiographics, video conferencing, interactive video) as a means to bridge these problems.

Moore and Kearsley (1996:20) add that advice and guidance be accessed universally by involving e-mail, the Internet and CD-ROM packages in the delivery of course material.

Van der Merwe (1996:77) recommends that students match theory and practice by applicable learning opportunities (i.e. the Internet) serving as functionalisation opportunities to become independent, self-motivated and thinking creatures in their fields of study.

Study-centres may provide facilities and bring education and training to those students who do not have access to technology.

Technology-supported learning can provide lifelong learning opportunities to distance education students by sharing expert knowledge from different countries to complement individualised learning with collaborative ways of knowledge acquisition while co-learners can give motivational support (Rebel, 1996:118).

The ILCDE model is committed to service excellence in the delivery of distance education, and future options to increase interactive participation in distance learning will be investigated.

Snyman (1993:1) proposes a low cost, interactive education and distance training model for South Africa via television, as this distance training system has worldwide been very successful for adult education and training, literacy upgrading and for vocational training.

Technology, which increases interactive participation in distance learning, brings the student closer to the lecturer

and removes the distance from distance education. Technology in itself however, cannot ensure that learning takes place, (cf. Rebel, 1996:118) although it can deliver information quickly, and efficiently over vast distances.

2.7.2 Choice of media or technology

Although the educational content does not place constraints on distance education, the format of presentation may be influenced by the delivery system. Batey and Cowell (1986:13) explain that a pure lecture format would be inappropriate over an audioconferencing system since it does not engage students in much dialogue. However, it is the only format possible when radio broadcasts or audiotapes are used as the delivery vehicle. The curriculum format should be interactive if the delivery system supports an interactive format.

The choice of technology or media to consider for distance education depends on the competencies and skills of the learners who will use it as well as their access to it. The nature of the learning material, the affordability of the technology and the availability of supporting staff should also be considered when choices are made. Rowntree (1994:98) believes the message should determine the media to be used and suggests that the media chosen should be selected for its strongest qualities in meeting the learning objectives. According to Batey and Cowell (1986:11), multimedia are likely to be more effective than a programme with only one type of delivery. The distance educator, however, must focus continuously on outcomes and goals, suitable subject matter, student requirements and delivery constraints. Distance education is still evolving and striving to integrate voice, video, computer data and print effectively and innovatively. Distance education requires an integrated ef-

fort by the programme groups, the lecturers, mentors, support staff and administrators to exercise their full potential.

2.7.3 Different media and technology-supported learning

Effective distance education media should focus on the needs of the students and the requirements of the content (Willis, 1993:102). Supportive audiovisual multimedia may be integrated with modularised, interactive study guides to assist distance education students. Integrated modes of instruction may constitute the distance education mode of self-study, complemented with contact sessions, facilitated by tutors and mentors, practical contact courses, experiential training and a decentralised support system. Multimedia packages may include slides, videotapes, CD-ROM (compact disk with read-only memory), audio-cassettes and tapes. Sound can be a very powerful medium in open learning (Rowntree, 1994:107). Students can make good use of their time by listening to audio-tape discussions while driving to work.

Barker (1986:4) informs that interactive television, whether transmitted via satellite, microwave, cable, telephone lines, or instructional television fixed stations, offers two-way contact eg. Netech, Ubuntu Edunet and Africa Growth Network. Hummel (1993:20) suggests that students be taught problem-solving skills during practical sessions with an interactive video programme, without direct student-teacher contact.

Computers give access to CD-ROM, interactive video and databases, helping learners keep in touch with one another or

with their tutors (i.e. computer conferencing) and provide computer-based training (Rowntree, 1994:113).

Using the best media to suit the outcomes of the modules or lessons, may stimulate students' interest, help with comprehension of difficult content and enrich the course.

The following are some of the media options which may be used to reach distance education students:

- **Teleconferencing**

This medium allows the student to interact directly with other people at a distance and discuss common problems, share ideas, seek help and perhaps reduce the feelings of isolation (Rowntree, 1994:116). Rowntree sees teleconferencing to include audio-conferencing, video-conferencing and computer-conferencing.

- **Audio teleconferencing**

This medium provides a distance seminar situation for learners to discuss difficulties in courseware. It is an interactive medium that fosters the development of learning experiences that suit the needs of specific learners and provides direct feedback enabling distant learners in participating in the planning of curriculum relevant to their needs (Willis, 1993:80-81).

Two-way audio interaction can take place from satellite campuses where students present can be "linked by a speaker phone with the at-a-distance instructor" (Barker, 1986:5-6). Baker suggests that the lecturer may be con-

nected to the satellite campus via telephone lines and may introduce a video lesson verbally, for example. The videotape is then played locally at each site, after which the lecturer returns to the audio network and conducts a seminar.

- **Video-conferencing**

The principle is the same as for audio-conferencing, but the participants are able to see one another on TV-monitors (Rowntree, 1994:116). Students can acquire realistic problem-solving skills offered by interactive video programmes.

Controversial issues can be debated to develop, not only interpersonal communication skills, but also verbal strategies and values. These are crucial when stating the case of the environment and persuading students to take the necessary actions to combat mismanagement of the environment. For this reason interactive video seems to be very valuable in distance education.

- **Computer-conferencing**

Here the participants communicate with each other through a network of personal computers, linked via telephone lines (Rowntree, 1994:116). This medium not only provides direct instruction or discussion, but according to Kaufman (1984:251), is also a medium for electronic submission of assignments with rapid feedback. The contact with other learners through speech is important to distance education students studying on their own.

- **Computer teaching and linkage with audio interaction**

Computers can contribute to distance education by "controlling access to other media such as interactive video or CD-ROM and other databases" (Rowntree, 1994:113). A CD-ROM is a storage medium which has the capacity to store vast quantities of information in text, pictures and sound (Rowntree, 1994:113), providing stimulated tuition to students through moving animated graphics. The computer can evaluate the student's knowledge and skills, and can respond immediately, acting as a patient tutor at the student's own pace.

Another innovation is the linking of computers to each other via modems over regular telephone lines, coupled with an audio bridge, over a separate set of telephone lines (Barker, 1986:4). Barker explains that it allows the computer monitor to function as an electronic chalkboard between instructor and students, and the audio bridge permits voice interaction between all users. This type of computer-aided learning can provide feedback to learners on concepts and skills taught in the course.

- **Computer-assisted instruction**

Computer-assisted instruction uses the computer as a self-contained teaching machine that can be used in problem-solving, simulation and tutorials (Willis, 1993:91). In this way tutorials can become one of the most powerful media for invoking, specialising and generalising, and particularly for stimulating students to try to express what

they have understood so that they can modify, embellish and develop their interpretations (Mason, 1984:11).

Computers can facilitate self-pace learning, give immediate feedback and are extremely flexible and maximise learner control and increase access (Willis, 1993:95).

Many adults learn best in a social context and participation in discussions can develop self-confidence (Connect, 1991:2).

- **E-mail**

The e-mail allows the user to send messages electronically via the international network to registered users (Van der Merwe, 1996:76).

The electronic mail system can be used to send lessons and assignments to the students, who write their assignments off-line and then send their work back to the instructor. The instructor in turn comments and corrects their work before returning it by electronic mail (Batey & Cowell, 1986:5).

Students who do not have computers and a modem to receive or send e-mail messages can make use of their nearest satellite campus for access to these facilities. This system can reduce the turnaround time of assignments.

- **Telecourse via satellite**

Satellite delivery is a non traditional method which can be used in distance education to reach students in rural areas. Satellite broadcasts can be used to enrich courses or supplement the core curriculum and demonstrate practical aspects of the work.

According to Salvador, Schmidt and Miller (1993:11-15), a telecourse offered by Iowa State University on sustainable agriculture and delivered via satellite (AG*SAT) provides student-instructor interaction by using a telecommunications network. Summative evaluation of the course indicated that "respondents rank the use and educational value of multimedia very highly" (Salvador, Schmidt & Miller, 1993:18). An interactive telecourse via satellite such as Netch, Ubuntu Edunet and Africa Growth Network can be valuable to distance education students in remote areas who do not have other resources nearby.

The use of new technologies in distance education that foster live interactivity between student and lecturer or student and student will enable distance education to assume its rightful and respectful role in education (Keegan, 1993:46).

- **Fax**

Fax could be used to distribute and receive assignments and last minute announcements (Willis, 1993:103).

- **Internet**

The internet as a medium of delivery may increase the level of communication between the learner and the lecturer and limits of distance and communication costs may be drastically reduced (West, 1996:87).

- **The World Wide Web (WWW)**

The multiple learning activities of the World Wide Web can be used as a multimedia package and learning activities can be structured to enable the students to obtain mastery of the learning objectives on their own (Van der Merwe, 1996:78). He sees many application for the WWW, including interactive "lectures" with supportive material (graphics, animations, audio visual programmes etcetera), a "do it yourself" instruction package enabling students to do self-evaluation, receive and send assignments, tests or down load lectures for revision later-on (cf. West, 1996:91).

Instruction on the WWW can provide for different learning styles since students can do their own planning (Van der Merwe, 1996:78).

- **Discussion groups**

The Internet can be used by a group of people to communicate on a specific topic (Van der Merwe, 1996:76). He points out that it operates on the same principles as e-mail, except that a mail server controls the discussion group.

Using multimedia may lead to learner autonomy. Independence in learning are usually cited by teachers, employers and government bodies as one of the key aims of education (Lockwood, 1994:112).

2.8 REQUIREMENTS OF THE DISTANCE EDUCATION INSTITUTION

Curricularists have to be mindful of the institution's model for cooperative distance education, which implies that it serves the interests of industry and community partners. Learning programmes should focus on competencies and foster employability, which encompasses learner outcomes, bearing in mind that the curriculum focus on instruction and learning should be student-centred.

The education and training philosophy at Technikon SA is eclectic, which means that it includes a variety of educational philosophies (Genis, 1995:1). The curriculum should promote the values underlying a democratic process and prepare students for life in a modern economy and democratic environment.

The need for change as expressed in reconstructionism is addressed by the learner-centred approach to curriculum design and instruction, while progressivism is expressed in the interdisciplinary approach to subject matter.

Curriculum approaches must fall within the framework of the government's policy on education and training and its Reconstruction and Development Programme. Consideration should also be given to the Ministry of Education who invites academic institutions to design a new education and training system to meet the personal and social needs, and economic

challenges confronting a democratic nation" (Government Gazette, 1994:10). The main theme of the government's Reconstruction and Development Programme, is the empowerment of the people "through appropriate education and training" ... "to participate effectively in all processes of a democratic society, economic activity, cultural expression and community life" (Government Gazette, 1994:10).

The Department of Education is the macro-level, decision-making body influencing technikon policy on education and training.

The meso level of decision-making at technikons consists of the Committee of Technikon Principals. The Committee of Technikon Principals provide *inter alia* guidelines as to the composition and weighting of programmes and courses, as well as recommendations on admission requirements. The requirements for national instructional programmes at technikons and the National Education Policy of the Department of Education influencing technikon curricula, are contained in their Report 150 (95/01). Specifications on the allocated credit value of an offering or module are also contained in this document.

The curriculum is also influenced by the mission and vision statement of the institution of learning. This purports accessible, co-operative, career-centred, contextually relevant education and training.

The distance education institution of learning must take cognisance of the policy of the Department of Education and Training regarding guidelines to the curriculum process. According to the Government Gazette (1995:21-22), the policy on Education and Training demands equal open access to all

learners and lifelong education and training of good quality. The curriculum should encourage independent and critical thought, sustainable agricultural training and values that subscribe to sustainability.

According to Reijntjes et al. (1994:131), most curricula and textbooks used at agricultural colleges and universities are biased toward high-external-input agriculture (HEIA) technologies. Professionals are trained within an outdated and inappropriate paradigm, imparting their knowledge and attitudes via farmer training centres, within the same paradigm. Training methods are not participatory and they foresee that professionals, including farmers, will need a different type of training if they are to develop and apply low-external-input and sustainable agriculture (LEISA) technology. This training places the emphasis on holistic concepts, co-operative attitude, respect for nature and local sustainable farming systems and indigenous knowledge.

The distance education institution of learning must also take cognisance of the mission statement outlined in the White Paper on Agriculture (1995:4). This calls for equitable access to agriculture and promotes the contribution of agriculture to the development of all communities and the economy by enhancing income, food, security, employment and quality of life in a sustainable manner.

Local urban governments should assist in providing an infrastructure for practising urban agriculture and should form partnerships with distance education institutions to help with the practical training of students.

A study of the profile of distance education students is also necessary in order to meet their needs (cf. section

2.3; par. 2.3.1 and 2.3.2). Make the learning system appropriate to what is known of the learners, and help them develop their own abilities to learn (Rowntree, 1994:37).

2.9 CONCLUSION

Culminating from the above discussion distance education should provide education, learner support and services that are learner-centred, and flexible to help learners achieve required learning outcomes and cater for different learning styles and learner needs. Students may for instance access various sources of information (Internet, industry) to help solve a practical problems in urban agriculture and demonstrate mastery learning in an individualised manner, suitable to each students' needs.

An outcomes-based approach to education, based on these needs should provide the key to relevant distance education, competent learners and an effective workforce.

Choice of media and technologies should be justified in terms of the purpose of the learning experiences, their instructional effectivity, financial prudence, learner needs, and the required learning outcomes. In this way flexibility of choice is incorporated in the curriculum framework. The curriculum framework should specify the learning outcomes required for admission so that formal learning or work experience (prior learning) can be recognised.

Quality standards in distance education should ensure that qualifications are fit for purpose, and meet the needs of industry. Prior learning should be recognised and accredited to enhanced access to further education.

Distance education institutions should form partners with all other higher education institutions to form a single, national, co-ordinated system that can equip learners cost-effectively with quality education throughout their lives and address access, redress, success and service. A mixed mode of delivery can combine face-to-face learning and distance education to produce the "best of two worlds." Access will be enhanced if students can register at any distance education institution, credit is given to similar modules obtained elsewhere and services jointly provided.

The lecturer's role should be to facilitate and not dictate, guiding students to achieve self-actualisation, improving their capacity for lifelong learning and enabling them to recognise new learning needs so that learning can become self-directed, self-motivated and rewarding.

Learning should be meaningful organised around life situations and directed by the adult learners studying Urban Agriculture. It should be based on the learner's desire to learn and meet individual needs. The curriculum should allow exposure to many different experiences allowing students a freedom of choice and a shared responsibility in curriculum planning, vital for achieving an outcome of emergent self-paced and self-directed learning.

A curriculum design model suited for a distance education course in urban agriculture is needed to provide purposeful experiences and help learners with different learning styles to achieve the required learning outcomes needed in their working career. Research, which include a literature study of environmental problems and curriculum design as well as an empirical study will be undertaken to identify the needs

of potential distance education students and provide a curriculum framework for urban agriculture.

2.10 SUMMARY

In this chapter the characteristics of distance education and the needs of adult learners were studied for integration into the curriculum framework.

In the following chapter a suitable definition for an urban agriculture curriculum will be proposed as well as the underlying philosophies, approaches and curriculum model influencing it. Finally, the principles of curriculum design will be discussed.



CHAPTER 3

CURRICULUM DESIGN

3.1 INTRODUCTION

The aim of this chapter is to find a suitable definition for an urban agriculture curriculum. Design types, philosophies, approaches and a model serving as a theoretical framework for an urban agriculture curriculum, will be discussed. The chosen model will be founded upon an Outcomes-Based Education (OBE) approach, because according to Killen (1996:1) it focuses the attention on the desired end results of education and the purpose of instruction rather than on content.

A discourse on the curriculum design principles will finally be given.

3.2 DEFINITIONS AND DISCUSSIONS OF CONCEPTS

As a frame of reference, the following concepts used in this chapter are defined and discussed in terms of an envisaged urban agriculture curriculum.

3.2.1 Curriculum

The curriculum is all the learning experiences and instruction - learning strategies that learners have with the purpose that learners learn and successfully demonstrate specific, purposeful, predetermined outcomes.

The curriculum is democratically planned in terms of a framework of theory and research to ensure that it has purpose to the learners.

3.2.2 An Outcomes-Based Curriculum (OBE)

An OBE curriculum formulates the purpose of learning and teaching and uses them as criteria for further curriculum development and assessment (Department of Education, 1997:v-vi). They regard OBE to be driven by the outcomes demonstrated by the learner at the end of the educational experience. OBE is based on the philosophy that all learners can learn (cf. Killen, 1996:2) and it defines the knowledge, skills and attitudes or values that learners are to learn (Department of Education, 1997:vii). The reason for the paradigm shift away from the aims-and-objectives approach to OBE is to achieve a prosperous, democratic and internationally competitive country with literate, creative and critical citizens, leading productive and self-fulfilled lives (Government Gazette, 1997:5).

It is envisaged that an OBE urban agriculture curriculum will contribute towards socio-economic development and the acquisition of knowledge, critical-thinking skills and attitudes that will enable learners to become responsible decision-making citizens, protecting and conserving natural resources and improving the quality of life for all.

Unfortunately the current instructional practices in education are time-driven rather than students demonstrating mastery of an outcome and experiencing success (Capper & Jamison, 1993:428-429). Outcomes-based education there-

fore provides a means of meeting the needs of "all students, making education more efficient by emphasising outcomes that are attitudinal, effective, motivational, relational and promote, critical-thinking, problem-solving, communication and technology application") Spady & Marshall (1991:69). The fact that outcomes-based education has a "transdisciplinary and empowerment-oriented approach that is collaborative, flexible and open" (Spady & Marshall, 1991:68), renders it suitable for training students in urban agriculture.

OBE focuses on significant learning outcomes and concentrates on meaningful student learning that leads to demonstrations of competencies (Killen, 1996:2-3). This pragmatic approach of what students will be able to do after the education process, points out that OBE will more likely to prepare students for success in their future vocation and in life than the current education.

3.2.3 Curriculum framework

A curriculum framework is a systematic approach to the planning of the curriculum and includes a curriculum rationale (cf. Marsh 1992:73) and according to the The Consultative Forum on Curriculum (TCFC) (1996:9) outcomes, content, learning and teaching strategies, assessment and systemic shifts to enable curriculum change.

3.2.4 Critical outcomes

Critical outcomes are cross-curricular, broad, generic outcomes that will ensure that learners gain the skills, knowledge and values that will allow them to contribute

to their own success and that of the community and the country (Government Gazette, 1997:13).

According to them the South African Qualifications Authority (SAQA) proposes the following seven critical outcomes for learners:

- Identify, solve problems and make decisions, using critical and creative thinking
- Work effectively with others in a group, organisation or community
- Organise and manage themselves responsibly
- Collect, analyse, organise and critically evaluate information
- Communicate effectively
- Use science and technology effectively, showing responsibility towards the environment and health of others
- Demonstrate cross-curricular problem-solving activities

3.2.5 Specific outcomes

Specific outcomes are contextually-demonstrated knowledge, skills and attitudes, reflecting the critical cross-curricular outcomes (Department of Education, 1997:v). They refer to what learners will do as a result of learning experiences, rather than the traditional approach of listing content to be covered within a learning programme (Government Gazette, 1997:15).

3.2.6 Curriculum design

Curriculum design refers to the way we conceptualise the curriculum and arrange its major components to provide

direction and guidance as we develop the curriculum (Ornstein & Hunkins, 1993:18; cf. Krüger, 1980:103; cf. Zais, 1976:16; cf. Print, 1993:94).

According to Ornstein and Hunkins (1993:18) the way a curriculum is designed is partially rooted in the approach and the definition of curriculum and is based on the curricularist's views of teaching, instruction and how students learn.

According to Print (1993:95) designs based on problem-solving and learner-centred approaches will emphasise less content and more of the other curriculum elements.

3.2.7 Design types

Most curriculum designs are integrations of three basic design types: subject-centred, learner-centred and problem-centred designs (Ornstein & Hunkins, 1993:242). Different design types will be contrasted in terms of advantages and disadvantages for the envisaged curriculum.

3.2.7.1 Subject-centred designs

This design revolves around the teaching of an established body of content (Print, 1993:97; cf. Longstreet & Shane, 1993:76). Advantages of this design are:

- Educational excellence
- Ease of delivery by means of study guides and textbooks

Disadvantages:

- Learning is compartmentalised, stresses mnemonic skills and content and neglects students needs, interests and

experiences and fosters in students a passivity of learning (Ornstein & Hunkins, 1993:244; cf. Print, 1993:99)

- It is teacher-centred

This perennialist orientation does not cater for unique needs, student-centredness or an outcomes-based approach, where each "area of study is an integral part of a journey towards significant learning outcomes that will prepare them for life" (Killen, 1996:4). This promotes a static curriculum that does not support the dynamic, ongoing change in knowledge or problem-solving activities of real-world situations needed for this curriculum.

What is needed is to integrate content with the learner's prior experiences, leading to meaningful new experiences.

3.2.7.2 Learner-centred designs

Curricularists of this design view society in democratic terms, emphasise individual development and are concerned with creating curricula that are valuable to students' needs and interests (Print, 1993:100; cf. Ornstein & Hunkins, 1993:249).

Learner-centred designs are not as preplanned as other designs and evolve from teacher-learner interaction (Print, 1993:100; cf. Longstreet & Shane, 1993:68).

The experience-centred form of the learner-centred design is based on:

- The needs and interests of learners (Ornstein & Hunkins, 1993:250; cf. Print, 1993:100)

- The claim that people only learn what they experience
- Learning is an active transaction (Taba, 1962:401)
- Joint planning of learning experiences between students and curriculum developers
- Skills and knowledge are acquired as the individual requires or needs them (Print, 1993:100)

These factors tie in with the definition of the envisaged curriculum as "all the learning experiences that individual learners have" and the active learning approach of outcomes-based education.

The humanistic form of the learner-centred design is a reaction against the excessive emphasis on disciplines and has its origin in progressivism (Ornstein & Hunkins, 1993:252). Its advantages include:

- Meeting individual needs in a conducive, supportive learning environment
- Proving learners with rewarding experiences for self-development (Print, 1993:100-101)
- It subscribes to the notion of confluence education which melds the affective domain (feelings, attitudes, values) with the cognitive domain (intellectual knowledge and problem-solving abilities) and stresses the whole person by integrating thinking, feeling and acting (Ornstein & Hunkins, 1993:254)
- It emphasises power-sharing, negotiation and joint responsibility

These characteristics of the humanistic curriculum, together with its confluent approach, tie in with the curriculum for urban agriculture which is in part concerned

with developing the students' environmental awareness (partly based on feelings and facts) as well as their commitment to act, allowing them to choose and to take responsibility for their choices. These designs lead to student self-actualisation, which can be achieved by allowing the students freedom to compile their own course by choosing the content or electives they find relevant. This self-direction is in line with the open learning approach and leads to self-actualised, critical learners.

3.2.7.3 Problem-centred designs

This design attempts to resolve problems of living both individual and social in nature (Print, 1993:101; cf. Ornstein & Hunkins, 1993:254).

Problems that it addresses are:

- Community and societal needs currently unmet
- Persistent life and worldwide problems (environmental)
- Social problems, the needs, interests and abilities of learners
- Reconstruction of society (Ornstein & Hunkins, 1993:254-255; cf. Print, 1993:101)
- A more meaningful curriculum design that involves learners in what they perceive as relevant and meaningful learning
- Students should play a more purposeful role in society by identifying, addressing and resolving multifarious problems (Print, 1993:102)

The curriculum should be designed so that students might study and resolve problems of an individual or group nature (Print, 1993:102).

Problem-centred designs are planned in advance and therefore differ from learner-centred designs (Print, 1993:10-11; cf. Ornstein & Hunkins, 1993:255). The thematic form of the problem-centred design suggests that learning experiences should reflect those that we experience in our lives in order to make them meaningful and useful (Print, 1993:101). This type of design develops themes relevant to the problems, needs, abilities and interests of students and integrates different themes in the process. On these points, this design will strongly influence the conceived curriculum due to its commitment to address community needs based on life problems currently unmet (Print, 1993:102; cf. Ornstein & Hunkins, 1993:255).

The life-situations design, which is a variation of the problem-centred design, focuses on:

- Social problems, life situations and links subjects to solve real-life problems.
- Emphasising more meaningful knowledge and learning to broaden students' insight.
- Health, responsibility, aesthetic appreciation, social participation, and the ability to deal with environmental, socio-economic and political problems (Ornstein & Hunkins, 1993:256) applicable to the proposed curriculum.

To fulfill the desire of complete living the envisaged curriculum should emphasise sustainable living.

The envisaged curriculum can be designed to direct learning to function as a positive social force by involving students to function effectively in community gardens, food gardens, environmental, urban agricultural and entrepreneurial projects.

Advantages of the life-situation curriculum design according to Ornstein and Hunkins (1993:256) are:

- Its focus on problem-solving procedures for learning so that process and content are effectively integrated into the curricular experiences
- Its use of prior knowledge and current experiences of learners to analyse immediate problems in the society
- Its presentation of subject matter in an integrated form by cutting across the separate subjects and its encouragement of students to learn by applying problem-solving procedures in real situations increase the relevance of the curriculum

This ties in with an outcomes-based approach where the emphasis is on student learning and integrating knowledge around a common concern so that each learning activity serves a specific purpose and motivates students, helping them to understand information and to transform it into their own personal knowledge (Killen, 1996:4-5).

A strength of this curriculum design and relevance to the one envisaged, is its problem-solving learning strategy that clearly highlights problem areas to students, utilising their past and current experiences to analyse and solve problems in an integrated manner by drawing from different subjects and implementing it to real life problems.

This design ties in with OBE because relevant content is applied and according to Killen (1996:4) "all content and student activity can be justified on the basis that they help students to learn meaningful things". Students are free to access any other sources for information to solve a problem. This ties in with OBE which uses effective learning strategies to empower students (Killen, 1996:5).

3.2.7.4 The core design

The core design, is based on a core or set of common learnings (knowledge, skills and values) provided to all learners in order to function effectively in society (Print, 1993:103). This design has several variations; subject-matter core design is subject-centred, while the areas-of-living core design is problem-centred (Ornstein & Hunkins, 1993:258). According to them this latter design is preplanned and requires that students actively engage in identifying discussing and debating current problems, needs and concerns of learners. Advantages of the core design are:

- It encourages, co-operative and democratic practices
- It unifies content, presents relevant subject matter to students
- It fosters intrinsic motivation in students
- Drawing conclusions stimulates students' higher cognitive domains and problem-solving skills
- It attacks crucial problems of society and encourages students to learn about the community (Ornstein & Hunkins, 1993:258)

These advantages fit OBE and the envisaged curriculum.

Weaknesses, according to them are:

- ⇒ Conventional textbooks do not support this design
- ⇒ Teacher should be well versed in subject matter, problem-solving skills and general knowledge
- ⇒ General education has not been accepted by the population as worthwhile

3.2.7.5 The social problems and reconstructionist design

According to Ornstein & Hunkins (1993:259) the emphasis of this design is on social, political and economic development of society. They believe that through the curriculum, educators will effect social change and ultimately create a more just society, aimed at social action-taking and engages the learner in analysing severe problems confronting society. — Pressing socio-economic and unsustainable agricultural practices need to be addressed in an urban agriculture curriculum to plan for change and a better tomorrow. This may also include creative ways of conserving limited resources to meet the needs of society. This design is also rooted in the philosophical tradition of pragmatism and promotes equality of educational opportunity (Ornstein & Hunkins, 1993:260).

Learning experiences and content can be defined by outcomes that students have to achieve based on creating a more just society.

3.2.8 Reconstructionism

Reconstructionists see the aim of education as improving society and assisting in social reform and change, in so doing encouraging an awareness of problems confronting humankind (Ornstein & Hunkins, 1988:47).

3.2.9 Eclecticism

Eclecticism in curriculum refers to the selection of content based on different sets of principles. It is founded on a set of philosophical premises about the nature of humankind, of knowledge and of the ultimate goals of life that is distinct from that of other philosophies underlying curriculum designs (Longstreet & Shane, 1993:85&105).

3.2.10 Pragmatism

Pragmatism construes knowledge as a process in which reality is constantly changing. Pragmatists regard critical-thinking as an important skill that learners should acquire. Truth is not absolute but has to be proven. Learning takes place in an active manner by solving problems (Ornstein & Hunkins, 1988:30-31).

3.2.11 Existentialism

Existentialists stress personal self-fulfilment and they prefer learners to be free to choose the knowledge they wish to possess (Ornstein & Hunkins, 1988:31).

3.2.12 Progressivism

Progressivism is an educational philosophy which examines problem-solving skills and tools of learning. Progressivists prefer the curriculum to be interdisciplinary in nature (Ornstein & Hunkins, 1988:38).

3.3 CURRICULUM DESIGN

An OBE approach to curriculum design is rooted in competency-based education and mastery learning (TCFC, 1996:1).

Philosophies and approaches influencing the curriculum and contributing to competencies that will provide learners with skills, knowledge and values needed for their careers will be discussed.

3.3.1 Philosophical influences on curriculum design

Almost all elements of curriculum are based on philosophy and it provides curriculum workers with a framework for organising the learning environment (Ornstein & Hunkins, 1993:34-35).

3.3.1.1 Philosophical traditions

All the philosophies influencing the urban agriculture curriculum will be discussed to provide a basis for curriculum decisions. The traditional philosophies of the realist and idealist prefer a curriculum that consists of separate subject matter and are rigorously knowledge-based (Ornstein & Hunkins, 1993:38) and are not flexible. However, the fact that realists cultivate logical and ra-

tional thought give them merit and credibility in a scientific discipline curriculum.

On the other hand, the pragmatists have contemporary views and base their philosophy on "knowledge as a process in which reality is constantly changing" (Ornstein & Hunkins, 1993:39). To them learning occurs during the process of problem-solving by integrating knowledge from a number of subjects and situations. Carl (1995:56) sees a pragmatic approach as eclectic. Pragmatism's problem-solving and transdisciplinary approach to learning is reflected in OBE (cf. TCFC, 1996:8) appropriate to the envisaged curriculum. This philosophy is basic to the curriculum for urban agriculture, where the most suitable agricultural methods are sought to solve current environmental problems in different ecological situations. This philosophy, in an urban agricultural context, infers that learning will take place when students are actively engaged in practical agricultural and scientific projects that require environmental problem-solving for an urban environment.

The contemporary philosophy of the existentialists allows learners to choose what they want to study and select the knowledge they need. This philosophy allows the students a personal freedom of choice (Ornstein & Hunkins, 1993:39-40) based on the open learning approach of students selecting their own learning content. Rowntree (1994:39) mentions that open learning is a new consumer-orientation in education and training, and includes accreditation of prior learning, credit accumulation and modularisation of courses. This "bottom up" approach permits the learners more freedom of scope and control over their studies that may ultimately lead to self-

actualisation. This is also subscribed to in OBE (cf. Killen, 1996:6). A modular curriculum refers to a curriculum that consists of a number of teaching-learning units. It is a clearly delineated content unit of a discipline, containing a teaching-learning theme or topic with disciplinary cohesion. It offers flexibility and definite focal points (Krüger, no date, as referred to by Geysers & Van Loggerenberg, 1994:63).

The existentialist's philosophy of freedom of choice ties in with curriculum envisaged for urban agriculture, allowing students more flexibility of choice in learning experiences and endorsing a modularised approach.

3.3.1.2 Educational philosophies

Each of the educational philosophies: perennialism, essentialism, progressivism and reconstructionism has its roots in one or more of the four philosophical traditions (Ornstein & Hunkins, 1993:61). Examples cited show that perennialism draws on the principles of realism; essentialism is rooted idealism and realism; while progressivism and reconstructionism stem from pragmatism. Reconstructionism has ties with existentialism.

The fact that the curriculum of the perennialist is subject-centred and constant, with knowledge regarded as timeless, renders its input towards a curriculum for urban agriculture of low status, because it may not be able to solve current problems based on new facts and finds itself catering for needs which no longer exist.

Essentialists see the curriculum consisting of the essential basic knowledge and skills. "While essentialism

does not conceive of knowledge as absolute, it does give great importance to time-tested content that has proved its worth to society " (Longstreet & Shane, 1993: 112).

According to Longstreet and Shane (1993:114) progressivists see knowledge as a social and individual product of activity. Progressivism is characterised by an open-minded, flexible attitude that views all knowledge about the world in a state of flux (Longstreet & Shane, 1993:113). They believe in the individual's ability to solve problems confronting society and see knowledge as a product of activity that include co-operative learning experiences and self-discipline (cf. Ornstein & Hunkins, 1993:50). These criteria are crucial to the democratic principles of social living (Longstreet & Shane, 1993:13) and in OBE where students are encouraged to "collaborate in learning rather than compete" (Killen, 1996:2). A progressivist's curriculum focuses on students' interests, solving of human problems and views subject matter as interdisciplinary (Longstreet & Shane, 1993:114). Independent environmental protection projects are important to expose students to real-life experiences. Progressivists are advocates for relaxation of admission standards at institutions of learning (Ornstein & Hunkins, 1993:51). A curriculum in urban agriculture ought to subscribe to the progressivists' viewpoints that the "universe is in a continuous state of development with new experiences integrating into the existing mass of prior experiences" (Longstreet & Shane, 1993:113) and Technikon SA's approach of open access to all students and its endorsement of a modularised curriculum.

Reconstructionism, as seen by Longstreet & Shane (1993:114, 115; cf. Ornstein & Hunkins, 1993:54), is a

further elaboration of progressive ideas, but differs from it in its concern for the future in order to improve and reconstruct society. Both the reconstructionists and the progressivists are human-centred philosophies. Reconstructionists are sensitive to global issues (Ornstein & Hunkins, 1993:55) which may include global environmental awareness. The curriculum focus of the reconstructionists is on social research and socio-economic and political problems and learning must be instrumental in achieving a vision for the betterment of society (Longstreet & Shane, 1993:115; cf. Ornstein & Hunkins, 1993:54).

Reconstructionists differ from the progressivists in that the curriculum stresses the outcomes rather than the processes (Longstreet & Shane, 1993:115). This reflects the view of OBE focusing on significant learning outcomes (Killen, 1996:3).

Some of these philosophies may be combined to serve as a framework for decision-making to design a curriculum for Urban Agriculture that will be relevant, serve the needs of a present and future society and the environment. Philosophies that may greatly influence this curriculum are progressivism, which pursues relevant knowledge that can contribute to solving present problems and reconstructionism that strives to appraise and improve the times by developing knowledge and skills to promote active learning and research for solving socio-economic problems of a contemporary and future society. The ultimate aim of this curriculum is to enable individuals to function well in their vocation and to act in a responsible manner towards attaining a sustainable society and environment.

3.3.2 Influences of educational philosophies

Contributions of *progressivism* on the envisaged curriculum are:

- Progressivists' urge to solve societal problems, integrating prior experiences with new experiences and its curriculum focus on relevancy, student interests and co-operative education with industry (cf. Longstreet & Shane, 1993:113 & 13; Ornstein & Hunkins, 1993:50 & 62).
- Progressivist's problem-solving learner-centred approach (cf. Ornstein & Hunkins, 1993:50) to educate adult learners (cf. par. 2.3.1; par. 2.3.2), may help to solve society's socio-economic and environmental problems (cf. par. 1.1.1 & par. 1.1.2) and ties in with an outcome-based approach to education of obtaining "skills in problem-solving" (cf. Killen, 1996:8).
- The fact that progressivists focus on a relevant curriculum, interdisciplinary knowledge as a social and individual product of activity (cf. Longstreet & Shane, 1993:114; cf. Ornstein & Hunkins, 1993:62) and integrating prior experiences with new experiences tie in with the concept of the envisaged curriculum (cf. par. 3.2.1) and an outcome-based approach to education, focusing on significant learning activities to help students understand information and to transform it into their own personal knowledge (Killen, 1996:5).
- Progressivists' curriculum focus is based on the learner, students' interests, self-discipline and co-operative learning, focused on active relevant learning experiences (Ornstein & Hunkins, 1993:50 & 62; Long-

street & Shane, 1993:113) which is endorsed by outcome-based programming, emphasising student learning and success, learners' needs and democracy (Killen, 1996:11-12) and suit the envisaged curriculum.

- Progressivists are flexible regarding admission (Ornstein & Hunkins, 1993:51) which reflects the concept of Open Learning in distance education, recognising prior learning and removing unnecessary barriers to access (SAIDE, 1994:2) providing in society is demands for mass delivery of education and training (cf. Greyling, 1996:102; Moore, 1996:54).
- Progressivists oppose authoritarian teaching and fear as a form of discipline, excessive reliance on textbook methods, memorisation of facts, static aims that cannot accommodate change and education that isolate learners from individual experiences and social reality (Ornstein & Hunkins, 1993:50; cf. Longstreet & Shane, 1993:113-114). The above are also not acceptable to the envisaged curriculum, because they do not enhance learning or are conducive to active, relevant learning. Critics of progressivism regards it as lacking vision and ultimate systematic order because it is not pre-planned and set forth the outcomes it deems most desirable (Longstreet & Shane, 1993:114) differing in this respect from outcome-based programming that is pre-planned, purposeful and systematic, providing appropriate learning experiences and opportunities based on a clear set of outcomes, most valuable to students (Killen, 1996:11-12). Progressivists however, believe that if the quality of the processes pursued is good, then quality of the outcomes will be good (cf. Longstreet & Shane, 1993:114).

Contributions of *reconstructionism* to the curriculum are:

- Its society-centredness
- Its urge to improve and reconstruct society towards a better life
- Its concern about social and economic problems and its desire that institutions of learning would help to reform society
- Its sensitivity to global issues (i.e. the earth's ecosystem and world problems)
- Learning is seen as active and involve the contemporary and future society
- Its curriculum focus based on research of socio-economic problems and international problems (i.e. environmental)
- Its curriculum emphasis on outcomes rather than processes, proposing a planned set of outcomes for a better life
- Its view that goal-governed structures and strategies be open and co-operatively compiled by individuals and groups
- Its concern for a better life, meaningful knowledge coming from experiences of learners (cf. Longstreet & Shane, 1993:114-116; cf. Ornstein & Hunkins, 1993:54-62)

All these factors are important to the envisaged curriculum and blend in with an outcome-based approach of setting outcomes, based on democratically compiled goals to ensure accountability towards the community (cf. Killen, 1996:2).

3.3.3 Curriculum approaches and orientations

According to Ornstein and Hunkins (1993:18) the way a curriculum is designed is partially rooted in the approach and the definition of curriculum and is based on the curricularist's views of teaching, instruction and how students learn.

New visions should be broached in today's society of accelerating social and economic problems, unemployment, pollution of the environment, exhaustion of our natural resources and unsustainable farming practices. A specific curriculum approach is required to accommodate change and to develop relevant competencies, needed by the learners and has an outcome-based or results orientation.

A curriculum approach can be influenced by political policies and movements (cf. National Education Policy Investigation, 1992:29). The curriculum approach and views of teaching, learning and instruction influence the curriculum design (Ornstein & Hunkins, 1993:18).

Various approaches to curriculum development may serve as a theoretical foundation (Carl, 1995:49). Five approaches will be discussed to provide a basis for an urban agriculture curriculum design.

3.3.3.1 Outcome-based approaches

OBE focuses on "what students will learn and be able to do on completion of the program" (Killen, 1996:3).

OBE is an approach that focuses on the desired end product of education, therefore statements of the desired educational outcomes must focus on the purpose of instruction and learner needs (Killen, 1996:1).

An OBE approach to curriculum design can provide technician students with relevant competencies needed for their vocation and to develop society. Demonstration of outcomes obtained from varied learning experiences must be a high quality internalised, integrated learning process (TCFC, 1996:3). They regard varied learning experiences to include content, teaching and learning strategies, resources and assessment strategies to focus on knowledge, understanding, skills, attitudes and values (TCFC, 1996:4).

An outcome-based approach to curriculum development can be attributed to an undertaking to improve the quality of life of South African citizens and redress the inequalities of the past by focusing on economic growth and job creation, coupled with social responsibility and empowerment (TCFC, 1996:5). They suggest that *ubuntu* (humanity) forms the collective value system of African solidarity and be an essential outcome, to be pursued in the new curriculum and reinforced in future generations. *Ubuntu* is seen as an attitude to life embodied in principles of justice, equality of human rights and respect for the dignity of all human beings.

According to TCFC (1996:6) an outcomes-based approach to curriculum design should lead to social responsibility and empowerment and have a clear focus on what learners should successfully demonstrate at the end of their learning experiences to bring about the vision of social

transformation. It should expand learning opportunities to technikon students to learn and demonstrate purposeful, high quality outcomes successfully in their career.

The following three levels of outcomes-based approaches and their application to the Urban Agriculture curriculum will be discussed:

- **Traditional**

According to TCFC (1996:7) this approach is synonymous with content-dominated categories that do not relate to real-life demands and living experiences. It limits demonstration of competence to small segments of instruction. These qualities limit its use for the curriculum envisaged as it should prepare learners to acquire practical life skills.

- **Transitional**

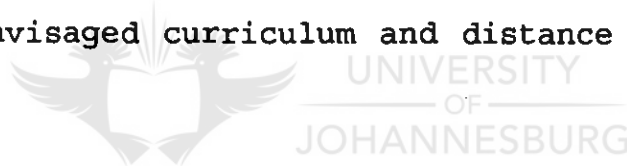
This approach gives priority to higher-level competencies (critical thinking, effective communication, technological application and problem-solving) (TCFC, 1996:8; cf. Spady & Marshall, 1991:69), which are important skills for the trainer of urban agriculturists. Cross curricular content can be applied to develop higher-order competencies. This approach addresses the most essential knowledge, skills and values for success in life (Spady & Marshall, 1991:69).

- **Transformational**

It is a collaborative, flexible, transdisciplinary, open system, outcome-based, empowerment-orientated approach to learning and equips all learners with the knowledge, competence and orientations needed for suc-

cess in life (TCFC, 1996:8). This approach provides many learning opportunities to achieve significant and practical outcomes.

The transitional and transformational outcomes-based approaches have major application in an urban agriculture curriculum providing the learner with an open, flexible system that ensures competencies and a mind set required for success in life, because they are acquired from learning guided by relevant outcomes. This approach is learner-centred, allows for flexibility in time, freedom in content and method selection (Killen:1996:2) focuses on life skills and learning is facilitated toward the achievement of relevant outcomes appropriate to learner needs, leads to independent learning and thinking and provides many learning experience (Boschee & Baron, 1993:3-4). All these facts contribute to its suitability for the envisaged curriculum and distance education students.



3.3.3.2 The academic approach

This is a knowledge-oriented, academic and theoretical approach (Ornstein & Hunkins 1993:6; cf. Carl, 1995:49). This objective approach, results in a subject disciplinary design where curricularists unilaterally take curriculum decisions without involving others (Carl, 1995:49). This undemocratic, content-oriented approach makes it unsuitable for the envisaged curriculum, because the curriculum consists of a heap of knowledge to be covered in a certain time, rather than using time as a flexible resource and allowing students to participate and to take responsibility for their own learning. This content-based concept of curriculum sees subjects as un-

related and not integrated. Killen (1996:3) indicates that if time dominates, little attention is given on how much a student will learn in that time, making it acceptable that individual students learn different amounts (due to differences in ability, motivation and learning styles).

The Urban Agriculture curriculum should rather allow students to gain the skills, knowledge, and values needed to demonstrate a specific outcome in a democratic, cross-curricular manner. Considering curriculum as subject matter, places the emphasis on facts, concepts and generalisations of a particular subject as opposed to generic concepts and principles that cut across the field of curriculum (Ornstein & Hunkins, 1993:10).

The academic approach does not conform to Technikon SA's mission statement of career-centred education, as this viewpoint only emphasises facts, concepts and generalisation, and does not include purposeful skills. Desired educational outcomes focus on the purpose of instruction rather than on the content ...” (Killen, 1996:1).

Taba (1962:197) as quoted by Carl (1995:50) disagrees that a single source of information be used for decision-making, recommending that the sources be the learner, society, subject disciplines, philosophy and learning psychology.

The fact that the academic approach reflects a transmission orientation of curriculum character, rejects its appropriateness for the envisaged learner- and society-centred curriculum.

According to Carl (1995:57) a transmission orientation considers content and product most important, while learner involvement is of lesser importance. The fact that "decision-making processes, cognitive processes, logic, critical thought and directed enquiry" are associated with the academic curriculum approach (Carl, 1995: 51-61) makes it valuable to the envisaged curriculum. This is in line with the transitional OBE approach which gives priority to higher-level competencies such as critical-thinking and problem-solving (cf. TCFC, 1996:8) paramount to the envisaged curriculum.

3.3.3.3 The experiential approach

According to Carl (1995:51-57) this approach is subjective, personal, heuristic and stresses the role of the teacher and pupils as well as their co-operative curriculum decisions. This approach utilises self-directed, self-paced, unstructured, personalised instruction programmes and personal feelings, values and experiences are considered necessary curriculum content. This implies strong transformation¹ orientations in respect to curriculum development.

Active learner involvement is important to obtain maximal learning outcomes (Carl, 1995:51). Basic to this learner-centred approach is the fact that people only learn what has meaning for them and it regards the needs of the learners as the most important (Carl, 1995:52). This is in agreement with the approach in outcome-based education (cf. Killen, 1996:12). Its learner-centredness and transformation orientation will help to meet the needs

¹Transformation¹ orientation requires that the learner and the curriculum totally integrate and it has a strong humanistic and social adaptation as well as involvement by both learner and teacher (Carl, 1995:57).

of distance education adult learners (cf. par. 2.3.2) and lead to purposeful and independent learning. This approach takes an holistic view in educating the whole person (Carl, 1995:52), its co-operative nature, relevant education and learner-centredness also reflect Technikon SA's mission and vision statements of intent (cf. par 2.2.1).

3.3.3.4 The technological approach

This approach is analytical and regards instructional planning in terms of *systems, management, and production* (Carl, 1995:53; cf. Ornstein & Hunkins, 1993:5).

This system progresses from an educational need and the identification of a terminal outcome to the realisation of the outcome (Londoner, 1972 as referred to by Carl, 1995:54).

From a technological view-point:

- Nothing is real and meaningful unless it is subject to objective analysis
- Only knowledge that prepares the learner for life is worthy of acquiring
- Learning outcomes are key issues (Carl, 1995:53-54)
- Assessment is continuous and a repeated process
- Curriculum designs based on this approach are computer-supported instructional programmes, contain vocational and technical teaching subjects and competency-based teacher educational programmes (Walters, 1985:13-17 as referred to by Carl, 1995:54).

From the above it is clear that this approach coincides in part with that of OBE in that learner outcomes are paramount and that relevant knowledge, leading to the improvement of the quality of life, should be learned and that learner outcomes and continuous assessment are key issues (cf. Killen, 1996:1 & 10). It differs from OBE in that learning is considered as a system. In OBE learning may be supported by computer instruction as one of the "variety of methods of instruction to help each student to learn" (Killen, 1996:6). More flexibility in learning experiences or instruction methods is therefore required in OBE and the envisaged curriculum. The influence of this approach on the Urban Agriculture curriculum is that computer-supported instruction may be one of many learning experiences available to learners.

3.3.3.5 The pragmatic approach

- According to this approach curriculum practice is reactive and a complex process of involvement and interaction which takes place fragmentarily.
- Curriculum development is a political and eclectic process and therefore a pragmatists curriculum has elements of the academic, the experiential and technological approaches (Carl, 1995:56).

According to this approach curriculum development may therefore have a transmission, transaction and transformation orientation.

Its political affliction and eclectic nature with the inclusion of "concepts and principles from various theoretical models in the same curriculum" (Carl, 1995:56),

allow for flexibility and wider democratic participation in curriculum design.

For these reasons this approach will have application in the envisaged Urban Agriculture curriculum.

3.3.4 Application of approaches to an urban agriculture curriculum

An outcomes-based approach (cf. par 3.2.3.1) has major application for the envisaged Urban Agriculture curriculum if goals of building a sustainable society are to be realised and will form the basis of the curriculum. However, contribution of different approaches to curriculum development are also envisaged for the curriculum. Learning experiences are to evolve through learning based on outcomes of social development, care for the environment and communicating and creative thinking.

Solving ecological agricultural and socio-economic problems, require, not only psychomotor skills, but also the development of students' cognitive processes or thinking skills. Students must be able to analyse a situation, apply their knowledge and skills in different situations, synthesise new ideas to solve a problem, evaluate (by judging the relevancy and the practicality of the proposed ideas). Logic and decision-making properties, associated with the academic approach, call for a transactional orientation in respect of curriculum development, contributing to the envisaged curriculum. This ties in with an OBE approach that encourages individual, independent, problem-based learning that equips students to be lifelong learners (Boschee & Baron, 1993:80-81).

An experiential (experience) approach is needed to provide a variety of learning experiences, which are self-directed and self-paced and ensure active learner involvement based on learner needs. This ties in with an outcomes-based approach that encourages alternative learning experiences, keeping in mind that not all students learn at the same pace or learn equally well from the same experiences (Killen, 1996:9).

The systematic procedure of curriculum development of the technological approach may help to direct the urban agriculture curriculum by determining needs empirically and identifying outcomes. According to Killen (1996:8) outcomes influence all other components of the curriculum.

The computer and its supporting facilities can provide many learning experiences to distance education students, but should not be the only method of instruction to help students learn; more freedom and flexibility in learning experiences or instruction methods are needed as required in OBE (cf. Killen, 1996:6&10).

Technology however, can help to remove the isolation and loneliness, experienced by distant education learners and assist them to become self-directed and self confident (cf. par. 2.3).

The *pragmatic approach* undergirds eclecticism in curriculum development and includes elements of the *academic, experiential and technical approaches* (cf. Carl, 1995:53).

Its reactive involvement and interaction have application for the envisaged curriculum in that learning experi-

ences, based on identified outcomes, may lead to further involvement that can be explored as the learner interacts with the topic. In this way learning can be enhanced and learning experiences increased, while the curriculum is extended as learner interests increase. These characteristics tie in with an OBE approach (cf. Killen, 1996:9).

The transitional and transformational outcomes-based approaches can contribute largely to the envisaged curriculum design as indicated in par. 3.3.3.1. Outcomes-based approaches are devoted to knowledge, skills and attitudes or values and competencies acquired from significant learning, based on outcomes. The envisaged curriculum subscribes fully to this practical approach to learning.

Providing appropriate and purposeful learning experiences and opportunities will develop originality, self-motivation and independence (Killen, 1996:12). These characteristics are important to distance education students (cf. par. 2.3).

An OBE approach is needed that provides a variety of relevant learning experiences based on outcomes that will address the needs of the learners and the society and allow them to function successfully and sustainably in the urban environment. Success in life is however, the basic premise on which OBE is founded (cf. Killen, 1996:2).

3.4 MODELS OF CURRICULUM DESIGN

A model is a simplified representation of reality often depicted in diagrammatic form (Print, 1993:61). Models give direction and purpose to the process of curriculum development (Carl, 1995:90; cf. Print, 1993:61). Models

examine the elements of a curriculum and how they inter-relate (Print, 1993:61-52).

The relative importance and arrangement of the elements of curriculum design and what each one constitutes of, has led to a number of different models. According to Carl (1995:96) different rationales for the choice and design of a specific curriculum model exist. Some of these models will be discussed to find a suitable model for the envisaged curriculum. According to Carl (1995:90) adjustments may be made to existing models after determining to what extent they comply with the curriculumist's requirements, or existing models may be used without adjustments.

The linear models will not be considered because they are outdated, static models. These linear, classic, *rational or objectives models* of Tyler and Taba are sequential and their view to the curriculum is rigid (Print, 1993:63).

Cyclical models of Wheeler, Nicholls & Nicholls and Krüger are according to Print (1993:63-63) rational in approach and flexible in application, while the *dynamic or interaction models* (Walker, Skilbeck) view curriculum processes as flexible, interactive and modifiable.

An *outcome-based model* has strong emphasis on successful and significant student learning based on the outcomes that all students are to achieve and be able to do on completion (Killen, 1996:3; cf. Capper & Jamison, 1993:429). Outcome-based education is collaborative, flexible, transdisciplinary, outcome-based, open and empowerment-oriented (Spady & Marshall, 1991:68; cf. Killen, 1996:2-3).

A dynamic, outcome-based and cyclical model will briefly be discussed in order to find a combination suitable to the envisaged curriculum.

3.4.1 Dynamic models (interactive)

The dynamic model of Walker (1972) is a temporal model (Print, 1993:77) and has three steps: "platform," "deliberation" and "curriculum design" (Marsh, 1992:12).

Dynamic models:

- Commence with any curriculum element and proceed in any order, allowing developers freedom of creativity (Print, 1993:74-75)
- Regard the needs of the learners most important

Disadvantages of these models are that they lack direction, provide little guidance and the time spent in the deliberative stage arguing, is time lost from effective development. For these reasons the dynamic models will not be considered for the envisaged curriculum.

3.4.2 Outcome-based model

According to Killen (1996:8-9) meaningful outcomes that all learners have to achieve are at the heart of this model, because they influence all other components of the curriculum (the scope and structure of the content for developing knowledge, skills and values; instructional methods so that learning activities have a definite purpose; student placement and advancement based on demon-

strated learning; assessment of student learning; and the learning environment necessary for outcomes to be achieved). Varied learning experiences include content, teaching and learning strategies, resource and assessment strategies (TCFC, 1996:4).

This model is interactive in nature and the elements are integrated around what students will learn (Killen, 1996:9).

The achievement of goals results in an outcome desirable to students (Killen, 1996:10). After defining the learner outcomes, both core and extended curricula are developed (Capper & Jamison, 1993:430). Prior knowledge, necessary to develop new or advanced knowledge, skills and attitudes has to be stated or opportunities given to acquire the prerequisites (Killen, 1996:9; cf. Capper & Jamison, 1993:430).

A variety of teaching methods and learning experiences are needed to cater for different learning styles, while content is regarded a support base, facilitating learners' achievement of outcomes (Killen, 1996:9).

Learning is active, and experienced-based while progress is demonstrated on criterion-referenced rather than norm-referenced assessment (Boschee & Baron, 1993:3; cf. Killen, 1996:1). Although content, methods, learning context and student assessment interact with each other in the same way as in other curricula, placement and advancement are not determined in traditional ways.

This model of curriculum design reflects the curriculum concept of the envisaged curriculum because varied learn-

ing experiences help learners to become self-directed. Underlying this model is the outcome-based approach in South Africa to reconstruct society, and create jobs and economic growth to improve the quality of life (TCFC, 1996:4). Other strengths of this model, important to the envisaged curriculum, are that it is:

- Student-centred and success orientated
- Promotes diversity of learning experiences and methods
- Promotes creative ways of learning (problem-solving) that enhance authentic learning (resembling real life) rather than learning by authority
- Committed to address accountability to the community
- Committed to provide personalised learning
- Not time driven but sees it as a flexible resource
- Focused on the purpose of instruction
- Focused on collaborative rather than competitive learning
- Focused on practical and significant learning outcomes
- Flexible and incorporates multiple and continuous assessment strategies to encourage students to demonstrate learning
- Flexible and integrates disciplines (Killen, 1996:1-4; cf. Boschee & Baron, 1993:6-7, 79-80, 84, 95)

The fact that an outcome-based curriculum uses a variety of experiences and integrates areas of study to achieve outcomes, links outcome-based learning with an integrated curriculum and a problem-centred design, basic to the envisaged curriculum.

In an outcome-based curriculum "content becomes a vehicle for experiencing, practicing and applying the processes

needed to think creatively and critically and are basic to life-long problem-solving" (Costa & Garmston, 1996:3). These skills are important to empower students for success in life and are also inherent to the problem-centred design and the envisaged curriculum.

The outcome-based model is grounded on the beliefs that all students can learn and succeed, success breeds success (Capper & Jamison, 1993:429; cf. Boschee & Baron, 1993:2). Outcomes are focused on life skills and are sources from which all other educational decisions flow. (Boschee & Baron, 1993:3).

3.4.3 Cyclical models

Advantages of the cyclical models as considered by Print (1993:69-70) are:

- Prescriptive, logical and sequential (differences do exist)
- A continuing activity
- In a state of change as new information or practices become available
- Responsive to needs (community need for improved health)
- Flexible to accept interaction between curriculum elements (view elements as interrelated and interdependent) and not rigid separate categories
- Collaborative by including a situation analysis to reflect the needs of students (Print, 1993:69-70)

Krüger's model is representative of a cyclical model and includes six interdependent principles of curriculum design (cf. Krüger, 1980:34):

⇒ A situation analysis

⇒ Aims, goals and course objectives

⇒ Planned learning experiences

⇒ Selection and organisation of learning opportunities

⇒ Selection and organisation of learning content (Krüger, 1980:34)

⇒ Evaluation

An advantage of the Krüger model is that the curriculum can start with any of these elements, but has to comply with all of them (Krüger, 1985:97). It is therefore not prescriptive but a flexible model. The Krüger model is based on pragmatism because it includes only that which is valuable, worthwhile and essential in the curriculum (Krüger, 1985:81) and this fact ties in with the envisaged curriculum and OBE.

The above design principles will however, have to be adapted if they are to fit an outcomes-based approach to learning as the envisaged curriculum requires. From the envisaged curriculum and its concept's perspective it is important that students gain values, relevant skills and knowledge experiences and at the same time integrate cross curricular experiences to solve complex socio-economic and environmental problems.

For the envisaged curriculum the cyclical model of Krüger (1980:34) will be used as the basic model but will be

adapted to suit OBE. The reasons for using it are as follows:

- It includes learning experiences (student involvement) as a design principle which fits in with the definition of the Urban Agriculture curriculum as "all the learning experiences that learners have ..." (cf. par. 3.2.1)
- It includes a "situation analysis", necessary to determine the needs of the learner, society, distance education and relevant disciplines
- It is flexible and dynamic which render it suitable for modification
- It is a pragmatic model including only what is useful and relevant (cf. par. 3.3.1.2) in the curriculum and therefore fits the envisaged curriculum and OBE
- The fact that the sequence of the curriculum elements is not important (cf. Krüger, 1985:97) increases its flexibility, eliminates prescriptive restrictions and allows freedom of choice which is an attribute important to the envisaged curriculum and supported by existentialism (cf. par. 3.3.1.1)

The curriculum design model depicted in figure 3.1 is a framework embodied in an adaptation of Krüger's model (1985:97) to accommodate OBE. It is based on the needs of the learner and society to acquire what will be most useful to them. This model takes into account the definition of the curriculum, approaches, philosophies, design types that could enhance the curriculum and are moulded to achieve the desired outcomes of ameliorating the problems confronting the temporary and future society by providing them with the relevant experiences for suc-

cess in a world undergoing rapid social, political, economic and environmental changes.

3.5 PRINCIPLES OF CURRICULUM DESIGN

3.5.1 Introduction

The aim of this section is to discuss each of the design principles of the adapted Krüger model (cf. fig. 3.1). The situation analysis, will provide an overall view of the area to be covered in this curriculum. Attention will be given to the determinants or role players influencing this curriculum. Outcomes in curriculum design eventuating from the situation analysis will be discussed. Curriculum content and its selection, as well as learning experiences, learning opportunities and assessment will then be discussed.

3.5.2 Situation analysis



A situation analysis involves an overview of the terrain to be covered (Krüger, 1980:35).

According to Oliva (1988:223) a situation analysis is based on educational goals and philosophies of life. It collects and interprets all information influencing curriculum development (Carl, 1995:97).

As the name implies, a situation analysis analyses the present situation (Marsh, 1993:79) and identifies factors and facts that may have bearing upon the curriculum (cf. Print, 1993:109; cf. Carl, 1995:97). According to Mostert (1986:10-11), a situation analysis is a continuous process and attention should be given to changed needs.

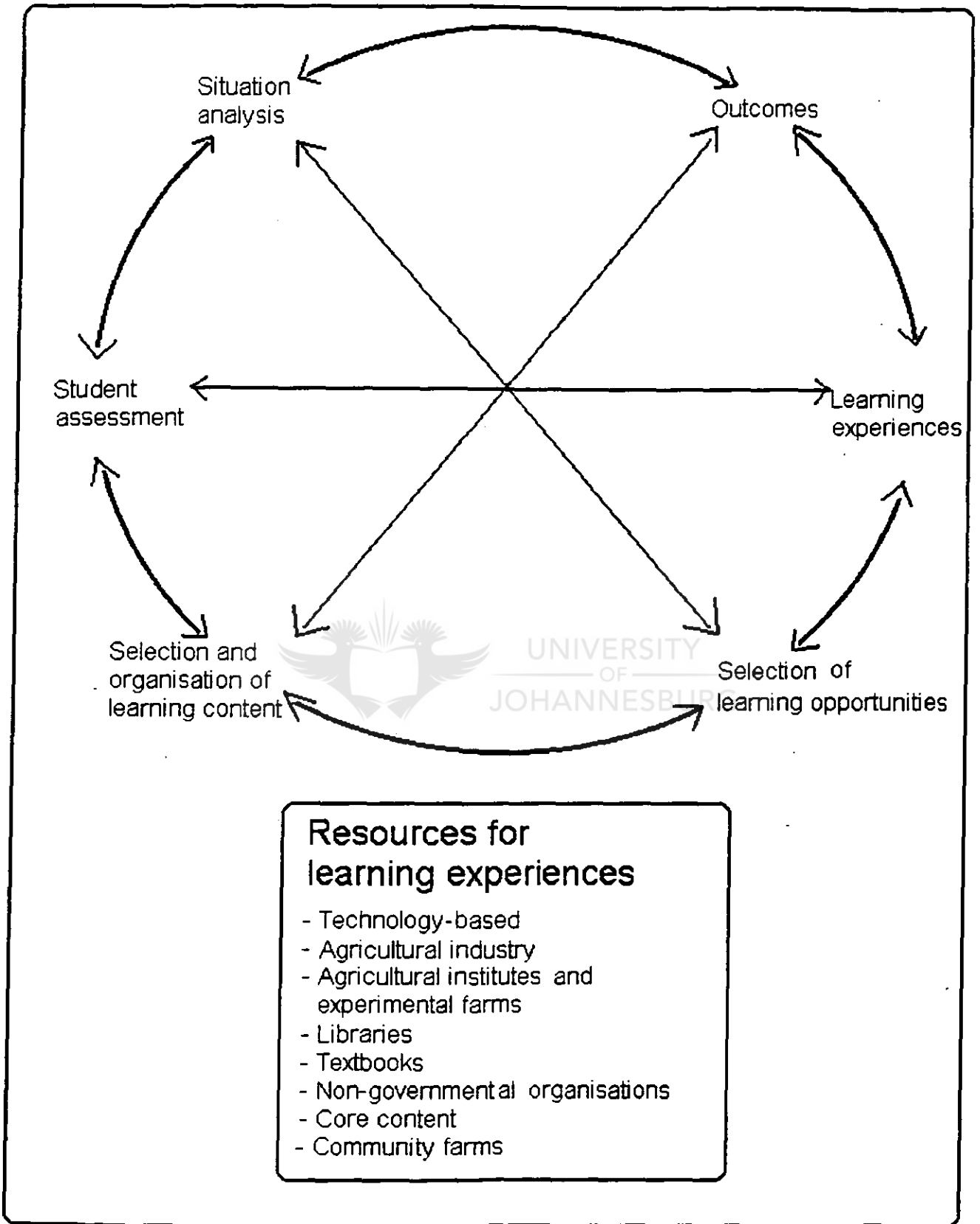


Figure 3.1 A curriculum design model for Urban Agriculture (adapted Krüger Model)

The situation analysis is also instrumental in meeting the needs and expectations of all the determinants. The premises of curriculum design are based on the design principles of which the situation analysis is the first (Krüger, 1980:34).

Situation analysis techniques may include surveys, interviews and literature studies. A situation analysis is "a valuable technique for getting different groups to discuss issues and to agree upon shared values and mutual support" (Marsh, 1992:83). It therefore leads to identifying changes in society, expectations and needs of learners, the changing nature of a subject discipline or learner-support systems and the needs of industry.

The situation analysis is a holistic view of the ground to be covered from which outcomes should emerge.

It may provide answers to the following questions:

- What content must be included?
- What specific outcomes, learning experiences, learning support, media or educational technology must be used?
- To whom (target groups) must it be directed?
- How should student competencies be assessed?

Mostert (1986:100) sees the task of the curricularist as ensuring a broad democratisation or participation in the situation analysis. It is therefore necessary to involve those who will be affected by the curriculum or who will influence the curriculum.

The situation analysis and the outcomes which result from it will be guided by the educational philosophies. The situation analysis will include a literature study and an empirical study (see chapters 4 and 5). The literature study will assess and analyse the needs of the sources of change, which include the subject science, environmental education, distance education, the learners and the community. In this subsequent empirical study the learners, employers in industry, lecturers in distance education and the community will be consulted using a questionnaire and semi-structured focus group interviews (cf. chapters 4 and 5).

3.5.2.1 Determinants of the situation analysis

Who or what are the determinants that will influence the curriculum? The curriculum, according to Krüger (1980:20), should take a dynamic, critical, rational and constructive stance towards learning objectives and learning content, conveying with it a democratic renewal in education and training. From this it can be deduced that not only the subject science, but a wider democratic participation is needed for a functional curriculum.

The government and other democratic movements may also influence the curriculum.

3.5.2.1.1 The learners

According to Marsh (1992:32-34) students have the potential to be effective participants in curriculum planning and to share in decision-making. They also have legal rights to an effective education and an educational environment that is comfortable, conducive to learning and to

equality of educational opportunity (Marsh, 1992:36). It is therefore important to determine the needs, interests and aspirations of the prospective students for self-actualisation. Pratt (1994:40) states that consultation with students about the curriculum is an appropriate mark of respect. In an integrated, learner-centred distance education approach, learners need to be actively involved in deciding what, how, where and when they learn.

Rogers (1993:47) states that adult education is built on the basis of a negotiated curriculum where learners declare what they want to learn and in what format. Determining how much learners know about current environmental and agricultural problems may indicate worthwhile needs that could be met by certain specific outcomes in the curriculum. It is therefore important that the prior learning experiences of students be taken into account when setting them.

Recognition of prior knowledge and skills, irrespective of how it was achieved (through employment or community work) can be assessed and accredited by the National Qualifications Framework if they meet the requirements set by the National Qualification Framework (NQF) (1996:36). This flexibility will allow access or entry to the course through informal learning experiences and enhances lifelong learning. Students' prior knowledge can also be assessed by means of a practical assignment, or technology supported methods (cf. par. 2.7.3) to determine whether they are equipped with adequate prerequisite knowledge or if guided practical instruction or content support should be provided. The learning styles of adult learners and the technology or audio-visual media necessary to bridge the instructional gap in distance

education should also be taken into account (see par. 2.3.1 and 2.7.3).

Because of its focus on student success, outcomes-based education places much more importance on individual learning than many other approaches to education (Killen, 1996:11). This may lead to self-directed learning and responsibility for their own learning.

The students may wish to learn skills, not only for a specific job requirement, but also generic skills that apply in most vocational situations. This may include communication skills, business skills or problem-solving skills.

Information on the types of assessment or teaching methods they prefer and the type of student support systems they regard as appropriate in distance education may be supplied.

According to SAIDE (1994:8), there should be continuous, meaningful, counselling during the students' course of study, and counsellors, mentors and managers should be alert to any signs that further discussions and advice are needed. In this way the curriculum will provide the means for students to develop their full potential and achieve self-actualisation. Not only must the cognitive, affective or psychomotor aspects of personal fulfilment be addressed, but also the aesthetic and socio-economic aspects.

Wheeler (1983:16) is of the opinion that the end-product of education should be the modification of the learner's behaviour. Learners differ from each other due to the

variability in their human genetics and behaviour. Therefore, curricularists need to take cognisance of these differences, ensuring that the curriculum caters for both critical thinkers (problem-solving thinking) and creative thinkers.

Where critical thinking is based on inductive thinking (starting with specifics and working towards the whole), creative thinking is based on deductive thinking (starting with the whole and working towards specifics). However, Ornstein and Hunkins (1988:97) believe that although we can distinguish between both thinking processes, this does not necessarily suggest that they are mutually independent of each other. (Creative thinkers may or may not be good problem solvers, and good problem solvers may or may not be creative.)

The fact that this curriculum is also based on reconstructionism and progressivism means that it must be able to deal with change, promote democratic ideals and solve student problems.

In the empirical study, learners will be consulted on curriculum decision-making by means of focus group discussions, because they act as sources of change influencing the curriculum.

3.5.2.1.2 The community or society

The current interest in outcomes-based education can largely be contributed to community pressure for accountability in education (Killen, 1996:2; cf. Print, 1993:139).

Zais (1976:301; cf. Print, 1993:v) sees the procedure of studying society empirically as an action-giving source of the curriculum.

The curriculum can either reflect society and indirectly help shape society (Ornstein & Hunkins, 1993:151) or reflect the needs of the community (Carl, 1995:87).

What are the major concerns of society to be addressed in the curriculum?

Needs of the community can vary from a physical nature (food) to psychological and norm-oriented needs (freedom, values, education, vocational, technical or family guidance) (Carl, 1995:99-100).

Directional changes in society involve advances in science, communication, increase of the number of working mothers, population increase - all of which affect the quality of life (Ornstein & Hunkins, 1993:153).

A society undergoes a dramatic change when many people flock from the rural areas to the cities. In Africa this is taking place at an alarming rate, probably due to expectations of job opportunities in the urban setting. Unfortunately, few jobs are available to the women from rural areas. They have inadequate education and have traditionally been responsible for tending the lands (cf. Rakodi, 1985: 55-57; cf. par. 1.2.8).

Significant social changes in modern African societies may include the declining need for unskilled labour, the escalating population growth rate on the African continent (cf. par. 1.2.2), the rapid obsolescence of knowl-

edge, the food crisis of the poor (cf. par. 1.2.1), and insufficient family income and job opportunities (cf. par. 1.2.6).

The community has to be consulted to determine the types of competencies needed by today's urban agriculturists and act as change agents. Essential outcomes should be directed and reflected in specific outcomes based on these needs.

The society-oriented curriculum design sees the purpose of schooling as serving the needs of the society and can be interpreted from a status quo, reformist and futurist perspective (Longstreet & Shane, 1993:64). According to them the status quo perspective perpetuates the existing social order unchanged, while the reformist perspective intends to reform the curriculum and reconstruct society in a democratic image or even deschool society and distribute the educational task among the members of the community to serve the needs of society. The futurists perspective is linked with that of the reconstructionists and is directed at helping the present society to be prepared for the accelerating technological progress and they see the school's role as developing skills and useful knowledge so that members of society can participate in the future as decision-makers (Longstreet & Shane, 1993:68). The envisaged curriculum subscribes to the reformist's and futurist's perspectives.

Critical outcomes such as technology application, critical thinking, communication and mastery of skills and knowledge, that lead to a competent future citizen will be encourage within a reconstructionist's curriculum and content will be chosen to meet these outcomes.

It becomes imperative that researchers study and analyse new needs of the urban society in an attempt to search for or offer improved alternatives. This will prevent curriculum designers from turning a curriculum into indoctrination or forcing students to accept certain cultural norms and standards they do not want. In this manner the members of society will be given a choice to help solve current problems facing them. This may result in an alternative accepted way of farming with more co-operative value added to it.

An urban agriculture curriculum should be relevant to life situations, enabling members of society to function well in the urban environment. A critical outcome for a curriculum to be relevant, should be wise decision-making, ensuring a desired future.

Urban agriculture may be a powerful community-based tool for weaving together strong psychological ties in joint endeavours of food production and other ventures.

Community gardens in cities provide security and an opportunity for demonstrating co-operation with others, in developing a social support system, sharing skills, experimenting and organising tasks. These are critical outcomes that will contribute to the socio-economic development of society at large.

Local governments have a key role to play in communities by making sustainable urban agriculture viable by maintaining water systems, sewage works, parks, and formulating local environmental policies.

Zais (1976:214) considers man and his decision-making to be future oriented; therefore the curriculum must be intimately concerned with society and the conditions of life that it supports. This curriculum should envisage a better environment through assistance to the community and sustainable utilisation of urban open spaces.

Education is a powerful instrument of social change and since society is increasingly concerned about environmental and sustainable development, the training of technical vocational education graduates should in turn reflect this (Basu, Chantrill, & Kashiwagi, 1993:32).

There are moments in history when the complex elements involved in change are so profound that the usually gradual course of cultural change is overwhelmed and a new cultural order, a sudden turning or "vector", develops so swiftly that the traditional institutions no longer fulfil their functions (Longstreet & Shane, 1993:8). Incisive socio-economic and political changes are occurring in our society and the curriculum needs to address them.

The futurists and reconstructionists are in agreement as to improving and helping society to operate constructively in the future. Both propose a paradigm shift away from the traditional curriculum.

3.5.2.1.3 Environmental education (subject discipline)

An environmental education curriculum should be developed in consultation with partners in technical and vocational education institutions, scientists, research-

ers, government agencies, agricultural practitioners and local communities (UNESCO-UNEP, 1993:42).

Environmental education is a holistic problem-solving education, "managing and improving the relationships between human society and the environment in an integrated and sustainable way, employing new technologies, increasing productivity, avoiding environmental disasters, alleviating existing damage, seeing and utilising new opportunities and making wise decisions" (Meadows, 1989:5). Environmental education is not a new discipline but a new dimension in the education system-cutting across different disciplines (Sinha, Jangira & Das, 1985:8-11; cf. Basu, Chantrill & Kashiwagi, 1993:26).

The aims of environmental education are to stimulate education processes that develop responsible life-styles in harmony with the environment and to make people aware that an acceptable quality of life depends on their judicious utilisation of the environment (White Paper on Environmental Education, 1989:5).

Environmental education examines the environment as a whole, looking at the natural, social, economic, technological, political, cultural, historical, philosophical or ethical aspects (Basu, et al., 1993:26).

The curriculum aims for urban agriculture include the conservation of resources, reduction of environmental degradation and the improvement of the socio-economic situation of the poor.

The message of environmental education must be to consider the environment holistically and to strive for sus-

tainable human development that is ecologically, socially and economically sound and meets the human needs and aspirations, ensuring a high quality of life for the present and the future.

UNESCO-UNEP (1993:12) see the inter-disciplinary content of environmental education focusing on understanding the interconnections among ecological, social and economical systems and how to harmonise environmental and developmental goals.

The challenge is to educate people to develop an environmental ethic whereby they will assume responsibility for negative environmental impacts. The ultimate aim of environmental education according to Hungerford, Volk and Ramsey (1994:1) is to aid learners in becoming environmentally knowledgeable, skilled and dedicated human beings, willing to work towards achieving or maintaining a dynamic equilibrium between the quality of life and the quality of the environment. The curriculum must therefore be aimed at considering the environment holistically. It must strive for social, economic and environmental sustainability, meeting human aspirations and instilling an environmental awareness in individuals so that they will act responsibly, ensuring a high quality of life.

Awareness should be a prerequisite for taking action on issues of environmental concern, because without it pollution, soil erosion, agricultural degradation and over-exploitation of natural resources will persist.

An important goal of environmental education in urban agriculture is to ensure that students have the awareness,

knowledge and skills to resolve environmental problems in the world of work. To protect and conserve life-supporting resources (air, water and soil), and to live within the carrying capacity of the earth, are aims which should receive high priority in an urban agriculture curriculum.

Waste management strategies employed in cultivation must be aimed at conserving water and recycling domestic organic wastes. Producing agricultural or horticultural products or crops in or near cities reduces or cuts out the use of fossil fuels for transporting produce to markets.

A progressivist stance towards an interdisciplinary problem-solving approach must figure strongly in this curriculum. The aim that environmental education should be a life-long process to those practising urban agriculture, strengthens the reconstructionist educational philosophy.

The pragmatist's philosophical approach to curricula, urges students to think critically, and explore and investigate environmental problems in a scientific manner. The curriculum needs to prepare students for life, and solutions to problems must be based on proven facts. This pragmatist approach goes beyond discipline borders in searching for answers.

Environmental education must pay attention to key problems that may affect sustainable development in urban agriculture. These include the increasing use of agrochemicals, factors causing soil erosion, the loss of biodiversity and the exhaustion of natural soil nutrients.

The importance of environmental education according to the Government Gazette (1994:22) is its interdisciplinary stance and active approach to learning to create environmentally literate and active citizens, ensuring that all South Africans, present and future, enjoy a decent quality of life through the sustainable use of resources.

This curriculum has a responsibility to develop environmental literacy in students by exposing them to environmental problems and issues and to create a general awareness of the conservation of life-supporting systems.

Technical and vocational educators have a responsibility to prepare their students in making technical and managerial decisions in their future work that will be environmentally sustainable.

Educational and environmental professionals, trainers of urban agriculturists, extension officers, horticulturists, town planners and community leaders are key role players in resolving or addressing environmental issues regarding urban agriculture. Their contribution to the curriculum may ensure that the impact of urban agriculture on the environment is equitable, ecologically sound, socially just and economically viable.

Improving of technology to promote sustainable development should be the primary goal of technical and vocational education throughout the world. Meadows (1989:24-27) cites examples of sustainable urban development in Japanese cities where mechanised waste-recovery centres return every form of waste to a useful purpose.

Environmental education should be incorporated in the urban agriculture vocational curriculum because these students will ultimately draw resources from natural systems, manipulating and managing the natural environment. They may be personally affected by health hazards and their activities may have a crucial impact on the environment.

Education is a powerful instrument of social change and since society is increasingly concerned about the environment and sustainable development, the training of technical vocational education graduates should in turn reflect this (Basu, et al. 1993:32). Environmental education can assist in finding solutions to environmental problems, and promote attitudes and behaviour compatible with a conservation ethic where people, plants and animals coexist productively and sustainably (Baskind, 1989:144).

3.5.2.1.4. Studying the subject science (ecological agriculture)

The curriculum cannot remain static, but must change as new knowledge and facts become available. Owing to the negative environmental and social impact of some agricultural practices, current scientific knowledge and research are important to maintain an agro-ecological balance and to prevent the degradation of natural resources. New approaches to sustainable agro-ecological systems are imperative to make farming more efficient, the environment safer and the farmer more competent.

A primary force controlling this curriculum is the subject science. The subject matter of this curriculum should be selected for its usefulness to distance education learners and society, as well as for its scientific relevance and environmental value.

In the view of Zais (1976:48), pragmatist epistemology (nature of knowledge) is built on a stream of transactions between the individual and the environment. Pragmatist epistemology is concerned with actions deliberately taken, anticipating the most desirable outcomes due to the democratic participation of those involved in the curriculum.

From a pragmatist perspective, knowledge is only true for a particular point in time. Zais (1976:151) sees the pragmatist curriculum as a vehicle that fosters students' growth in intelligence, i.e. the capacity to construct knowledge of the good for wise decision-making in life.

What should students learn in urban agriculture for effective learning to take place? Criteria for selecting content should be: validity, significant interest and self-sufficiency compatible with social realities, utility, learnability and feasibility.

Validity of content may be judged differently by people depending on their philosophical stance and the curriculum design they support. Some knowledge may have become obsolete and therefore cannot be regarded as valid any more. New outcomes need to be specified and content can therefore only be considered valid if it promotes these outcomes.

The subject science should be relevant to a future career, functionalism in vocational training and sustainability in the social, economic and environmental fields.

Atmospheric pollution in urban areas can be reduced by practising agroforestry or tree-crop combinations. The trees help absorb air pollution and "various tree species may yield fruit, protein or carbohydrate-rich seeds or nuts for human food or animal feed, edible or commercial gums, medicinal products, building materials, mulch, firewood, shade or increase soil fertility" (Rowland, 1993:92).

The inclusion of agricultural practices in the curriculum such as water-saving and water harvesting techniques, recycling and the planting of drought-resistant species may help to conserve water and ensure that urban agriculture remains sustainable. According to Rowland (1993:156), water harvesting increases the soil moisture available to crops and benefits the environment by controlling soil erosion.

The subject science should pursue technological systems which help to search for new knowledge and skills that will improve crop yield, maintain land quality, conserve resources and control pests and weeds in an ecologically responsible way.

Ecological agriculture, in contrast to high-input agriculture, is a self-sustaining low-input, economically viable, small farming system. It is managed to maximise production without causing long term changes to the environment, or being ethically or aesthetically unacceptable

(Kiley-Worthington, 1981:350). It creates a diversified environment, providing a number of niches from which different plants or animals can be cropped. It has much in common with organic agriculture² and permaculture³ in that no synthetic fertilisers, herbicides or pesticides are used that contaminate the environment. According to Edwards (1989:34) integrated lower-input systems of farming minimises soil erosion and water run-off, as well as contamination of ground and surface water. Permaculture is called cultivated ecology, because it integrates human societies into sustainable ecosystems (Morrow, 1993:13).

Cook (1992:94) sees water management, agroforestry, intercropping, terracing, minimum tillage and mulching to be appropriate methods of soil and water conservation which have dramatic effects on food output.

Integrated pest management and bio-environmental pest control reduce pests by using a combination of sustainable control methods instead of pesticides.

3.5.3 Outcomes

The National Qualification Forum is vested in outcomes-based educational and training. It is therefore imperative that the design principle "aims" of Krüger's model (1980:34) be changed to "outcomes".

Statements of aims, goals or objectives are direction giving statements of intent (or purpose) of an educa-

Organic agriculture² or farming is a system of agriculture that encourages healthy soils and crops through such practices as nutrient recycling or organic matter, crop rotations, and the avoidance of synthetic fertilisers and pesticides (Reijntjes, *et al.* 1994:215).

Permaculture³ is a designed, integrated system of self-perpetuating species or crops, trees and animals (Reijntjes, *et al.* 1994:216).

tional process and if these intentions are realised, the end result is an educational outcome (Killen, 1996:1; cf. Print, 1993:138; cf. Carl, 1995:100).

Statements of intent or statements of desired educational outcomes concentrate on the purpose of instruction rather than on content or learning experiences that are conveyors of instruction (Killen, 1996:1).

The problem-solving approach to learning of the envisaged curriculum is indicative of an outcomes-based approach, because the emphasis is on how learning is applied and integrated in problem-solving (realised intentions).

According to the South African Qualifications Authority (SAQA) (1997:6-7) the term "critical outcomes", instead of "essential outcomes" will be adopted which describes the mental and physical processes problem-solving, communicating, collecting, analysing and critically evaluating information, using science and technology effectively, showing responsibility towards the environment and health of others.

Specific outcomes describe what students need to do and why and how well they will do them (Development & Training, 1997:20).

It seems important that critical outcomes be linked with the vision of social transformation and the curriculum planner's view of the learner, society and the nature of the subject. In other words keeping "whose interests are being served by the outcomes" (Killen, 1996:6) in mind.

Learning outcomes offer a starting point for curriculum design, shifting the emphasis from input and process to student learning (Allan, 1996:93).

An outcome can be seen as a demonstration of learning experiences and capabilities occurring in a performance context (TCFC, 1996:3). Other definitions put forward by them are: An outcome is that part of a unit standard indicating demonstrated learner capabilities or an outcome is a high quality demonstration of observable integrated learning processes at the end of varied learning experiences.

Killen (1996:1) defines an educational outcome as the end product of realised statements of intent of an education process. Print (1993:138) adds that outcome statements should cover knowledge, skills, attitudes and values. Otter (1992:20) defines learning outcomes as "what a learner knows or can do as a result of learning".

It seems as if key qualities of outcome statements are that they are purposeful *realised statements of intent*, must be demonstrated, are focused on student learning and ensure mastery learning and success.

All of these perceptions affirm that outcomes are based on what the student achieves, as a result of learning and not what the lecturer intends to teach or decides to do in order to make it happen.

The use of outcomes begins with what is learnt rather than what is taught and emphasises the role of the students in accepting responsibility for their own learning and acknowledging that learning may take place in a vari-

ety of settings (Allan, 1996:104; cf. Killen, 1996:3 & 6).

In OBE teaching is a process of assisting students to understand information and to transform it into personalised knowledge (Killen, 1996:5; cf. Allan, 1996:101). According to Capper and Jamison (1993:431-432) OBE centres on outcomes, core and extended curriculum mastery learning, accountability via information management systems and criterion-based assessment.

According to TCFC (1996:11) critical outcomes express the intended end results of education which should be reflected in the specific outcomes (which are subject-related areas). They suggest that critical outcomes direct teaching, training and education and the development of learning programmes and that they should be the starting point of curriculum development.

Specific outcomes describe competencies which learners should be able to demonstrate in a specific context and particular areas and levels of learning (TCFC, 196:12; cf. Boschee & Baron, 1993:96). They recommend that these outcomes be used in assessing learner progress, bearing in mind that the level of complexity, scope and learning context are critical for fair and transparent assessment.

Criteria that they attribute to a well-written outcome are to: "identify the *behaviour to be developed*" which is also an attribute of behavioural objectives, which emphasise the "changes in student behaviour" (Allan, 1996:96) except that in the latter case it should be identified after lecturer interaction with the learner. Other criteria set for specific outcomes are that they should

"identify the area of content or of life in which the behaviour is to be applied" and the "dispositional relation" that will have effect on social transformation (TCFC, 1996:12).

Outcomes in the transitional OBE approach address higher-order competencies essential in all life settings and questions of what students should know and be able to do to be successful after graduation (Spady & Marshall, 1991:69). He sees outcomes of transformational OBE to be future-oriented, equipping learners with knowledge, competence and orientations needed for success in a high-tech future. He recommends that outcomes lead to self-directed, involved citizens, who can improve the quality of life in their environments and act as adaptable problem-solvers, resolving socio-economic, environmental and political challenges.

Outcomes guiding this curriculum must meet the needs of the community, the environment, employers, the agricultural and horticultural industry, the students and distance education. Outcomes must not only address the problems that motivated this study (cf. par. 1.2), but must also be suitable for distance education.

Critical outcomes should promote competence⁴-based or project-based learning to encourage the development of autonomy, critical thinking and independent and self-directed learning, which are important outcomes of distance education learning.

Competence⁴ is the ability to perform in work roles or jobs to the standard required in employment (Henry, 1994:44).

A sample population of 36 distance universities throughout the world rate the ability to solve problems, interpret data and use knowledge and skills in unfamiliar situations most important in science practicals (Kirschner, Meester, Middelbeek & Hermans, 1993:276).

It is therefore important that specific outcomes include the demonstration of learning outcomes through a variety of ways (investigations, practical problem-solving projects, experiments, complex thinking, assignments, research projects and technology-based assistance). Examples of specific outcomes for the envisaged curriculum may be:

- Investigate the influence of compost on the water retention properties of soil in order to conserve water.
- How will you solve an aphid problem on cabbage plants without using chemical control methods that cause damage to the environment?
- Order the video, "How to measure accurately", from the Technikon library and apply the knowledge to your own experiment in finding the relationship between shoot growth of a maize plant grown amongst six legumous plants and one growing amongst six non-legumous plants on a weekly basis over a two month period.
- Demonstrate how you would solve the following problem:
Potato tubers have holes, the size of a marble, and no pests are observed during the day. Use as many support bases as possible to extract information on the possible cause and suggest environmentally friendly ways to rectify the problem.

3.5.4 Content

The curriculum content must serve a definite purpose (Killen, 1996:1; cf. Mostert, 1986:123). Learning content is therefore chosen for its effectiveness and to achieve specific outcomes. The content should include relevant knowledge, understanding of concepts as well as their application in order to improve life. In OBE all content should be justified on the basis of how they assist students to learn something meaningful (Killen, 1996:4).

For the envisaged curriculum, core content may be provided to serve as one of the many resources that learners may access or choose from to solve problems. Content in an OBE curriculum must serve as a vehicle for instruction (cf. Killen, 1996:1). The emphasis should be on problem-solving and not content "per se". Content will be defined by the outcomes.

From a pragmatic point of view, learning content should be chosen for its usefulness in real life situations. According to Ornstein and Hunkins (1988:32), problem-solving topics, cultivation of critical-thinking and preparing individuals for change, characterise the pragmatist viewpoint. Killen (1996:9) regards content as a support base for addressing and facilitating students' achievement of the outcomes rather than an end in itself.

Krüger (1980:72) distinguishes between two sources of content, namely the subject discipline sources and the non-disciplinary sources, which include the needs and interests of the learners as well as the demands of society. These may be integrated in a meaningful manner.

The level of the content and the practical application of the content should be considered. Problems may integrate content with learners' prior knowledge to lead to new experiences from which their own content evolve.

Content selection must be based on socio-economic development to improve the overall quality of life in South Africa (The Consultative Forum on Curriculum, 1996:12).

According to Zais (1976:324), learning content should consist of knowledge, skills and values. Outcomes-based education allows students to acquire through demonstration, the skills, values and attitude that provide them with competence and motivation to participate appropriately in society (The Consultative Forum on Curriculum, 1996:2).

3.5.4.1 Validity of curriculum content

Learning content should be valid. Criteria of validity of content is that it must reflect the stated outcomes, and content must be true and accurate (Print, 1993:146).

3.5.4.2 Significance of content

The extent to which learning content is essential or of value to the disciplined field of study determines its significance (Print, 1993:145).

Specific learner, community and employer needs and demands have to be addressed in an urban agriculture curriculum content.

For the content to be significant, it has to meet the overall aims of the curriculum and to develop knowledge, skills and attitudes necessary for life situations. The fact that the content must be useful and practical, underlines the realist approach, while job-competency accentuates the behaviourist approach. Occupational competency is realised via experiential training. If the content is to be significant in terms of problem-centred designs, it must address or assist in socio-economic problems. The content must be finely tuned to the ecological, socio-economical and political environment. If the content is to be significant in the context of subject-centred designs, it must contain innovative knowledge and practices, which are transferred in the most suitable manner. Significance in terms of the learner-centred and society-centred designs involves the contribution of meaningfulness to the experiences of the students and the reflection of current social needs and values of society in these designs.

Content which helps learners to attain maximum self-sufficiency is, according to Ornstein & Hunkins (1988:207) supported among others, by humanists, as a means by which learners can actualise their potential.

Interest is an important criterion to a learner-centred design and the content must be meaningful and relevant to life situations.

3.5.4.3 Utility of content

A criterion for content selection is its usefulness in preparing students for adult life which implies a relevant and functional approach to the selection of content

that will lead to a desired outcome (Print, 1993:148). In OBE there is a clear focus on what students will learn and be able to do. The choice of content should therefore be based on its practical application, usefulness and significance (cf. Killen, 1996:3).

The utility of learning content in an urban agriculture syllabus refers to its usefulness in improving the quality of human life. The content should therefore be chosen for its worth to the community, environment and the learner in the work situation.

Utility as a content criterion is discussed in terms of the design types which are included in the eclectic, urban agriculture curriculum design. The utility criterion of curriculum content to the subject-centred designs means that knowledge must be applicable to the workplace. To the learner-centred designs, utility of content implies that it must be valuable to students. To the problem-centred design, utility of content implies application to life.

3.5.4.4 Learnability of content

Content must be selected so that students are able to learn (Print, 1993:149).

Learnability of content implies that students find it appropriate. Print (1993:150) suggests that by creating multiple content material or variations of the basic content material the curricularist will cater for individual differences in learners. This implies that students can also research their own content for solving their specific problems in a practical problem-solving project.

3.5.4.5 Feasibility of content

For content to be feasible in the context of distance education, the curriculum planner has to consider limitation factors. These may be the unavailability of the most suitable integrated media serving a specific purpose, and inability to meet the needs of distance education students in a manner that is instructionally effective and financially viable. Feasibility should also consider available resources, time, expertise of staff, the political and socio-economical climate.

Students should therefore have freedom to access many resources of content to solve problems.

3.5.4.6 Interest of content

Curriculum developers must take cognisance of student interests and perceived needs (Print, 1993:151).

The criterion for selecting content in a learner-centred distance education institution is that it should be of interest to the learner. Interesting content may motivate learning.

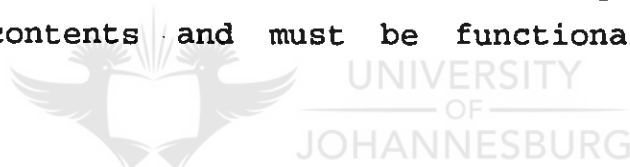
3.5.4.7 Selection of curriculum content

In OBE content should be selected on the basis of purposeful learning.

Select appropriate content to meet outcomes and recommendations from the situation analysis (Print, 1993:143).

Content selection must be based on social and economic growth to improve the overall quality of life in South Africa (TCFC, 1996:12).

Selection of curriculum content based on pragmatist philosophy implies that there is no permanent knowledge or subjects and that the focus should be on problem-solving skills, appropriate experiences that prepare the individual for change (Ornstein and Hunkins, 1993:41). According to Carl (1995:111) content criteria must be accessible, relevant, stimulating (motivating), take prior knowledge and needs into account, offer opportunities for self-discovery, promote thinking skills, be practically achievable, offer opportunity for learner input and choices, be balanced in depth and extent of study, consider the needs of the learner, community, the institute of learning, the country and the world, promote integration of contents and must be functional and empower learners.



The choice of curriculum content for Urban Agriculture must be based on desired outcomes for the course and must allow students to link up with other study programmes. Content selection for the envisaged curriculum should be learner-centred and include problem-solving experiences, allowing students to construct content and use knowledge to improve life. By allowing students multiple exit and entry levels, they are given greater flexibility. The Urban Agriculture curriculum focus is interdisciplinary, emphasising its progressivist nature that stems from pragmatic philosophy. The content includes topics which address agricultural, ecological and economic problems of society. The curriculum content will also be based on research work, focusing on present and projected problems

in agriculture, revealing its reconstructionist philosophy and pragmatist base. Essential basic communication, as well as business, horticultural and agricultural skills are included in the focus on acquiring essential skills. The pragmatist impact is expressed in those subjects which focus on the problem-solving aspects of knowledge and the breeding of enquiring minds.

In the context of outcomes-based education "the desired educational outcomes focus is on the purpose of instruction, rather than on the content or learning experiences that are the vehicles for instruction" (Killen, 1996:1). Students should therefore be involved in learning activities that will help to resolve practical problems as specified by specific outcomes.

Problem-centred designs are planned before the arrival of students, but because they are concerned with real life problems, they have to adjust and cater for the concerns of learners (Ornstein & Hunkins, 1993:255).

The Urban Agriculture curriculum may include the following broad areas of content that may be used as vehicles for student learning and problem-solving and provide a general support base or perspective to the outcomes that students have to demonstrate. More relevant information on solving a real-life problem can be obtained by exploring other sources. In this way students become self-directed learners. Content needs to be seen as a support-base for addressing and facilitating students' achievements of the outcomes, rather than as an end in itself (Killen, 1996:9). For the pragmatist, learning occurs as a person or groups engages in problem-solving

and critical thinking, using subject matter in an interdisciplinary manner (Ornstein & Hunkins, 1993:39).

The content of the envisaged curriculum could be a list of problems to be solved in terms of knowledge, skills and values.

3.5.4.8 Sequence and scope of curriculum content

Organising subject matter depends on one's philosophy of what is regarded as important knowledge (Marsh, 1993:96). From an existentialist point of view learners are free to choose what to study and free to select from many available learning situations (Ornstein & Hunkins, 1993:39-40). Philosophy deals with aspects of life the problems and prospects of living and the way we organise our thoughts (Ornstein & Hunkins, 1993:34).

Sequence refers to the "vertical" organisation of content and scope or the "horizontal" organisation, refers to the integration of content at a given level (Marsh, 1993:96).

In terms of scope, this curriculum's approach would be to organise it by activity whereby "students' needs and interests determine the curriculum. All content is not pre-planned, but students use problem-solving methods to set their own tasks and skills and knowledge are required as they are needed" (cf. Marsh, 1993:97-98). Core subject areas or modules may be included, based on environmental and socio-economic problems and used as a support base. Advantages of this approach are that it is student-centred and very flexible and meet the required needs and interests of the students (cf. Marsh, 1993:98).

Sequence is concerned with the order in which content is taught (Marsh, 1993:99). Its relevance to this curriculum is insignificant because students will use many other resources of knowledge as needed and not only a core of modules.

Cross-curricular themes, such as the effect of human population growth on environmental destruction, can form part of the horizontal organisation of the learning content.

The focus will however be on the desired educational outcomes or purpose of instruction (relevancy to life) rather than sequencing content that has no function or meaning.

3.5.5 Learning experiences

Learning experiences are regarded by Krüger (1980:79) as making content your own and that learning opportunities provide opportunities for learners to experience learning experiences. In outcomes based programming the focus is on what the students will learn and be able to do on completion (Killen, 1996:3). Prior knowledge needed to solve problems must be stated and current experiences must be used to analyse problems in society.

A pragmatist's curriculum is, according to Zais (1976:150), mainly composed of relevant social problems along with suggestions for projects which will involve students in practising the skills needed to arrive at solutions. For this partly pragmatist curriculum to be learner-centred, it needs to include problem-solving projects (experiences) to promote students' capacity for

constructing knowledge with the purpose to improve life. A powerful approach to make the curriculum relevant to distance education students is to build learning experiences around the adult student's experiences of life.

From pragmatist philosophy learning occurs as learners engage in problem-solving (Ornstein & Hunkins, 1993:41). It is therefore necessary that students should be able to access and select knowledge to solve problems that stimulate critical-thinking. In a process approach for content selection, the skills for acquiring information are of value, as they allow students to locate current data and maintain relevancy (Print, 1993:144). Knowledge is considered a transaction between the learners and the environment and learning takes place in an active way as they solve problems in response to a changing world (Ornstein & Hunkins, 1993:39). Additional information can be acquired using multimedia (videos, internet) visits to agricultural research institutions, industry, contact sessions and so on. J Brady (1992) as referred to by Print (1993:180) suggests that the criteria for selecting learning activities should include variety, scope, validity, appropriateness and relevance. A large degree of flexibility in selecting content and methods is allowed in order that students achieve the required outcomes (Killen, 1996:2).

Learning experiences refer to interactions between the learner and the teaching situation (Zais, 1976:352; cf. Mostert, 1986:132). When addressing teaching methods and learning experiences, distance education lecturers must consider different ways of helping students to achieve the outcomes, keeping in mind that not all students learn at the same rate or equally well from the same experi-

ences. In distance education, learners may acquire learning experiences through interaction with core content, the experiential instructional component, contact sessions with their tutor or lecturer, practicals or other instructional methods or learning opportunities which may include technology-based instruction.

Carl (1995:115) regards all learning experiences as multi-purpose in nature although the focus is on specific outcomes, although other learning may take place simultaneously.

Henry (1994:89) sees the inclusion of activities such as self-assessment questions in text and questions or exercises with follow-up comments as a major characteristic of distance learning texts. This gives students the opportunity to gain learning experiences. Distance education students may access many resources (technology-based, industry agricultural institutes, libraries and so on) to gain the necessary learning experiences for solving problems (cf. figure 3.1).

According to Killen (1996:4) each area of study should be regarded as an integral part of their journey towards significant and purposeful learning outcomes in preparation for life.

A learning experience is complete when learners have achieved something meaningful.

3.5.6 Learning opportunities

In OBE teachers have a large degree of freedom to select methods through which learners should achieve outcomes (Killen, 1996:2).

By means of instruction and learning actions (by the teacher and the learner) a learning opportunity is created for the learner (Carl, 1995:114; cf. Krüger, 1980:80). Students may be provided with themes to study and to integrate or cut across subject boundaries in order to solve problems related to the themes.

A learning opportunity is a didactical matter as opposed to a learning experience which is a psychological matter (Geysler, 1994:87).

In OBE, teachers must facilitate learning to ensure that significant student learning occurs, which meets to intended outcomes (cf. TCFC, 1996:14) and they must provide students with purposeful activities, giving all students an equal opportunity to succeed in a flexible time-frame (cf. Killen, 1996:5; cf. TCFC, 1996:14). Learning opportunities should engage students in active learning and problem-solving and provide learners with meaningful experiences for self development. The choice of learning opportunities should link up with learners interests, and abilities and have life relevance (Steyn, 1992:95-97). Distance education students may be given practical projects to execute with the instruction to obtain prior knowledge from learner support systems such as the internet or from experimental farms in their area.

The lecturer in distance education should create learning opportunities for students to partake in actively. These could include self-teaching methods using interactive study guides, vocational practices, practical work, assignments, projects or small research experiments. Technology and project-based learning provide unique contributions to this curriculum as it encourages student autonomy and self-activity in learning. Distance education students can thus partake in problem-solving in a self-paced and self-directed manner.

3.5.7 Assessment

The Krüger model (1980:34) uses the term "evaluation" as a design principle which is norm-referenced (cf. Krüger, 1980:95) and not criterion-referenced as required by OBE and should therefore be changed to "assessment". Criterion-referenced measurement is especially appropriate for OBE, because it measures performance on a continuous basis ranging from "no proficiency" to "perfect performance" (TCFC, 1996:6).

The term "evaluation" can be interpreted in two ways: determining learner achievement (product evaluation) and awarding of marks; or the evaluation of the curriculum itself (Geyser, 1994:92; cf. Carl, 1995:118). According to Krüger (1980:95) evaluation is about value-judgement. However, in OBE the term assessment is used, because it places "emphasis on the use of facts and the application of those skills dealt with in the course" (Cohen, 1996:278). Learner competence and performance are assessed by using criterion-referenced measures.

Assessment criteria, are derived from specific outcomes and provide evidence that learners have achieved the specific outcomes (Department of Education, 1997:3). This document specifies that assessment criteria should broadly indicate the observable processes and products of learning which serve as culminating demonstrations of learner achievement. Assessment criteria provide a framework for assessment and are detailed in the range statements, which indicate the scope, depth, level of complexity of learner achievement and indicate direction, but also allow for multiple learning strategies, flexibility in choice of content and a variety of methods (Department of Education, 1997:3&5). Range statements also ensure a balance between acquisition of knowledge, skills and values (Government Gazette, 1997:17). Assessment describes the activities undertaken by the teacher to obtain information about the knowledge, skills and attitudes of students (Marsh, 1992:102).

Valid, reliable, flexible and equitable assessment procedures of student learning are essential to outcomes-based education and must be made against predetermined standards on an individual basis, matching the outcomes students are striving to achieve (Killen, 1996:7).

Assessment of students studying Urban Agriculture should be aimed at a demonstration of competence. It is therefore important that lecturers know in advance "what it is that they want students to learn and why they want them to learn it" (Killen, 1996:7). OBE places emphasis on diagnostic assessment and frequent feedback (Killen, 1996:6).

To develop an appropriate assessment system for recording individual student progress, lecturers will have to state clearly how they will determine whether or not students have achieved an outcome and to what level of competence the outcome is to be demonstrated (Killen, 1996:9).

In OBE student placement and advancement will be based on the assessment of demonstrated learning (Killen, 1996:9).

According to the National Qualification framework (NQF) (1996:10) assessment should be an ongoing process and be based on specific learning outcomes that will meet the requirements of industry. Assessment should therefore ensure that technikon students in distance education become competent employees, rather than be focused on the learning process. Students studying Urban Agriculture should be able to transfer and apply skills, knowledge and values in their workplace and in new environments. Student competency may be self-assessed, or be assessed by peers, employers and lecturers on an ongoing basis as well as at the end of the learning process.

- **Summative assessment**

Summative assessment is a summarising assessment at the end of the instructional learning process (Oliva, 1988:446; cf. Marsh, 1992:103).

Students studying Urban Agriculture may also be assessed at the end of the course by means of an oral, written or practical examination. However, in OBE, assessment at the end of a unit of work is not sufficient; assessment must be an integral part of all programming (Killen, 1996:7).

Batey & Cowell (1986:27-28) suggest that students' completion rates, achievement gains and satisfaction be considered when performing any summative assessment.

- **Formative assessment**

Formative assessment is an ongoing assessment which takes place at one's discretion during the course of the instructional learning process (Carl, 1995:121). This continuous assessment is in line with an outcomes-based approach of measuring competency on an ongoing basis (cf. TCFC, 1996:6).

Continuous feedback improves instruction and improves the students themselves (Carl, 1995:121; cf. Pratt, 1994:109). This may take place in a formal or informal manner (Oliva, 1988:445).

Students' achievement in Urban Agriculture may be continuously assessed by means of practical projects, assignments or small research projects to determine whether students can demonstrate the required outcomes.

3.6 CONCLUSION

The curriculum must be relevant and dynamic to encompass change in the society it serves. It seems unavoidable that the curriculum designer will be influenced by the definition of the envisaged curriculum, many approaches, philosophies, design-types and sources of curriculum. This may eventually culminate in an eclectic design which combines information from various sources to create the

curriculum design that the designer wishes to promote. This design should include OBE to encourage student learning, and cater for differences in learning styles and motivation where time is seen as a flexible resource (cf. Killen, 1996:5; cf. Boschee & Baron, 1993:2-4). It implies a clear set of outcomes, based on students' interests that are to be achieved. These outcomes will influence the content, instructional methods, learning experiences and opportunities and student assessment. In this way students understand what they have to learn, why they have to learn it, what future use it will be to them, and know when they have learned it. In this way they are given responsibility for their own learning to become self-directed learners.

The cyclical curriculum design model of Krüger (1980:34) is adapted to suit OBE and portrays the underlying design principles influencing it.

The determinants influencing the curriculum have been discussed under the situation analysis followed by a discussion of all the other design principles influencing this OBE curriculum.

The next chapter will include the empirical qualitative and quantitative research study which will convergently provide data for curriculum outcomes for the envisaged urban agriculture course.

CHAPTER 4

THE EMPIRICAL STUDY

4.1 INTRODUCTION

The main aim of the qualitative study is to formulate curriculum guidelines and determine the overarching aims for a distance education course in urban agriculture. The course is based on an eclectic curriculum model (Figure 1; par. 5.4). The rationale suggested by Krüger (1980:34) was used as a basic curriculum design model for this research.

The purpose of the quantitative study (a pilot study) was to determine the feasibility of offering a distance education course in urban agriculture, whereby it is envisaged to train the trainer. It also included a needs analysis to determine what learning opportunities, media and content, would be suitable to train the trainer.

Another focus was on the role that local government could play in establishing an infrastructure for practising sustainable urban agriculture in achieving the ultimate goals for the course: social, environmental and economic sustainability.

A survey was used in the quantitative study as the method of enquiry and questionnaires were sent to the target population.

In the qualitative study semi-structured focus group interviews were used as the method of enquiry.

In this research a multi-disciplinary approach was used which not only cut across disciplines and subjects, but also included different methodological research para-

digms. Both quantitative and qualitative paradigms were used to give a holistic, integrated view of the empiricist approach of the former and the constructivist approach of the latter. In the quantitative study a deductive approach was taken, where categories of phenomena directed by literature were chosen *a priori* by the researcher with the intent to quantify them (Creswell, 1994:162).

In the qualitative methodology an inductive approach to logic was applied. Categories from the respondents' data emerged at the end of the research. These contextually-bound, evolving categories were then used in theory-building based on the views of the respondents and only aided by literature at the end of the study when comparisons of the findings were made.

The rationale behind choosing both quantitative and qualitative paradigms was to triangulate the findings; seeking convergence in the results. Multiple methods of data collection and analysis contributed to validity considerations.

Findings from the qualitative and quantitative studies were used to determine the content, the learning opportunities, learning experiences, and evaluation as well as the overall aims for the course.

The main reason for conducting the qualitative study was to obtain more depth in the research answer so that the total picture could be built, based on the suggestions from the target population. In the qualitative study the picture or theory emerged during the data collection (or interview) and analysis stages.

The data obtained from both the quantitative and qualitative studies were convergently used to write the curriculum guidelines and the overarching aims for the course.

4.2 GENERAL PERSPECTIVE OF QUANTITATIVE AND QUALITATIVE RESEARCH DESIGN AND METHODOLOGY

4.2.1 Overview

Designing a research project involves organizing the collection and analysis of data to provide the information which is sought (Peil, 1995:9; Mouton & Marais 1994:32). The qualitative study conveyed an inductive, emerging design and the quantitative study a more deductive, static design where the literature and theory helped to direct the study (Creswell, 1994:45).

For both methodological research paradigms, an exploratory and descriptive type of research design was used, however the methodologies differed. In the quantitative study the questionnaire was the data collecting instrument and the survey the method of enquiry. In the qualitative study the researcher was the primary instrument for data collection and analysis and the semi-structured focus group interviews the method of enquiry. These different methodological approaches were used to triangulate¹ research results.

In the quantitative research study, the survey allowed collection and quantification of data. Superficiality of data was reduced by capturing more depth in data-collecting by including open questions. Creswell (1994:174) views triangulation to include multiple meth-

Triangulate¹ is to use multiple methods, data sources, and researchers to enhance validity of research findings. (Mathison, 1988:13; cf Glen & Baker 1990:27).

ods of data collection and analysis, even within or between research approaches.

In this study different methods of data collection and analysis were used. Data triangulation in this study refer therefore not only to different data collection methods, but also using several data sources within each paradigm.

Another reason why more than one research design was used, was to obtain a different perspective on the study and to strengthen validity.

4.2.2 Validity

The aim of a research design is to plan and structure a given research project in such a manner that the eventual validity of the research findings is maximized (Mouton & Marais, 1994:33).

"Validity" depends on whether one has in fact investigated what one wished to investigate (Kvale, 1983:191) or measured what one wished to measure (Bailey, 1987:282). According to Mathison (1988:13) triangulation is a perceived strategy for improving the validity of research or evaluation of research findings. In this study triangulation was used to ensure internal validity and also as a research strategy because of its advantages. According to Creswell (1994:175) these include: convergence² of results; a complementary nature, in that overlapping and different facets of a phenomenon may emerge; being developmental, because the first method is used to help inform the second method; fostering initiative, because contradictions and new perspectives emerge; and, finally, being

Convergence²: When data from different sources or collected from different methods agree, the outcome is convergence (Mathison, 1988 : 15).

expansive, as mixed methods add scope and breadth to the study.

In the case of qualitative studies, validity of content analysis can be determined by (1) the appropriateness of the categories to the data (cf. Wilson, 1989:476).

4.2.2.1 Appropriateness

The fact that data is constantly compared with existing literature to ensure congruence between it and scientific categories, verifies its validity and appropriateness. Other factors influencing validity include: (2) the usefulness of content analysis categories, (3) the relevance of the categories to the research question, (4) and clarity of the categories (Holly, 1989:475-476).

4.2.2.2 Usefulness of categories

Results were compared with those of an independent coder and literature for confirmation of usefulness.

4.2.2.3 Relevance of the categories to the research question

The categories are pertinent to and portray the research question (cf. par. 1.3.1 and 1.3.2) because curriculum guidelines and the overarching aims for the course can be generated from them, answering the research question.

4.2.2.4 Clarity of the categories

The clarity of the categories is reflected in the data statements or citations (verbatim quotes) that support them.

Validation may involve content analysis of additional focus group data, or may employ other methods and measures such as survey research (Stewart & Smadasani, 1990:113).

In this study triangulation was used to improve validity. This also provided different methods of data analysis and data sources within and between approaches, further enhancing the validity of the research finding.

4.2.3 Reliability

Reliability means that a particular technique, if applied repeatedly to the same object, yields the same result each time (cf. Babbie, 1990:132).

The data obtained from the six semi-structured focus group interviews used in this study converged to a large extent, confirming their reliability. The first three interviews formed the basis of a pilot study to test the questions and the researcher's interviewing style. These were then submitted to experts in this field who suggested that an independent moderator conduct the others in order to obtain greater methodological rigour and to prevent bias. The main categories were generated out of these latter interviews, while the interviews from the pilot study were collaterally used to indicate data saturation.

Another critical question asked by Wilson (1989:475) and directed towards content analysis is: How reliable is the coding? Reliability was addressed in the qualitative study by using two coders and analysts who independently coded the six focus group transcripts, using phrases as the unit of analysis. They compared their work item by item and were in agreement on the congruency of the emerging categories that had been developed from the data and thus contributed to its reliability. The use of mul-

multiple analysts provides an opportunity to assess the reliability of coding, at least with respect to major themes and issues (Steward & Smadasani, 1990:105).

Reliability was further strengthened by consulting experts and literature on how to conduct semi-structured interviews. The fact that interviews were tape recorded, and consistency of the results was obtained from all six focus groups, although different moderators were used, further strengthened reliability.

4.3 RESEARCH DESIGN AND METHODOLOGY

4.3.1 Sampling

4.3.1.1 Quantitative research paradigm

For data collection this survey research, attempt was made to select the sample purposively³, but also as far as possible representative of the target population. The sample was selected on the basis of including a wide variety of respondents that would suit the purpose of the study. In one case (municipalities with a city population of more than 5 000 people) the entire population was chosen and in the other cases only those members of the population were selected where information was available.

A survey was chosen, on the basis of low costs and convenience, using a questionnaire as the data collection instrument. The purpose of the survey was to explore and describe. According to Babbie (1990:51) a survey aims to satisfy more than one general objective: description, explanation and exploration.

A purposive³ method of sampling is to select the sample on the basis of your own knowledge of the population, its elements and the nature of your research aims (Babbie, 1990:97).

A total of 1 290 people were sampled from the community and industry involved. The reason for including a non-probability, purposive or judgmental sampling method, was due to expense and the unavailability of information on the total target population. Another reason was that the widest variety of respondents, from the target populations be included in this cluster sample. Data was collected on the basis of sufficiency for the purpose.

However, more than one research designs were combined to give a different perspective of the subject under study.

4.3.1.2 Selection of target population

Industry and prospective students

All municipalities with a city population of more than 5 000 people were included. A total of 573 questionnaires were mailed to horticulturists because prospective students or trainers would come from this sector as they would be involved in providing resources, developing an infrastructure for urban agriculture to take place and assisting the urban agriculturists. Municipalities could also provide jobs for the trained urban agriculturists in their Parks or Community Development sections.

The general agriculture and horticulture industry were targeted and a total of 489 questionnaires were mailed to them. These included small farmers, horticulturists and non-government organizations working in this field and where addresses could be obtained. Agricultural companies, urban agricultural environmentalists, agricultural training centres, research councils and institutes doing training in this field were also included. Industry was included because of their expertise and job creation possibilities.

Community and students

A total of 228 questionnaires were mailed of which 212 were sent to community leaders in Gauteng where information on names and addresses could be obtained. The remaining questionnaires were sent to all African Agricultural Schools.

Criteria for including the community and students stem not only from the learner-centred approach of the institute of learning, but are also based on the educational philosophy of progressivism and reconstructionism which form part of the foundations of this curriculum. Both these human-centred philosophies (cf. par 2.4) strive to solve present socio-economic problems. It is therefore necessary to determine the needs of the community and render their opinions important.

From the total of 1 290 questionnaires mailed, 273 were returned, representing a response rate of 21,2 per cent.

4.3.1.3 Measuring instruments

Operationalism of concepts refers to operations carried out in the measurement of the concept (Bailey, 1987:55). In quantitative studies an instrument is necessary to measure. A scale is a composite measure constructed on the basis of an intensity structure among items comprising the measure (Babbie, 1990:164). The intensity of rating a respondent's answer in the closed ended questions was measured by using a Likert scale. This scale was used because of its suitability to measure ordinal data. Ordinal measurement consists of categories ranked in order of their value (Bailey 1987:62) or indicates an ordered categorization.

Likert's model asks respondents to say whether they strongly agree, agree, are uncertain or neutral, disagree or strongly disagree with a series of statements (Peil, 1995:146). In some of the structured questions from the questionnaire the five point Likert scale was used to determine the respondents' extent of agreement and intensity of judgment. A numerical value is allocated to each response (cf. appendix B).

A nominal scale was used when the variable was of a qualitative nature and could not be placed in a numerical order or sequence. With a nominal scale, each score does not actually indicate an amount; rather, it is used simply for identification as a name (Heiman, 1992:35).

Other closed-ended questions where no ordered categorization existed, were measured using a yes-no-unsure type of nominal, objective scale. Both this scale and the Likert scale belong to the independent type of scales. According to Kerlinger (1992:458-459) independence means that a person's response to an item is unrelated to his response to another item.

Measuring open ended or unstructured questions, was a more comprehensive and indirect process. The hierarchy of emerging category importance was measured, using Kerlinger's (1992:479-481) methodology of content analysis. Each category's relative level of importance was quantified and expressed as a percentage of the total.

Content analysis is a method of studying and analyzing communications in a systematic, objective, and quantitative manner to measure variables (Kerlinger, 1992:477).

Categories were generated from all the respondents' responses. The unit of analysis was themes. The frequency of these themes was established by counting them and as-

signing them to appropriate categories and checks on reliability and validity were obtained by using two independent analysers generating categories and quantifying the number of themes pertaining to each category (cf. Annexures B, C, D, E, F, G, H, I, J).

4.3.1.4 Data collecting methods

The questionnaire

A questionnaire was constructed in accordance with the research aims and a accompanying letter, introducing the study and its purposes was enclosed (cf. appendix A). These were mailed to the target population on 28 February 1995 (cf. appendices A and B) and requested to be returned before 1 May 1995. The questionnaires were to be completed anonymously to enhance the reliability of the response.

The questionnaire used in the quantitative pilot study consisted of closed-ended questions allowing for alternative responses or choices from the categories provided, and open-ended questions, or questions in which response categories were not specified (cf. appendix B). Open-ended questions were used for complex questions to elicit the respondents unique views, philosophy, or goals and require more detail and discussion (Bailey 1987:121).

The advantage of using closed-ended questions was the ease of analysis. Responses on open-ended questions were more difficult to analyze and quantify, but allowed the respondents a free choice in airing their views.

The respondents' responses are presented in appendix C; annexures B to H and J.

Composition of the questionnaire

The layout or design of the questionnaire was done according to a standard format used at the Directorate Research, Technikon SA to suit SPSS computer analysis (cf. appendix B). Coding was done by Lynfer Data.

Choice of questions

A combination of open- en closed-ended questions were included. The open-ended questions were asked to solicit a response in the respondent's own words and to avoid apparent superficiality of structured questionnaire items, so that more depth of meaning could be captured by including unstructured or open-ended questions. Avoid double-barreled questions and ensure items are clear, unambiguous and not biased (Babbie, 1990:128).

The purpose of Section A of the questionnaire was predominantly to determine the feasibility of offering a certificate course in Urban Agriculture in the Programme Group: Applied Natural Sciences.

Question A1 rated the extend of importance of the course in the new South Africa and A2 determined the number of people who would be interested in such a course.

The purpose of question A3 was to enquire about the learning opportunities and media that would be suited for this course. Respondents could choose from structured options or specify their own. This would provide valuable curriculum information.

In the structured question A4, enquiries were made about the suitability of distance education in offering this course countrywide. This information was important as strategies had to be devised in providing assistance or

an infrastructure to make this a viable distance education course.

The reason for including the open-ended question A5, was to ascertain from the respondents how urban agriculture could contribute to environmental education as environmental education also formed part of the foundation of the course and its content.

Numbers 1 to 11 of Section B, were to test the respondents feelings on the aims of urban agriculture which included socio-economic, environmental educational or ecological issues and their concern of population growth, on food security as well as the improvement of technical knowledge and skills of trainers. The responses were measured on a Likert scale.

The structured question B2 pertained to the aim of a sustainable size of land per individual that local governments should allocate for urban agricultural purposes. This question was aimed at establishing an infrastructure for practicing urban agriculture and respondents could either choose a suitable size from the ones given or indicated whether they were unsure of plot sizes.

Open-ended questions B3 to B5 requested the respondents' view on policies and assistance by local governments, aiming at creating an infrastructure for practicing urban agriculture and a sustainable city.

Open-ended questions B6 to B8 had bearing on problems that could be encountered, thoughts on recycling of waste water, the provision of water and the utilization of urban wastes for urban agricultural purposes. The reason of including these questions was to ascertain whether respondents would visualize urban agriculture to be prac-

ticed sustainably by conserving resources and identifying environmental problems.

Reliability of questionnaire items

Babbie (1990:133) indicate that reliability of questionnaire items can be maximised by asking questions respondents are likely to know the answer to, or that are relevant and clear to them.

Reliability was ensured by selecting a target population who should know the answers to the questions because of their familiarity with this field of study or they are working in a related industry or have the intention to study in this field or this field is relevant to them or their community. All questions were set as clearly as possible without any unambiguous or double-barrel-type questions (cf. appendix B).

Validity of the questionnaire

Questions A₁ to B₁ were used in the first article to determine the feasibility of offering a distance education course in Urban Agriculture as well as the role that Environmental Education play in this course. These questions do indeed measure these aspects and therefore have face validity.

Questions B₂ to B₁₀ were included in the second article, which focused on the role that local governments could play in achieving the ultimate goal: sustainable urban agriculture. These questions have face value, based on the grounds that they reflect these issues.

Content validity refers to the degree to which the items cover the range of meanings included within the concept (Babbie, 1990:134).

Questions A₁ to B₁ cover more extensively than face validity what they were supposed to reflect. They include questions which reflect feasibility in terms of numbers, importance of the course, distance education and appropriate media. Environmental Education's role is determined in relation to healthy and sustainable food production, population growth as well as socio and economic sustainability. This extensive coverage of feasibility reflects content validity.

Questions B₂ to B₁₀ cover local governments' role in regard to important policies, problems, assistance pertaining to land, assistance regarding urban agriculture and provision of water. Most suitable urban areas for practising agriculture and the most important type of agricultural endeavours as well as conservation and recycling practices are amply covered. This extensive coverage of a range of facets to determine local governments' role in achieving sustainable urban agriculture, ensures content validity of the questionnaire.

In the closed-ended question B1(8) and the open-ended question B7, a cross check was made to improve reliability of the question by repeating its essence. Respondents' thoughts on sustainable use of or conservation of resources were re-examined (cf. appendix C, annexure G; section 5.2, table 1; and section 5.3, table 5).

The closed-ended question B9 made enquiries about what urban open spaces could be used for. Respondents were given ten choices to choose from or could specify their own. From this information inferences could be drawn concerning the content for the course and the practicality thereof.

The unstructured question B10 requested respondents to indicate areas that could be used for urban agriculture. The purpose of the question was to obtain suggestions on what urban open spaces would be suitable for urban agriculture, fulfilling the aim of using all urban open spaces productively and sustainably in an environment where resources are marginal and valuable.

4.3.2 Data analysis (quantitative analysis)

4.3.2.1 Descriptive statistics

The completed questionnaires of the quantitative study were coded by Lynfer Data, Johannesburg, using the SPSS programme (Statistical Package for Social Sciences).

The descriptive findings of the research are given in tables, pie charts, bar graphs and histograms. Descriptive statistics are procedures for organizing and summarizing data so that we can communicate and describe the important characteristics of the data (Heiman, 1992:32).

The statistical package Excel (Windows, version 5.0) and Harvard Graphics (version 3.0) were used to draw the graphs (pie chart, bar graphs, and histograms).

A summary of the results of this quantitative pilot study is given in appendix C (Executive Summary), in tables below and in the first two journal articles (cf. sections 5.2 and 5.3). In these articles a summary of the results are given, some as tables and others in graph form, and discussed.

4.3.2.2 Interpretation of results

From the 1 290 questionnaires mailed, 273 were returned.

Data analysis and discussion of results in the quantitative study are presented in the first two journal articles of Chapter 5.

The feasibility study indicated that most respondents rated the importance of a course in urban agriculture very high [cf. appendix B, table 4.1, question A.1; appendix C (executive summary No 1); section 5.2, figure 1].

TABLE 4.1 THE IMPORTANCE OF URBAN AGRICULTURE IN THE NEW SOUTH AFRICA

LIKERT SCALE OF RATING	%
Definitely important	60,8
2	20,1
3	10,3
4	3,7
Absolutely unimportant	5,1
	n = 273

In question A.2 (appendix B), the number of staff members that would, according to the respondents be interested in a one year certificate course in Urban Agriculture, varied (table 4.2). Most (28,9%) indicated that two of their staff members would be interested.

The media (or learning opportunities) regarded as best for the course were user-friendly study guides plus workshops (51,2%), [cf. par. 5.2, figure 2; appendix C (Executive Summary No 3); and appendix B, A3].

Most respondents (66,3%) thought it possible for a technical course in Urban Agriculture to be offered country

wide through distance education (cf. table 4.3, appendix B, question A4).

Content analysis of the open-ended question on the contribution of urban agriculture to environmental education (cf. appendix B, question A5), was done in an article. (See section 5.2, table 2, and also appendix C, annexure B for verbatim responses).

Respondents regarded urban agriculture's contribution to environmental education mainly in terms of sustainable development, which included social, environmental and economic sustainability (84,1%). Social sustainability included aspects such as social participation and interactions and community farming, empowerment of the community, capacity building and sustainable living.

TABLE 4.2 NUMBER OF RESPONDENTS' STAFF MEMBERS OR OTHERS INTERESTED IN A COURSE IN URBAN AGRICULTURE

NUMBER OF STAFF MEMBERS INTERESTED IN THE COURSE n=273	%	NUMBER OF OTHER PEOPLE INTERESTED	%
2	28,9	10	21,4
1	23,7	1	20,0
3	11,8	8	10,0
4	6,6	3	8,7
6	6,6	5	7,4
10	6,6	2	7,4
5	4,6	100	6,0
8	2,6	50	6,0
7	1,9	4	5,0
26	0,7	15	3,6
150	0,7	6	1,0
10% of the Council	10,0	40	1,0

TABLE 4.3 POSSIBILITY OF OFFERING A COURSE IN URBAN AGRICULTURE COUNTRYWIDE THROUGH DISTANCE EDUCATION

POSSIBILITY n=273	%
Yes	66,3
No	15,0
Unsure	18,7

Environmental sustainability was seen in terms of protecting, conserving resources, preservation of biodiversity and improving the environment, creating a love for nature, and environmental awareness as well as taking an interest in the environment, better use of available land, beautifying the environment and basing urban agricultural practices on ecological agriculture.

Economic sustainability pertained to generating income and stimulating the economy, creating employment opportunities and providing, business opportunities and benefits.

Another contribution of urban agriculture to environmental education was seeing its potential as a training and teaching strategy for environmental education (11,4%).

Respondents regarded the contribution of urban agriculture to environmental education in terms of natural resource management (3,8%). Better utilization and management of resources and the awareness of the vulnerability of urban resources were included as contributing factors.

Only 0,7% indicated that urban agriculture would have no major impact on environmental education.

For analysis of section B.1, questions 1-11, appendix B, see section 5.2, table 1.

In question B1(1) the majority of respondents (70%) definitely agreed that it was necessary to improve the technical knowledge and skills of horticulturists, extension officers, farmers, teachers and community leaders and trainers regarding urban agriculture. This was indicative of a strong practical orientation of the curriculum.

In question B1(2), (56,0%) of the respondents definitely agreed that the certificate course in Urban Agriculture should be based on healthy and sustainable food production, 27,5% agreed to its importance, while 10,6% were unsure, 4,1% disagreed and 1,8% definitely disagreed. The fact that 83,5% of the respondents were positive that urban agriculture be aimed at sustainable food production, pointed towards the inclusion of ecological agricultural practices in the curriculum content which might include permaculture principles, organic growing practices, agroforestry and other sustainable practices.

The fact that the majority of the respondents (70%), in question B1(3), definitely agreed and 17,5% agreed that population growth would influence food security, while only 7,4% were unsure, 2% disagreed and 3,1% definitely disagreed, indicated their concern in this regard. It should be a motivating factor, indicating the importance of urban agriculture for sustainability, especially in cities, due to the ever-increasing influx of people to urban areas.

Responses to question B1(4) showed that 65,8% of the respondents definitely agreed that urban spaces should be used more productively, 18,4% agreed while 8,1% were unsure, 5,9% disagreed and 1,8% definitely disagreed. In-

Increased productivity could be interpreted as a positive contribution to socio-economic factors in the urban society.

In question B1(5) the majority (78%) agreed that urban agriculture could contribute to job creation, while 12,5% were unsure, 7,7% disagreed and 1,8% definitely disagreed. This finding was also an indication that the majority of the respondents considered urban agriculture as contributing to socio-economic upliftment of the community.

Judging by the high response of 90,8% in agreement of reducing the food crises of the urban poor, compared to 5,5% who were unsure, 2,2% who disagreed and 1,5% who definitely disagreed, strongly indicated the importance of improving food security for the urban South African dweller.

In question B1(7) respondents agreed very strongly (93,2%) on the need to teach people how to produce their own food through sustainable use of resources. Only 2,5% were unsure, 2,5% disagreed while 1,8% definitely disagreed. These findings reflected the aims of conserving resources and relieving the food crisis of the poor.

On the issue of using domestic waste products and waste water more productively in urban agriculture, of 87,3% of the respondents responded favourably to it, while 8,7% were unsure, 3,3% disagreed and 0,7% definitely disagreed. Again the aim to conserve resources featured prominently. (See question B1(8)).

In question B1(9), 60,8% of the respondents agreed that a high input of fertilizers and pesticides in agriculture could have a negative influence on the environment and human health. Some (21,1%) were unsure, 15,1% disagreed

while 3% definitely disagreed. These findings showed that the majority of the respondents felt protective against the environment and their health, indicating that the curriculum needs to aim at fostering ecological agricultural principles based on low external input, sustainable urban agriculture as opposed to high artificial inputs that have detrimental environmental effects.

In the case of question B1(10), most respondents agreed that farmers should accept responsibility for environmental offenses (74,9%), 19,3% were unsure, 4,0% disagreed while 1,8% definitely disagreed. This could be interpreted that respondents felt strongly about the protection of the environment, therefore the curriculum should include environmental education.

The above deduction ties-up with question B1(11) where 94,1% of the respondents agreed that environmental education is important in agriculture, while 4,1% were unsure, 1,1% disagreed and 0,7% definitely disagreed.

Question B2 enquired about the area of land per individual that local governments should allocate for urban agriculture in the lower income group areas (see appendix B).

Most respondents (25,3%) were unsure about the area of land suitable for urban agriculture, followed by (21,8%) who reckoned that 10-24 m² per individual would be enough. (See table 4.4, section 5.3, figure 1). More research would be necessary to determine the optimal size for socio-economic sustainability.

Content analysis was done on questions B3 - B8 and B10 according to Kerlinger's (Kerlinger 1992:479) method. Content analysis is a method of studying and analyzing

TABLE 4.4 RESPONSE RATE OF THE AREA OF LAND PER INDIVIDUAL THAT LOCAL GOVERNMENTS SHOULD ALLOCATE FOR URBAN AGRICULTURE IN THE LOW INCOME GROUP AREAS

AREA OF LAND (m ²) n=273	RESPONSE RATE %
< 10	11,9
10 - 24	21,8
25 - 39	8,4
40 - 54	10,8
55 - 70	8,4
More than 70	13,4
Unsure	25,3

communications in a systematic, objective, and quantitative manner to measure variables (Kerlinger, 1992:477). According to Kerlinger (1992:479), content analysis can be applied to letters, diaries, newspaper articles and materials especially produced for particular research problems.

The first step in the content analysis was to define the universe of content to be analyzed, which were all the responses of respondents to the questions asked.

The next step was to underline themes or words as the units of analysis. These themes or words were then quantified by counting and assigned to appropriate categories, ranked in order of significance. Agreement with an independent coder was reached in terms of categorization. (See appendix C, annexures B - H and J. tables 1 - 7 and section 5.3 for discussion).

In question B9 (cf. appendix B) the data was ranked.

Respondents were asked how they would like urban open spaces to be used. This ranking order (ordinal data), from the most to the least preferred use, was described in a bar chart (cf. par 5.3, figure 2).

Planting trees, (these included trees for fruit, wood and indigenous trees), was the most popular category (21,0%), followed by growing vegetables in second place, followed by parks, sports, medicinal plants, flowers, community farms, herbs and kiosks as the least preferred. If the category, medicinal plants (9,2%), was combined with the category herbs (5,9%), it would become the third most important category (15,1%) for urban open space usage.

These finding could be viewed as the aims for urban open space usage and would therefore provide valuable guidelines for the curriculum in urban agriculture, especially finding application in guidelines for curriculum content.

This quantitative research pilot study assisted the researcher in determining the aims and feasibility of a course in Urban Agriculture, the needs of the community and the necessary infrastructure to be put in place for practicing urban agriculture. The findings provided guidelines on curriculum content and learning opportunities.

This exploratory and descriptive research design contributed to the aims of the study; to develop curriculum guidelines for a course in Urban Agriculture and to base it on sustainable agricultural practices which will hopefully contribute to addressing the socio-economic situation of the urban farmer.

4.4 RESEARCH DESIGN AND METHODOLOGY (QUALITATIVE RESEARCH PARADIGM)

4.4.1 Introduction

The survey provided useful information, however more clarity insight and depth were needed that could not be obtained through questionnaires alone.

The qualitative study was included in this research to improve on both validity and reliability and to obtain richer, detailed information and flexibility. Triangulation will result in more valid research findings. According to Creswell (1994:145), the process of qualitative research is inductive in that the researcher builds abstractions, concepts, hypotheses, and theories from details.

The over-arching purpose of this study is to obtain more detailed information and greater depth of understanding in writing curriculum guidelines for a course in Urban Agriculture. Research questions used in the semi-structured group interviews were based on the model for curriculum design as suggested by Krüger (1980:34).

Creswell (1994:167) judges a qualitative study through a process of verification which includes internal validity. In this study internal validity is obtained through triangulation of data and peer examination.

This study allows the researcher to do a situation analysis based on information from the target population which include community leaders, industry, learners and professionals in distance education in order to design a course aimed at social, economical and ecological sustainability.

The significance of the study is to train trainers in Urban Agriculture in order to assist the urban farmers and communities.

4.4.2 Research design and methodology

This qualitative research study in parallel with the quantitative study, provided a multiple research approach that would add to diversity and richness of pertinent information for the study.

The qualitative research design can be described as exploratory and descriptive. The theory is unknown and has to be explored. The research approach is therefore research-before-theory. According to Creswell (1994: 145), qualitative research is descriptive in that the researcher is interested in process, meaning and understanding gained through words.

This inductive mode of the research process leads to theory being discovered and not tested, resulting in an emerging or developing design.

In the inductive model of thinking, a theory may emerge during the data collection and analysis phase of the research or be used relatively late in the research process as a basis for comparison with other theories (Creswell, 1994:94-95).

The qualitative leg of this study provides a mean of accessing unquantifiable facts on the elements of the curriculum process in order to develop curriculum guidelines for a course in Urban Agriculture.

4.4.2.1 Sampling

The sample size is not the determinant of research significance in a qualitative study; the major concern is with information richness (Crabtree & Miller, 1992:233).

This non-probability sampling method was purposive and convenient. The sampling population consisted of purpose-fully selected community leaders and community members, employers in the agricultural and horticultural industry, lecturers at a distance education institution, students and trainers in agriculture.

The participants were selected because of their relevance in representing the target population in this study, as well as being elements of change. Other reasons being convenience of distance, availability and willingness to participate. Their opinions were considered germane for this exploratory purpose.

The number of participants varied from six - 12 per focus group session. Continued interviews with respondents were conducted until data saturation occurred, that was when emergent themes became repetitive. According to Polkinghorne (1994:511), the qualitative research process moves through cycles of data collection and accommodation of the theory to the data until the theory is saturated, that is, until the newly generated data can be assimilated by the theory.

4.4.2.2 Data gathering

Six focus group sessions⁴ were conducted as a qualitative method for gathering data. They provided in conjunction

A focus group session⁴ can be defined as a discussion in which a small number (six - 12) respondents, under the guidance of a moderator, talk about topics of special importance to the investigation (Folch - Lyon & Trost, 1981:444).

with survey research, an opportunity to explore, encourage triangulation and increase validity of research findings. According to Morgan (1984:264) focus groups provide an opportunity to ensure that the respondents own thoughts and theories about a topic receive fair weight in comparison to hypotheses derived from prior theory and research.

The qualitative researcher is the primary instrument for data collection and analysis (Creswell 1994:145).

A pilot study was conducted in April and May 1996, which included three semi-structured focus group interviews of two hours each. The reasons were mainly to test the researcher's questions and interviewing style and to see if it would produce the kind of answers that could add value to the study.

Three follow-up semi-structured focus group sessions, of an hour each, were conducted, in July 1996 using an independent, experienced moderator, who is not an authority on the topic, to ensure reliability and validity of the study and adequate coverage of the topics.

These three focus groups formed the main body from which the major categories were generated. The three focus group sessions in the pilot study were used as co-lateral to add and indicate saturation of the main three. Citations were taken from all six focus groups to strengthen the methodological rigour of the study.

4.4.2.3 Semi-structured focus group method

Method

- The semi-structured focus groups were carefully planned and the researcher made the initial contact with the participants prior to the focus group sessions.
- The purpose of the research, namely to formulate curriculum guidelines for a distance education course in Urban Agriculture, was explained to the participants.
- The researcher also explained the functions of the focus groups sessions and what would be expected of the respondents during those sessions.
- Respondents were informed that:
 - ⇒ The focus group sessions would last for approximately one to two hours
 - ⇒ Participants would have to express their views, needs and ideas
 - ⇒ The discussions would be tape-recorded
 - ⇒ The researcher should be contacted if arrangements on dates were to change
- Names of participants willing to take part in the focus group sessions were written down and the researcher arranged the final dates for each focus group. Before the focus group sessions commenced, all participants had to confirm their willingness to participate.
- The venue for each focus group was arranged in a quiet environmental setting. At each venue participants were seated around a table to allow informal communication and two tape-recorders were positioned to capture the discussions as clearly as possible. The objective of the focus group sessions was discussion and members were seated in a manner to provide maximum opportunity

for eye contact with both the moderator and other group members (Stewart & Smadasani, 1990:88).

- A protocol was used in conducting the semi-structured focus group interviews. It included six questions (cf. appendix D), of which numbers 2 - 6 were based on the model for curriculum design suggested by Krüger (1980:34). This model consists of a cyclic arrangement of the components of curriculum design, which include a situation analysis, aims, planned learning experiences, selection and arrangement of learning content, suggested learning opportunities and evaluation. According to Krüger (1980:34), these design components or activities of curriculum design are stated as principles for curriculum design, because it is impossible to design a curriculum without each one of them. (See section 5.4 for the complete eclectic curriculum model on which this course in Urban Agriculture is based).
- The first question on the protocol enquired about the participants' conception of the term urban agriculture, followed by the aims they envisaged for a curriculum in Urban Agriculture. Thereafter the question on the content they regarded as most suitable for such a course in Urban Agriculture was followed by the learning opportunities they envisaged suitable for this course as well as the most important learning experiences they considered to be actualized by the learner. Finally they had to state how the effectiveness of the curriculum should be evaluated.
- The role of the moderator, was to facilitate or guide the open discussions in which each participant could comment, ask questions of other participants or respond to the question introduced by the moderator or comment on statements by other participants.

The moderator should establish a high level of comfort for participants in an atmosphere perceived as none-

valuative and nonthreatening (Stewart & Smadasani, 1990:100).

According to Folch-Lyon and Trost (1981 : 444, & 447) the moderator introduces and guides the discussion in an unbiased manner, his or her facial expression and voice should reflect both interest in what is being said and objectivity, without being regarded as an authority.

- The moderator encouraged participation in conversation of all the members in the focus group and summed up their verbal contributions before going on to the next question, open for discussion.
- Probing was done to elicit further discussion, especially in cases where more clarity and explanation were required.
- Before starting the group discussions, the research objectives were specified. Participants were not informed about the specific topics to be discussed before the time, but only about the general field of discussion.
- As part of the introduction, the moderator informed the participants that they had been invited because their opinions were valued in developing curriculum guidelines for a course in Urban Agriculture.
- From introducing the first question, the moderator allowed participants to talk to each other without unnecessary interference until saturation of information was reached on each question.
- The small group size of six - 12 participants allowed everyone to participate and elicited a range of responses.
- The moderator started with a general introductory question to allow for participation by all group members and progressed to more specific questions.

- The moderator probed in cases where more information was necessary to illicit a statement made. Follow-up questions, or probes, are an important part of extracting full information from respondents (Stewart & Sma-dasani, 1990:95).
- The moderator took field notes during the focus group sessions to ensure accurate recollection of data, perceptions and impressions.

4.4.2.4 Data analysis

All the audiotaped information of the interviews were transcribed verbatim, indicating silences and hesitations. The unstructured, transcribed recordings were coded by the researcher and an independent coder. The recordings were kept for reference purposes.

Content analysis was done on each group's transcriptions according to Tesch (1990) (as referred to by Creswell, 1994:155). Content analysis included the following steps:

- **Reading through the transcriptions**

The researcher reads the entire transcript to get a sense of the total picture.

- **Identification of the universum**

The next step was to identify the universum that was to be analysed. The universum in this research comprised of the spoken word.

- **Identification of units of analysis**

Themes and words were used as units of analysis. Themes or important words were underlined and main categories were generated from the three focus groups that formed the main body.

- **Defining and categorising categories**

Categorising included listing and classifying words and themes into categories.

- **Transforming from concrete language to scientific language and inferences**

The researcher reflected on the units and transformed the meaning from concrete language into scientific language. Pertinent citations from all groups were included under each category. In this way all the information was reduced to form the framework for the final report.

- **Independent coder**

After the researcher had done her own analysis and coding a work protocol was drawn up. The independent coder then analysed and code words and themes according the work protocol.

Work protocol

The work protocol contained:

- ⇒ A description of the steps to be followed
- ⇒ The transcriptions and field notes

Consensus discussion between researcher and independent coder

⇒ Agreement was reached between the researcher and independent coder on the placing of words and themes and identifying inferences and developing categories

- **Literature control**

- A final discussion included interpretation of the results in comparison with literature (cf. section 5.4).

Data analysis requires that the researcher be comfortable with developing categories and making comparisons and contrasts (Creswell, 1994:153). When categories were saturated, research data was compared with literature.

The findings of the research were interpreted, explained and structured to give the emergent overall picture from the textual data in the qualitative final text. Patton (1980 : 306) calls this type of data analysis, inductive analysis because the patterns, themes, and categories of analysis emerge from the data rather than being imposed on them prior to data collection and analysis.

Internal validity⁵ was ensured through triangulation, using a variety of information sources (community leaders, employers of horticultural and agricultural industry, learners), different investigators (moderators and coders) and different methods of collecting data (qualitative method; focus group sessions and quantitative method; a survey).

Internal validity⁵ is the accuracy of the information and whether it matches reality (Merriam, 1988; as referred to by Creswell 1994 : 158).

The rationale behind this was to search for convergence in data. According to Denzin, (1978) (as referred to by Polkinhorne 1994:511), qualitative researchers make use of a variety of sources of descriptions of the same event - that is, they use data triangulation.

The rigorous use of these different procedures was an attempt to guard against personal bias that may unduly influence the analysis.

Content analysis not only included consistent comparisons with literature, but also produced its own set original findings (cf. section 5.4). According to Merriam (1988) (as referred to by Creswell 1994:158-159), the intent of qualitative research is not to generalise findings, but to form unique interpretations of events. In other words as Creswell (1990:158) puts it: "limited generalizability of findings from the study - the external validity".

Reliability issues were addressed in that thematic constructs occurred repeatedly throughout different focus group settings. The protocol used in data collection ensured replicability of questions in each focus group session (cf. appendix D).

Using focus groups allowed exhaustive themes or data from different sessions to be coded, compared, classified into categories and interpreted to give form to the descriptive emergent product. Results and discussion of findings with literature control and conclusions were reported in narrative style (cf. section 5.3).

4.5 CONCLUSION

In this chapter a detailed description was given of the empirical study which included the research design and

methodology for both quantitative and qualitative research paradigms.

In the next chapter data and results of the quantitative study will be discussed in the first two articles (cf. sections 5.2 and 5.3). Results and data from the qualitative research will be discussed in the third article (cf. section 5.4).



CHAPTER 5

RESEARCH RESULTS AND DISCUSSION

5.1 INTRODUCTION

The aim of this chapter is to present the research data in a concise manner.

The results of the quantitative and qualitative research paradigms will be discussed in the following articles:

The first article (section 5.2), "Urban Agricultural course at Technikon SA: an ecologic approach", includes a feasibility study, and assesses the need for Environmental Education in this course.

This article was published in *Environmental Recreation Management Today*, 53(2), October 1996:21-23.

The second article (section 5.3), "Sustainable urban agriculture and its implications for local governments", concerns the provision of policies and assistance by local governments to establish an infrastructure for the practising of sustainable urban agriculture.

This article has been submitted for publication.

The third article (section 5.4), "Curriculum guidelines for a distance education course in Urban Agriculture based on an eclectic model", involves the sources of change influencing this curriculum and providing guidelines for the course.

This article has been accepted for publication in the January 1998 edition of The International Journal of Environmental Education & Information.

Sections 5.2, 5.3 and 5.4 that follow are written in the style of papers in environmental and educational journals.

5.2 URBAN AGRICULTURAL COURSE AT TECHNIKON SA: AN "ECOLOGICAL" APPROACH

5.2.1 Introduction

The history of hunger is a history of unjust social and economic systems which, frequently in combination with ecological degradation, have marginalised the poor and deprived them of the means to eat (International Movement for Ecological Agriculture, 1990).

A research survey was conducted to determine the feasibility of offering a distance education course in urban agriculture at Technikon SA. With this course, we envisage training the trainer.

The survey assisted in determining the need for and ascertaining the role of Environmental Education as a pillar of this course. A new approach is necessary to regenerate ecosystems and assist in the socio-economic upliftment of communities.

New opportunities must be seized and untapped potential exploited if the outcome is to result in the productive use of urban open-spaces, nutritional self-reliance, income generation, conservation and enhancement of the resource base and the empowerment of communities.

The massive increase of urban populations in Africa is only the early stage of a process that will accelerate into the next millennium (Drakakis-Smith, Bowyer-Bower & Tevera, 1995:183). Need must be taken and infrastructures put in place to guide urban agriculture towards sustainability.

According to Meadows (1989:5) an American ecologist, Garrett Hardin, once said that a citizen of the modern world must be educated to be literate (able to read and write), numerate (to understand numbers), and ecolate to understand and use sustainably the complex environmental systems of which he or she is a part.

5.2.2 Methods

A survey was conducted in the middle of 1995. The data collection instrument was a questionnaire with closed- and open-ended questions. This method was chosen because of its low cost and its convenience. A total of 1 290 questionnaires were sent to parties involved in the community and industry. Municipalities with a city population of more than 5 000 people were targeted and 573 questionnaires were sent to the general agriculture and horticulture industry (489), all black agriculture schools (16) and to 162 community leaders (whose names and addresses could be obtained).

Coding of the questionnaire for computerising was done by Lynfer Data. The type of scales used in this research survey for closed-ended questions include a Likert scale of rating (definitely to not-at-all), categorical (yes/no/unsure) and rank-ordered (rank from lowest to highest importance) scales.

A Likert scale was used to measure the intensity of opinion on socio-economic, environmental and urban agricultural issues.

An eclectic process of analysing data from the open-ended questions was adopted. Kerlinger's (1986:477) and (Tesch's, 1990 method; as referred to by Cresswell, 1994:155) were combined to develop categories and sub-categories from emergent themes.

5.2.3 Results

Respondents returned 273 questionnaires from the total of 1 290 mailed, representing a response rate of 21,2 per cent.

- Most respondents (80,8 per cent) believe that a course in urban agriculture is important (figure 1).
- The majority of respondents (93,3 per cent) indicated that between one to ten of their staff members would be interested in enrolling in a course in urban agriculture. In 84,5 per cent of all cases the respondents indicated that they knew of between one to ten other people who would be interested in studying this course.
- The largest percentage of the respondents regarded user-friendly study guides plus workshops as the best media for this course, to be followed by the written word plus video cassettes (figure 2).
- More than half of the respondents (66,3 per cent) felt that it was possible for a technical course in urban agriculture to be offered country-wide through distance education, while 15 per cent thought it was not possible and 18,7 per cent of them were unsure.

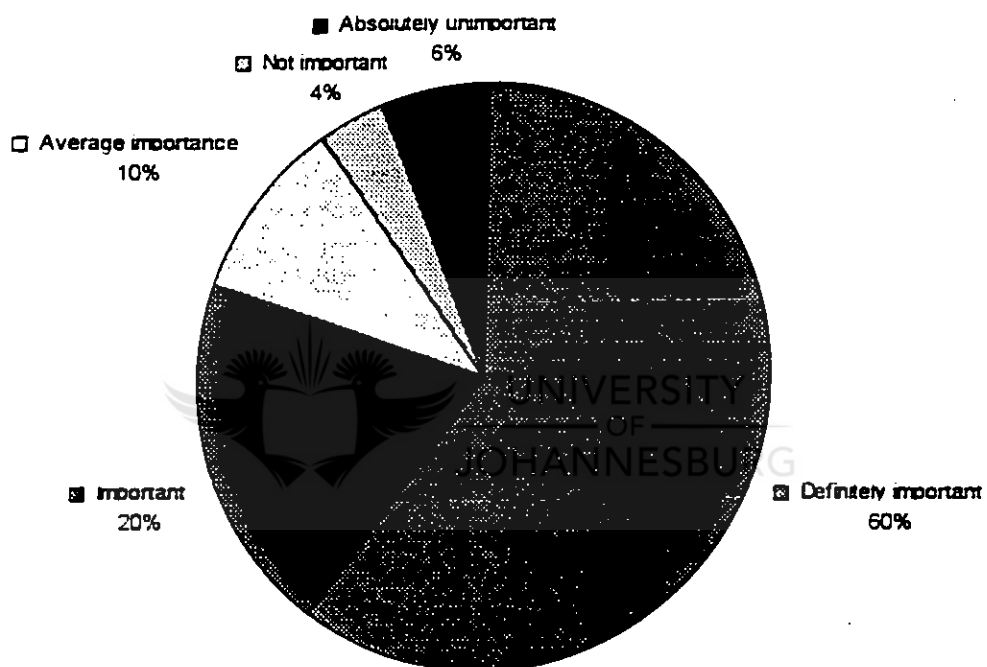


Fig. 1 Importance of a course in urban agriculture

- The majority of the respondents (87,5 per cent) felt that it was necessary to improve the technical knowledge and skills of horticulturists, trainers/ extension officers, farmers, teachers and community leaders regarding urban agriculture (table 1).
- Most respondents (83,5 per cent) regarded a course in urban agriculture, based on healthy and sustainable food production, as important (table 1).
- A large percentage (87,5 per cent) of the respondents felt that population growth influenced food security, and 84,2 per cent thought that urban open spaces should be used more productively (table 1).
- The majority of the respondents (90,8 per cent) felt that it was important to reduce the food crisis of the urban poor in South Africa, while 78,0 per cent believed that urban agriculture could contribute to job creation (table 1).
- While 87,3 per cent of the respondents were of the opinion that organic domestic waste products and waste water could be used more productively in urban agriculture, 93 per cent envisaged a need to teach people how to produce their own food through the sustainable use of resources (table 1).
- While 87,3 per cent of the respondents were of the opinion that organic domestic waste products and waste water could be used more productively in urban agriculture, 93 per cent envisaged a need to teach people how to produce their own food through the sustainable use of resources (table 1).
- More than half of the respondents (60,8 per cent) felt that a high input of fertilisers and pesticides in agriculture had a negative influence on the environment and human health (table 1).

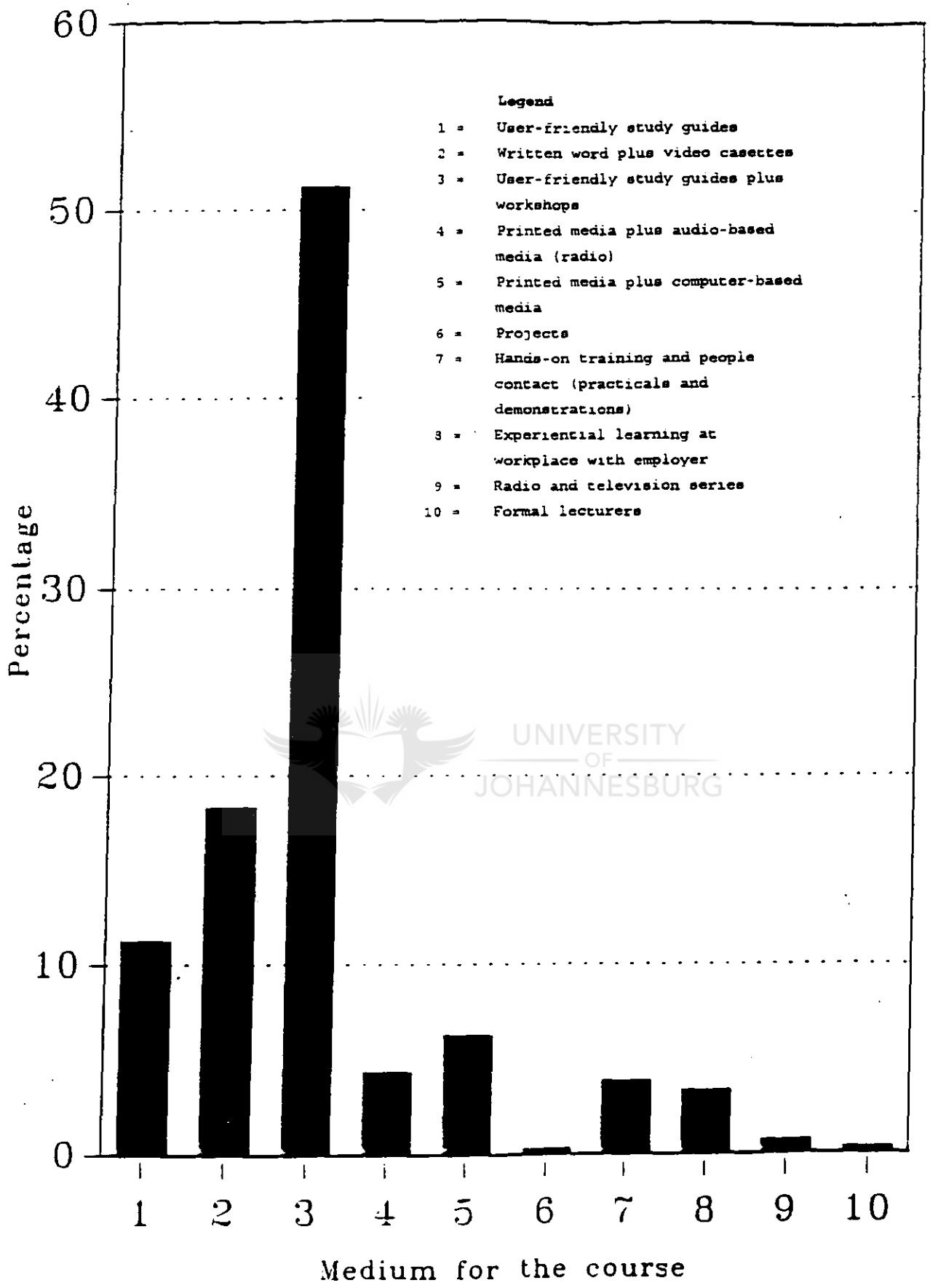


Fig. 2 Medium for the course

- 74,9 per cent of the respondents regarded environmental education as important in agriculture (table 1).

Table 1 Percentage of respondents indicating their intensity of opinion on statements

STATEMENTS	DA	A	U	D	DD
It is necessary to improve the technical knowledge and skills of horticulturists, extension officers, farmers, teachers and community leaders and trainers regarding urban agriculture	70,0	17,5	7,4	2,0	3,1
A certificate course in urban agriculture based on healthy and sustainable food production is important in the new South Africa	56,0	27,5	10,6	4,1	1,8
Population growth influences food security	70,0	17,5	7,4	2,0	3,1
Urban spaces should be used more productively	65,8	18,4	8,1	5,9	1,8
Urban agriculture should contribute to job creation	52,6	25,4	12,5	7,7	1,8
It is important to reduce the food crisis of the urban poor in South Africa	70,0	20,8	5,5	2,2	1,5
There is a need to teach people how to produce their own food through the sustainable use of resources	71,5	21,5	2,5	2,5	1,8
Domestic waste products and waste water can be used more productively in urban agriculture	64,0	23,3	8,7	3,3	0,7

High input fertilisers and pesticides in agriculture have a negative influence on the environment and human health	38,9	21,9	21,1	15,1	3,0
Farmers should accept responsibility for environmental offenses	52,6	22,3	19,3	4,0	1,8
Environmental education is important in agriculture	72,4	21,7	4,1	1,1	0,7

DA = Definitely Agree; A = Agree; U = Unsure; D = Disagree; DD = Definitely Disagree

Emerging categories and sub-categories from the open-ended question on how urban agriculture can contribute to environmental education, are given in (Table 2).

MAIN CATEGORY	SUB-CATEGORY	QUANTITY
1 Sustainable development: * Social sustainability	- Self-sufficiency in basic needs	7
	- Food and uses of plants to benefit people	7
	- Social participation and interactions and community farming	8
	- Decision-making	3
	- Recreation	2
	- Empowerment of community and building capacity	10
	- Sustainable living	1
	38	
* Environmental sustainability	- Serve, protect, conserve and improve the	9

	environment	
	- Create a sustainable city	4
	- Create a love for nature and an interest in environment	4
	- Better use of available land and integrate the community and city	4
	- Create environmental awareness, consciousness and sensitivity	21
	Beautify the environment	
	- Take responsibility for the environment/participatory action	6
		3
		51
* Economic sustainability	- Generate income and stimulate economy	4
	- Create jobs and employment opportunities	7
	Provide business participation and benefits	5
		16
		(36,3%)
2 Conservation of resources and preservation of biodiversity	- Prevention of air pollution and soil erosion and protection and conservation of top soil and water (sustainable use of natural resources)	36

	- Preserve and encourage communities to plant greenery (herbs, trees, edible and medicinal plants)	9 (15,6%)
3 Natural resource management in urban agriculture	Better utilisation and management of resources and an awareness of vulnerability of urban resources	11 (3,8%)
4 Urban agriculture as an environmental education, training and teaching strategy	- Understand the environment better and become more conscious of it and teach ecological principles - Provide job experience and productive use of urban open-spaces - Educate the community and school pupils and teach them skills	6 13 14 (11,4%)
5 Ecological urban agriculture	- Teach sustainable land management practices - Promote environmental education through agricultural teaching; (association of soil science and plant nutrition, teaching low-impact technology and design, permaculture methods, organic fertilisation, dangers of pesticides, fertilisers and chlorinated water, environmental friendli-	4 30

	ness)	(11,8%)
6 Improving the urban environment and preventing problems	- Provide knowledge and create interest in production of edible plants	11
	- Teaching skills (crop rotation, intercropping, resource utilisation management of urban wastes)	26
	- Improvement of health, sanitation and clean environment	6
	- Teaching consciousness of pollution, degradation of environment, commitments, involvement and responsible actions	16
		(20,4%)
7 No major impact	Do not know. Perhaps the wrong focus	2 (0,7%)
		N=289

5.2.4 Discussion

From the results, there seems to be sufficient interest in a course in urban agriculture through distance education, which would render it feasible.

Judging from the strong preference to user-friendly study guides plus workshops the respondents' it seems as if they foresee a substantial practical component to the course.

The strong support to improve knowledge and skills and the fact that the course should be based on principles of sustainable agriculture stress the need for ecological agriculture. This is echoed in the sustainable use of resources and the recycling of waste products and water.

From a socio-economical point of view it appears as if the respondents regard urban agriculture as conducive to job creation and relieving the food crisis of the poor.

The concern that population growth influences food security can be linked to the need that urban open-spaces should be used more productively.

The need for environmental education in the course emphasises the additional concern about the high external input of fertilisers and pesticides and their negative influence on the environment and human health.

There seems to be agreement that farmers should accept responsibility for environmental offenses. It is therefore not surprising that environmental education is regarded as important in agriculture.

The main categories emerging from the open-ended question are indicators of the respondents' view on urban agriculture's contribution to environmental education. The strongest category (36,3%), "Sustainable development", includes social, economic and environmental sustainability, and each of these is paramount for the improvement of the quality of life.

"Improving the urban environment and preventing problems" is the second strongest category (20,4%), indicating the importance of knowledge, skills, a clean environment and a commitment to act.

The other categories in order of diminishing importance are:

- "Conservation of resources and preservation of biodiversity" (15,6%)
- "Ecological urban agriculture" (11,8%)
- "Urban agriculture as an environmental education, training and teaching strategy" (11,4%)
- "Natural resource management in urban agriculture" (3,8%)

The category "no major impact", was least important (0,7%).

5.2.5 Conclusion

The data revealed the feasibility of a course in urban agriculture resulting in the sustainable use, management and understanding of the environment. This implies that trainers and urban agriculturists should be able to ecologate.

Further research is aimed at the assistance of local government in reconstructing and developing sustainable cities that will alleviate poverty and stimulate economic growth.

The ultimate aims of a course in urban agriculture as well as the skills and knowledge trainers should be equipped with, need to be researched.

5.2.6 Acknowledgments

My sincere thanks to Dr Louise Botha and Mrs Isabel van Aswegen, Directorate Research, at Technikon SA, for their assistance.

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5.3 SUSTAINABLE URBAN AGRICULTURE AND ITS IMPLICATIONS FOR LOCAL GOVERNMENTS

5.3.1 Abstract

This article concerns the provision of policies and assistance by local governments to establish an infrastructure for the practising of sustainable urban agriculture. Rapid urbanisation and population growth are placing immense pressures on the socio-economic conditions of a large section of the urban community. Food security for this sector is forcing urban communities and local gov-

ernments to become innovative in using urban resources optimally and sustainably.

5.3.2 Introduction

Before compiling curriculum guidelines for a course in Urban Agriculture, it is essential that an infrastructure be established to practice urban agriculture aimed at improving the quality of life and the environment.

Urban agriculture may offer the world's cities an opportunity to stimulate local economies and earn foreign currency.

One of the world's greatest challenges is to increase food production in a sustainable manner so that a rapidly growing global population can be fed (Keating, 1993). High food prices and the influx of people to urban areas, the current economic climate and concomitant high unemployment situation in South Africa increase the need for urban agriculture. New strategies, solutions, visions and actions are needed to help combat poverty, hunger, malnutrition and unemployment of the ever-increasing South African urban population. The promotion of urban agriculture is significant in South Africa because due to lack of alternative forms of income generation, many people have no option but to seek sustenance from the soil (May & Rogerson, 1994).

Urban agriculture presents itself as part of a wider food security goal and as an important challenge to South Africa's city managers (May & Rogerson, 1995). City managers must therefore be sensitive to people's socio-economic problems and their need to utilize available urban resources in their struggle for survival.

Productive use of idle urban open space, training, knowledge, skills community development may lead to the empowerment of urban and communities, economic growth and ultimately to self-actualisation. These aims are echoed in the mission statement of the South African agriculture policy: "Ensure equitable access to agriculture and promote the contribution of agriculture to the development of all communities, society at large, and the national economy, in order to enhance income, food security, employment and quality of life in a sustainable manner" (White Paper on Agriculture, 1995).

The scope of urban agriculture is wide. According to Smit & Nasr (1992) Chinese cities produce 90 per cent of their vegetable requirements within urban regions, while Japan, the Netherlands and Chile have more urban than rural farmers. The same trend is observed in Taiwan, where more than half of all urban families are members of farming associations, while in Kenya and Tanzania two-thirds of urban families engage in farming.

The purpose of this research is not only to determine the needs, problems and ways of resource conservation in urban agriculture, but also focuses on the role that local government can play in establishing an infrastructure for practising sustainable urban agriculture in achieving the ultimate aim: social, environmental and economic sustainability.

5.3.3 Materials and methods

This research followed a pilot study into the feasibility of offering a distance education course at Technikon SA, whereby the trainer in urban agriculture would be trained. Due to the substantial practical component envisaged for this course, joint ventures by Technikon SA and the horticultural and agricultural industry, includ-

ing departments of local government involved in practical training of this nature, would have to be undertaken. For this reason research was conducted in the middle of 1995 to ascertain the assistance needed from local governments to establish an infrastructure for the practising of sustainable urban agriculture.

A survey was used as the method of enquiry and a questionnaire, containing closed- and open-ended questions, served as the data collection instrument. This method was chosen on the basis of low costs and convenience.

A total of 1 290 questionnaires were sent to the target population in the horticulture and farming industry in South Africa and to community leaders. Of the total, 573 questionnaires were mailed to horticulturists in municipalities (with a city population of more than 5 000 people), and 489 were sent to the general agriculture and horticulture community, 16 to agricultural schools and 162 to community leaders (where information on names and addresses could be obtained).

Coding of the questionnaires for computerising was done by Lynfer Data, South Africa.

Data from the open-ended questions, was content analysed. The method suggested by Kerlinger (1992) was used to develop categories from emergent themes and rank them in order of importance. Each category's relative level of importance was quantified and expressed as a percentage of the total.

5.3.4 Results and discussion

Respondents returned 273 questionnaires of the total of 1 290 mailed, representing a response rate of 21,2%.

The results will be discussed in terms of the emerging categories from the textual data obtained from open-ended questions and will be substantiated by verbal citations.

Land Size

As shown in Figure 1 the majority (25.3%) of the respondents were unsure about the size of land or plot per individual that should be allocated by local governments for urban agriculture.

The policies in respect of urban agriculture that local governments should regard as important for urban agricultural purposes are summarised in table 1.

These policies have been arranged in ascending order of significance, and will be discussed in the same sequence.

Policies regarding access to land

This category was characterized by clear statements to the effect that urban land should be made available and optimally utilised in all instances for the production of food: "... no land should be under-utilised ... allocated land for food growing should not be used for other things ... public open spaces must be used productively and made available to the community ...". It was felt that policy should be formulated to facilitate the process in order that it be thus formalised: "... formulate policy to allow urban agriculture ... applications by interested farmers should be submitted for approval by local governments ... zoning of agricultural soils and strengthening of legislation against resource management ...". Land which would be made accessible was considered to have certain characteristics which would be suited to the needs of urban agriculturists: "... supply water and land ... fertile soil must be allocated to communities to be

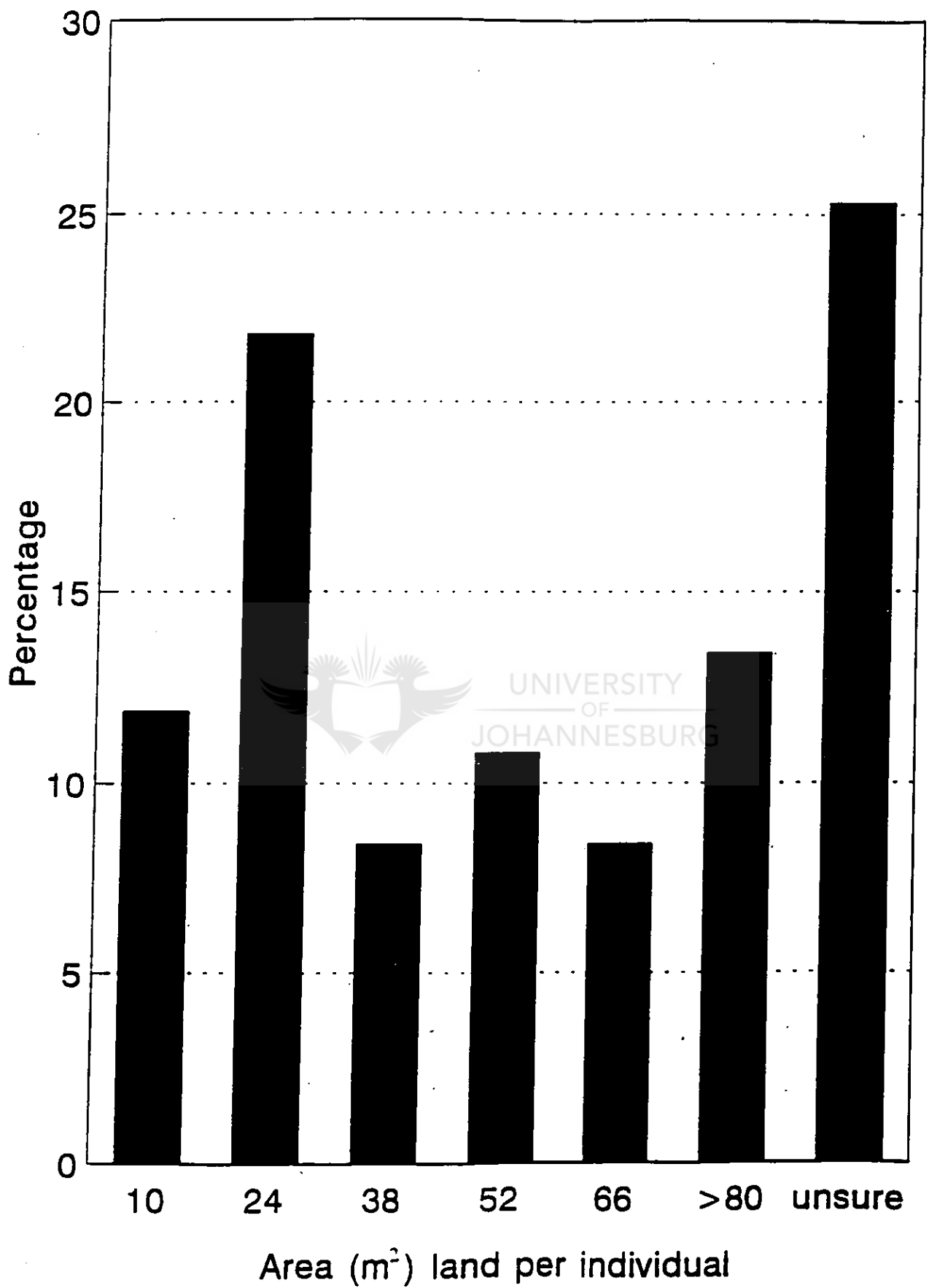


Figure 1. Area of land (m²) per individual (n=273).

**Table 1. Policies in respect of urban agriculture
(n=260)**

Category of policy	Quantity %
Access to land	28.0
Local government's control and management	16.0
Sustainability	12.3
Education and training	9.7
Community involvement	8.2
Town planning	6.4
Awareness of the importance of urban agriculture	6.3
Water usage	5.2
Job opportunities	3.6
Promotion	3.3
Security	1.0

successful ... (approval for) the type of crops to be planted ...". It was the intention of the respondents that land resources should be made accessible to benefit the community in the most appropriate and relevant manner: "... planned park areas in low income areas can be used as food gardens until the need for parks arises ... servitudes must be put in place to ensure that the community can utilise them ... municipal land must be made available on a loan basis ...".

Policies regarding local government's control and management

In their statements on control measures respondents clearly reflected their awareness of the environment, the

promoting of ecological agriculture and the adherence to health regulations: "... proper control should be exercised to ensure productive and good agronomic and livestock practices, while good sanitary and health regulations should be enforced ... control water, land and pollution ...". Management practices were also regarded as ways to ensure fairness: "... local government should be involved in ongoing planting, harvesting and fair distribution ...".

Policies regarding sustainability

Respondents considered that sustainable practices would include the transforming of urban wastes into products for re-use. Statements addressed concerns about environmental impacts on the urban ecosystem and respondents would prefer policies promoting sustainability: "... sustainable use of resources, combating pollution, awareness of the environment, sustainable water management and recycling ...". A strong link between responsibility and sustainability was expressed: "...people must take responsibility for the land to ensure that they use it sustainably ...".

Policies on education and training

Respondents regarded education and training as a means for the capacity building of urban communities: "... Educate people to keep land in good condition - use expertise of organisations involved in uplifting the community ...". Education and training also provides a foundation for schoolchildren and farmers to practise ecological agriculture: "... train farmers and schoolchildren ... give technical back-up ... teach the recycling of wastes and water ...".

Policies regarding community involvement

Responses to this category strongly emphasised that urban agriculture policies should be aimed at benefiting the community and fostering community cohesiveness: "... all benefits must be fed back into the community ...". Urban agriculture policies leading to community capacity building were foreseen: "... it must add to the upliftment of the community ... more productive and sustainable use of urban spaces which are community driven ... empowerment of individuals and communities to develop urban land ...". Respondents felt that policies fostering good communication links should be established between local governments and communities and that both be kept accountable for their actions: "... the gardens must be established and worked by the communities themselves ... government assists in the creation of an infrastructure and a transfer structure to communities ... all parties must share responsibility ...".

Policies regarding town planning

In this category respondents recommended that town planners proactively include urban agriculture as part of the total urban infrastructure: "... infrastructure planning in town planning schemes should make provision for urban agriculture, industry, housing, greenbelts and transport ...". The infrastructure should also include: "... open space planning ... active and passive recreation planning ...".

Policies regarding awareness of the importance of urban agriculture

Respondents considered that local governments should promote policies on urban agriculture that emphasise its

benefits in promoting dietary and nutritional values, and its positive role in community development and in agriculture: "... local governments should regard urban agriculture as important, realising that it would reduce the food crisis in South Africa and is an important component of agriculture ... change policies and city regulations to accept urban agriculture as an important service to the community ...".

Water usage policy

Respondents stated that policies be formulated regarding the provision of water for urban agriculture to prevent possible health hazards of re-used water and sewage: "... (policy) on water supply, run-off water, recycling of sewage, health regulations ...".

Policy on job opportunities

Respondents felt that local governments should seriously attempt to address the high unemployment scenario and to make land available for urban agriculture, thereby providing economic opportunities based on policies that encourage resource conservation: "... purposeful attempts to create jobs ... identify open spaces ... and draw up an environmental conservation policy ...".

Policy regarding promotion

Local governments should: "... promote urban employment, training and agriculture ... promote the concept of providing guidance and advice ..." as part of their policy. Some ways of achieving this could be to: "... allocate 10% of Research and Development (RDP) funds to the encouragement of urban agriculture ..." and to "... create markets where products can be sold ...".

Policies regarding security

Respondents recommended that policies should include security of land ownership to responsible cultivators: "... provide security, ownership should be legally transferred to entrepreneurs ... evaluate beneficiaries ...".

The assistance to be provided by local governments regarding access to land is summarized in Table 2.

Low cost or free availability of unused land

The respondents recommended that one way in which local government could provide assistance in developing urban agriculture was by making unused land available at low cost or even at no cost at all, provided that the agriculturalists gave evidence of maximal, sustainable usage and successful practice of urban agriculture: "... make an affordable rent on land and water available ... allocate 50 per cent of municipal open land to urban agriculture and community gardens ... allocate low cost or free land on condition that goals of productivity are achieved ... ownership or long-term leases can be given to successful and responsible farmers ... assign land-use according to feedback from communities ...".

Town planning and consultation with communities

Town planning and consultation should occur in collaboration with communities if local government is to be of assistance in the urban agriculture process: "... assign land-use according to feedback from communities ... zoning of suitable land, allocation, negotiation, and criteria for land legislation ... better land outlay identification and initial provision for urban agriculture in urban design ...".

Table 2. Assistance by local governments regarding land access (n=254)

Category of assistance	Quantity %
Low cost/free availability of unused land	23.4
Town planning and consultation with communities	15.6
Extension/legislation and infrastructure	15.1
Identify available land proactively	11.0
Buying or leasing land	10.6
Financial assistance/funding/loans	6.7
Proposals identifying suitable land for agriculture	6.2
Education and financial support	4.6
Land available for the jobless	3.8
Nothing	3.0

Extension or legislation and infrastructure

Local government could provide assistance with access to land if it facilitated the process by means of appropriate legislation and infrastructure as a support measure: "... provide properly trained extension staff or NGO's (Non Government Organisations) and a basic infrastructure ... revise city regulations ... advertise legislation of resources ... rent out implements ...".

Identify available land proactively

Respondents suggested that attention be given to an urban infrastructure which included the planning and identification of suitable land with high production potential for urban agriculture: "... develop a department of urban

agriculture to identify land ... provide an infrastructure ... plans to be submitted to the National land reform programme ...".

Buying or leasing land

Respondents suggested that tenure or ownership be encouraged and be established to inspire sustainable management and ecosystem conservation: "... a sense of owning the land gives people pride and contributes to sustainable use of land ... cultivators should rent, buy or lease land from local governments ...".

Financial assistance, funding or loans

Respondents suggested that local government provide financial assistance to urban farmers and recommended that local governments: "... encourage financial institutions to lend money to entrepreneurs for this purpose ... provide tax incentives ...".

Proposals identifying suitable land for agriculture

Appropriate areas identified for urban agriculture included: "... around schools and churches, unused parks, servitudes, plots, some greenbelt areas, vacant land, residential home gardens, unused areas around townships, land under power lines and traffic islands ...".

Education and financial report on land issues

Many challenges exist in developing an appropriate training program in urban agriculture to teach sustainable land practices. Respondents felt that efforts be made to "... educate people about the importance of keeping the

land in good condition ... provide knowledge and financial support ...".

Land availability for the jobless

Prevailing situations of escalating unemployment emphasise that efforts be made to provide land as a basis for a livelihood. Respondents recommend: "... Kibbutz-type farms according to the Mojave system ..." to provide a solution to the problem. Recommendations in this regard would be to "... issue land under group ownership for community gardens ..." or "... an allotment system ...".

Nothing

Respondents favoured little assistance or interference by local governments. Initial discussion with communities on land issues were regarded as sufficient: "... local government could facilitate initial meetings, but thereafter the community must take over ...".

Assistance by local governments in regard to urban agriculture

What assistance by local governments will help transform cities from their present polluting and consuming state to food producing, energy and resource conserving bastions, thereby uplifting the socio-economic conditions of a large sector of their inhabitants?

Assistance to be provided by local governments regarding urban agriculture is summarised in table 3.

Education and training

Most respondents were of the opinion that local governments should provide education and training facilities to improve the knowledge and skills of the community: "... provide training centres ... information services to make knowledge available to people ...".

According to Keating (1993) education can give people the environmental and ethical awareness, values and attitudes, skills and behaviour needed for sustainable development.

Extension

A substantial practical component is envisaged whereby urban agriculturists could obtain practical skills: "... extension officers and horticulturists should assist farmers ... give hands-on assistance and demonstrations ...". Other services and assistance envisaged, included: "... advisory personnel ...".

Provision of extension services may enhance diffusion of indigenous knowledge, ideas and technologies and give rise to a synergy in knowledge and skills of both the farmer and the extension officer.

Access to water and water storage facilities

- Urban water is an expensive resource, resulting in restricted urban agricultural practices. Respondents indicated that: "... water or waste water, sewage and run-off water be made available to tenants ..." and that local governments should: "... provide water tanks for storage ...".

Table 3 Assistance by local governments regarding urban agriculture (n=250)

Category	Quantity %
Education and training	25.6
Extension	15.0
Access to water and storage	11.7
Funding and support	10.6
Infrastructure	9.8
Access to land	8.2
Marketing/markets	6.7
Recycling of urban wastes	2.8
Empowerment of communities	2.8
Security	2.3
Provide leadership	2.2
Enforce fines for littering	1.7
Nothing	0.6

According to Smit & Nasr (1992) nutrient-rich waste water provides a precious agricultural input. However, not all respondents were positive about using waste water and suggested " ... recycling training ...".

Funding and support

Initial funding for urban agriculture would be necessary in economically depressed sectors of the population. Respondents recommended that local governments : ... assist in obtaining sponsors, provide loans for fencing and food stalls, tools, seeds or provide seedlings at low cost ...". Others stated that "... support must be related to research and development needs ...".

Infrastructure

"City planners must provide the necessary infrastructure (water tanks, facilitation, engineering services, tools, fencing, irrigation systems) and incorporate it in the holistic planning of urban areas." Ways suggested of making this operational were to: "... appoint agriculturists to manage the process, establish a centre for implement hiring, provide seedlings, organic manure, water reservoirs ...".

Access to land

Respondents felt that this could be done by: "... reviewing land-use plans ..." and to "... zone more open space to make land available ...".

Marketing or markets

Marketing by local government could include: "... continuous advertisements on the importance of urban agriculture ...". Selling could be facilitated if "... open markets are built at a central place for community garden produce ...".

Recycling urban wastes

Respondents indicated that methods to "prevent wastage were to ... encourage recycling and to produce compost ..." According to May & Rogerson (1995) converting food waste into fresh food reduces food costs, improves the quality of food available, improves the environment, creates jobs and reduces municipal management costs.

Empowerment of communities

The main emphasis in this category was aimed at self-sustained development of the community to become self-reliant with the local government playing a facilitating role only when necessary: "... empower the community ... start the project and hand it over to the community ... promote a Kibbutz-type of farming system ...". Assistance could be given by involving outside developers and the private sector to support development" ... and to involve the community in: " ... participative decision-making ...".

Security

For urban farmers, security of produce is vital: their very survival is at risk. Respondents suggested that local governments should assist urban farmers seeking security by: "... protecting the allocated area ...".

Provide leadership

Some respondents felt that: "... an overall resource management system should exist to monitor the development ...".

Enforce fines for littering

Mega-cities of both the Third and the First Worlds, as well as smaller cities everywhere, are having increasing difficulty dealing with the problems of solid and liquid wastes (Smit & Nasr, 1992). "Fines should be paid for littering ...", was put forward by respondents as a solution to this problem.

Nothing

A minority of respondents indicated that local government should give no assistance to urban agriculturists and that it should be a "private initiative".

Table 4 represents responses on the main problems foreseen in urban agriculture.

The most important problem identified by the respondents involved: "... land ownership, lack of water and appropriate land or uneven distribution of available land ...".

Environmental problems that caused concern included: "... pollution ..." and "... untidiness ..." which might create "... health hazards...".

"Inadequate pest management practices" might lead to pests taking on epidemic proportions, especially when monoculture crops ("... over-production of a specific crop ...") were cultivated. According to Reijntjes, Haverkort & Walters-Bayer, (1994) increased use of pesticides and artificial fertilisers is causing environmental problems.

Respondents felt that: "... soil erosion, infertile soils, drought, the removal of indigenous vegetation and the wasting of resources ..." could lead to serious environmental costs for urban farmers. "... High urban population ..." could put pressure on the environment.

Rogerson (1992) sees the escalating levels of urbanisation, expanding populations and a declining ability of many countries to feed themselves, the supply of food for the urban populations of Africa no longer a matter that can be taken for granted.

**Table 4. Major problems foreseen in urban agriculture
(n=495)**

Problems	Quantity %
Lack of water and land	22.9
Environmental problems	16.4
• Pollution	
• Soil erosion	
• Inadequate pest management	
• Drought	
• High population	
• Monocultures	
• Removal of indigenous vegetation	
• Waste of resources	
Lack of training, knowledge and skills	13.7
Theft and vandalism	10.0
Lack of sustainable structures	6.9
No infrastructure	6.1
Lack of business skills and money	4.8
Inadequate marketing of products	3.6
Negative attitude towards urban agriculture	3.6
Lack of interest	3.4
Lack of efficient management	3.4
Conflict and disputes	3.2
Top down structure	1.4
Unrealistic expectations	0.6

Industry and growing populations will place heavy demands on water in and near big cities in the South. Sustainable water management for these areas will require re-using water, charging polluting industries for the costs of water pollution and improving government regulations

and then enforcing them (Holmberg, Bass & Timberlake, 1991).

"Removal of indigenous vegetation" might lead to invader plant encroachment.

Inadequate "knowledge and skills" and "theft and vandalism" might be the main reasons for poor crop production and tenuous food security in urban areas.

"A lack of sustainable structures" could give rise to "... poor community development". Respondents felt that the lack of infrastructure, which included "... services, legislation, equipment, and toilet facilities ...". could add to the problems.

Other problems that might arise were "... a lack of business skills and money ..." and the inadequate marketing of products: "... marketing of products needs to be addressed ...". Mention was also made of "... negative attitudes towards urban agriculture as a source of income ..." and "... a lack of organisation (management), experience, control and interest ..." as possible problems. "A top-down structure" with "... too much interference and resistance to meet new ideas ..." as well as "... conflict and a clash of interests between ratepayers and cultivators ..." and "... disputes about land and water ..." could also create problems. "... Unrealistic expectations ..." was of minor significance as a problem.

The main emerging categories and citations of views regarding the provision of water, recycled water and waste water for urban agriculture range from positive to cautious and a need for education, as indicated in Table 5.

Positive views were characterised by: "... incentives should be given for recycling water." ... "Fairly clean

recycled water can be used" ... "partially purified water is good for plant growth and inexpensive" ... "excellent, however routine health inspections are required." ... "Provide water catchment sites on road sides." ... "Use water from factories' cooling systems." ... "Create cultivation sites near sewage works."

Practical ideas from the respondents included: "... recycled water can be purified using algae or allowing it to flow through reed beds".

Table 5. Views regarding the provision of water, recycled water and waste water for urban agriculture (n=125)

Category	Quantity %
Positive	57.6
Cautious	38.4
Education	4.0

More cautious remarks included: "... recycled water is a health risk" ... "soil may be contaminated by soap water" ... "supply municipal water" ... "not a good idea to use waste water, use other methods of conserving water" ... or ... "collect water from roof tops, storm water and gutters in storage tanks or construct dams down slopes".

Remarks on education included: "... education is needed on what is suitable water and training is needed in the correct use of water ...".

Main emerging categories from responses on how urban wastes can be used for urban agriculture are indicated in table 6.

In table 6 the utilisation of urban wastes is ranked in order of importance. Most respondents (53.8%) indicated that organic urban waste should be used for compost-making and mulches, while (15.4%) suggested that glass, plastic, tins and papers be sold for recycling purposes and the funds plowed back into agricultural endeavors. Others (11.5%) indicated that rubble be used in trench gardens or permaculture practices and for drainage. According to May & Rogerson (1994) permaculture provides an example of affirmative action for sustainable agriculture, by basing its design around the needs and resources of communities, and by taking what is really useful in modern agricultural technology and weaving it together with traditional production systems.

Table 6. Utilisation of urban wastes for urban agriculture (n=78)

Category	Quantity %
Compost-making and mulches	53.8
Recycling for capital gain	15.4
Trench gardens and permaculture practices	11.5
Making of manure and fertiliser	9.0
Containers for vegetables or seedlings	6.4
Feeding livestock	2.6
Generating power/heat	1.3

Further suggestions (9.0%) included the production of manure and organic fertiliser from animal wastes, while (6.4%) suggested that old tyres and plastic Coke bottles

be re-used as containers for seeds and vegetable seedlings. Finally there were suggestions that urban waste be used for feeding livestock (2.6%) or generating power or heat (1.3%).

Figure 2 shows respondents' preferences for the utilisation of urban open spaces. The predominant preference was for growing trees (21.0%), which included fruit trees (11.9%), trees for wood (8.6%) and indigenous trees (0.5%). This was followed by vegetable growing (18.9%), parks (13.5%), sports (10.3%), growing medicinal plants (9.2%), flowers (9.2%), community farms (8.1%), and the planting of herbs (5.9%), kiosks (3.2%), while hiking trails (0.5%) were less favored.

Possible reasons why trees were favored most, could be the domestic usage's of fruit and wood or their selling potential, while indigenous trees could be grown for their seed in order to propagate young trees to be sold to nurseries or the public. However local governments should take note of the fact that 75.7% of the preferences included food and business purposes as opposed to the 24.3% preference for recreation.

Figure 2 indicates respondents' preference for urban open space utilisation.

Areas identified by the respondents that could be used for urban agriculture are listed in Table 7.

Respondents identified servitudes and unused areas in and around cities as the most important areas for urban agriculture. Servitudes indicated, included those areas under power lines, next to pipelines, roads and railway lines.

Table 7. Suggested areas to be used for urban agriculture (n=329)

Suggestions	Quantity %
Servitudes	29.0
Urban open spaces	23.8
Public areas	12.5
River banks or flood line zones	8.2
Private gardens	7.6
Parks	6.4
Rubbish and mine dumps	6.1
Sewage works	4.9
Natural areas	1.5

These were followed by urban open spaces which included unused areas in an around the city, buffer strips and roof tops.

Then followed land around public areas, including schools, clinics, hospitals, children's homes, prisons, golf courses, airports, old age homes, churches, factories, libraries and cemeteries (for growing flowers only).

River banks and flood line zones (8.2%), private gardens and plots (7.6%) and parks (6.4%) were favored over mine dumps and rubbish dumps (6.1%), sewage works (4.9%) and natural areas or greenbelts (1.5%).

Mine dumps however should not be considered for food production, due to toxic wastes and the low pH of the soil.

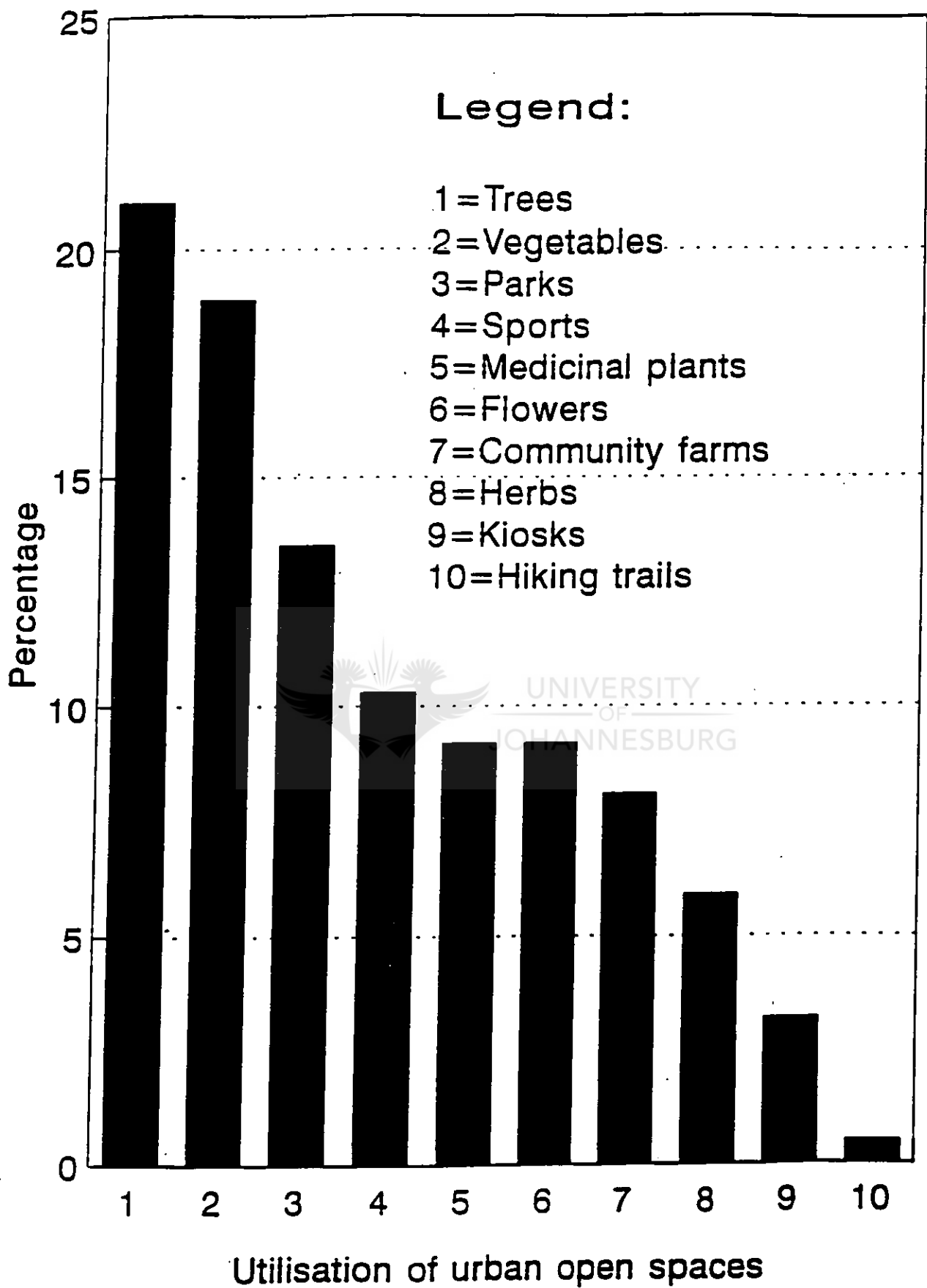


Figure 2. Uses of urban open spaces

According to May & Rogerson (1994) a wide range of crops are already cultivated on the fringes of South African cities. This is indicative of the wide range of potential areas that can be used for this purpose.

5.3.5 Conclusions

The fact that the majority of the respondents were unsure about the size of land to be allocated per individual for urban agriculture, may be indicative of their lack of experience in this regard. According to Rakodi (1985), the average plot size of a low-income households in Zambia is between 25-30m².

Opinions differ on the sustainability of certain plot sizes. More research is necessary to determine the carrying capacity of a specific plot, taking into account the type of agricultural practices and crops it is intended for, their production cycle, nutritional value, customer demand, methodology of cultivation or production, soil potential, availability of water and productivity.

The most important policy for local government to consider regarding urban agriculture is access to land, followed by control and management, sustainability and education and training. Other researchers have arrived at similar conclusions. According May & Rogerson (1995) access to land is the major issue among groups of South African farmers interviewed near Durban, Johannesburg and Umtata

The most important recommendation for assistance by local governments regarding access to land is to make land available at low cost, granting or long-term leases to responsible and successful farmers. The second most important recommendation regarding assistance in obtaining

land, is directed to town planners, urging them to proactively incorporate land for urban agriculture in their plans and to consult with the communities on this issue.

Obtaining a secure title to land was also a problem identified by farmers researched by May & Rogerson (1995). Local government should therefore give serious consideration to this constraint, as continuous removal of people from cultivated land cannot be conducive to productivity or initiative.

Local government should provide assistance, giving high prominence to access to land, development of a basic infrastructure and the provision of extension services, followed by financial assistance.

This trend is echoed by May & Rogerson (1995) who report that finance, machinery (infrastructure) and transport are problems, other than land issues, that cultivators experienced.

On the question of assistance by local governments regarding urban agriculture, education and training emerged as a top priority, followed by access to water, funding and the necessary supportive infrastructure.

According to the respondents, the main problems in urban agriculture that cultivators could encounter are lack of water and appropriate land and land ownership, followed by environmental problems, lack of knowledge, training, extension and problems of theft and vandalism. Crop security, vandalism and support services with a top-down nature were problems identified by communities researched by May & Rogerson (1995). It seems as if a participatory approach needs to be adopted in education and training programs with extension officers becoming facilitators rather than acting as pedantic technical experts. Ac-

According to Auerbach (1995) a systems approach, using participatory methods can lead to more sustainable and productive usage of resources, in dealing with the real problems of people.

The majority of respondents (57.6%) held the opinion that fairly clean recycled water could be used for urban agriculture, while others (38.4%) were cautious about the use of waste water due to health risks and suggested other ways of conserving or cleaning water. The rest (4.0%) felt that more education was required in these matters.

Urban agriculture should be seen by local governments and policy makers as action steps towards sustainable cities with the concomitant improvement of socio-economic conditions of the urban poor without environmental degradation. According to Drakakis-Smith, Bowyer-Bower & Tevera (1995) a set of recommendations are needed through which local and national governments can co-operate with producers and retailers to maximize the social benefits of urban agriculture and minimize environmental concerns.

Urban agriculture should be instrumental in securing income, recycling wastes, conserving natural resources, reducing reliance on chemical pesticides and promoting integrated pest management strategies. It should be used as an educational tool in health or nutritional, environmental and sustainable agricultural programmes.

Policies concerning sustainable urban agriculture as well as assistance by local governments in this regard, need to be addressed. Cognisance should be taken of possible environmental and other problems that may be encountered in practising urban agriculture. A sound infrastructure should be constructed to accommodate cultivators and to utilise urban open spaces to the benefit of the community and the environment. According to May & Rogerson (1994)

the environmental benefits of urban agriculture are nullified if social and economic changes in favour of local communities are not made. Zoning for urban agriculture should be proactively planned and suitable areas identified.

A participatory approach should be followed, which translates into ownership of entrepreneurial and cultivational ventures of the community, facilitated by local government and educational strategies.

Where this research focused mainly on the role of local governments' assistance in establishing an infrastructure for practising sustainable urban agriculture, further research would be required into the content for a course in urban agriculture, aims, learning experiences, learning opportunities and ways of evaluation to ensure suitable vocational education and training for the trainer of future urban agriculturists.

It is envisaged that the end result of all these endeavors will lead to sustainable urban farming which converts urban wastes and open spaces into work opportunities, food and an improved environment.

5.3.6 Acknowledgments

My sincere thanks to Dr Louise Botha and Ms Isabel van Aswegen (Directorate Research Technikon SA, South Africa) for their assistance with the questionnaires. This paper greatly benefited from suggestions made by Dr Ann Müller, research consultant (RAU, South Africa), and language editing done by Mr Alex de Bruyn, (Language Services: Directorate, Technikon SA.).

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5.4 CURRICULUM GUIDELINES FOR A DIS- TANCE EDUCATION COURSE IN URBAN AGRI- CULTURE BASED ON AN ECLECTIC MODEL

5.4.1 Abstract

Research was conducted involving the learners, community, agricultural industry, the subject science, environmental education and distance education as the main sources of change influencing this curriculum. The research design in this qualitative study is exploratory and descriptive in the field of urban agriculture, directed at the training of trainers of urban farmers. Major philosophies influencing the curriculum are pragmatism and existentialism, while the dominant educational philosophies are progressivism and reconstructionism. The semi-structured group inter-views consisted of potential learners, members of the community and employers in the agricultural field. Respondents were asked for their views on the

aims, learning opportunities and experiences, content and evaluation of the course. The data was content analysed and compared with literature findings. The most important results indicated that the course should be aimed at socio-economic empowerment, based on sustainable ecological-agricultural principles, an interdisciplinary approach, and competency through development of practical, problem-solving and critical thinking skills.

Urban agriculture, as defined by respondents, is not only predominantly about food production in cities but also includes diverse, productive and sustainable utilisation of urban open spaces. The ultimate goal is to empower the poor sections of the ever-increasing South African urban community with knowledge and skills, enabling them to utilise available urban resources to improve their socio-economic conditions.

A specific curriculum approach entailing new aims and actions is required to accommodate change in an urban society that has accelerating socio-economic and environmental problems, including exhaustion of natural resources and unsustainable farming practices.

This course is aimed at training the trainer in urban agriculture and is based on an eclectic curriculum design model as shown in Figure 1. Eclecticism does not represent a single definitive design but draws on elements of several designs (Longstreet & Shane, 1993). A reflective eclectic curriculum design is chosen because it can respond to different sources of change in meeting new needs, values and challenges of the present and future society. Thoughtful compromises between several design types, mainly learner-centered and problem-centered designs, are tailored to be effective and meaningful in meeting the needs deriving from the sources of change, as

indicated in Figure 1.

The idea of eclecticism is founded on a set of philosophical premises about the nature of humankind, of knowledge and of the ultimate goals of life - premises that distinguish eclecticism from other philosophies underlying curriculum designs (Longstreet & Shane, 1993).

In a democratic, pluralistic society where knowledge is rapidly changing, a flexible design with its own premises and aims needs to be established. The practice of democracy would not be possible without the reflective operations of eclecticism (Longstreet & Shane, 1993).

Major philosophical bases

The major philosophies influencing this curriculum are pragmatism and existentialism, and to a lesser degree realism.

Pragmatism construes knowledge as a process in which reality is constantly changing (Ornstein & Hunkins, 1988). Learning may be stimulated by problem-solving activities requiring critical thinking and the integration of different subjects and situations.

An extensive practical component is envisaged for the course, whereby students will actively solve practical problems, discovering their own truth and solutions to prepare them for real situations in a changing environment.

Ornstein & Hunkins (1988) state that existentialist philosophy stresses individualism and personal fulfillment through the confronting of situations in which a choice must be made.

This allows students the freedom to choose from available learning opportunities to obtain the knowledge they need. In practice students will have to discuss their problems with their mentors or people in the agricultural and horticultural industries, and then choose the practical solution or product that will solve their problem or meet their situation. This freedom of choice will encourage creativity, self-actualisation and responsibility, which are inherent in a learner-centered design.

This curriculum is to a lesser extent influenced by realism. Ornstein & Hunkins (1988) state that realists view the world in terms of material objects and come to know the world through their senses and their reasoning faculty, and they believe that reality and truth are reflected in both science and art. This view undergirds the curriculum proposed here, but the realist idea of the curriculum as consisting of clearly separated subjects cannot be supported.

Influence of educational philosophies

The three educational philosophies influencing this curriculum are progressivism, reconstructionism and essentialism. Both progressivism and reconstructionism have their roots in pragmatic philosophy. According to progressivist thought, learning is achieved through problem-solving methods and scientific inquiry; in addition, learning experiences should include cooperative behaviors and self-discipline, both of which are important for democratic living (Ornstein & Hunkins, 1988). Progressivism's contribution to this curriculum is its interdisciplinary and problem-solving approach in preparing students for a changing world.

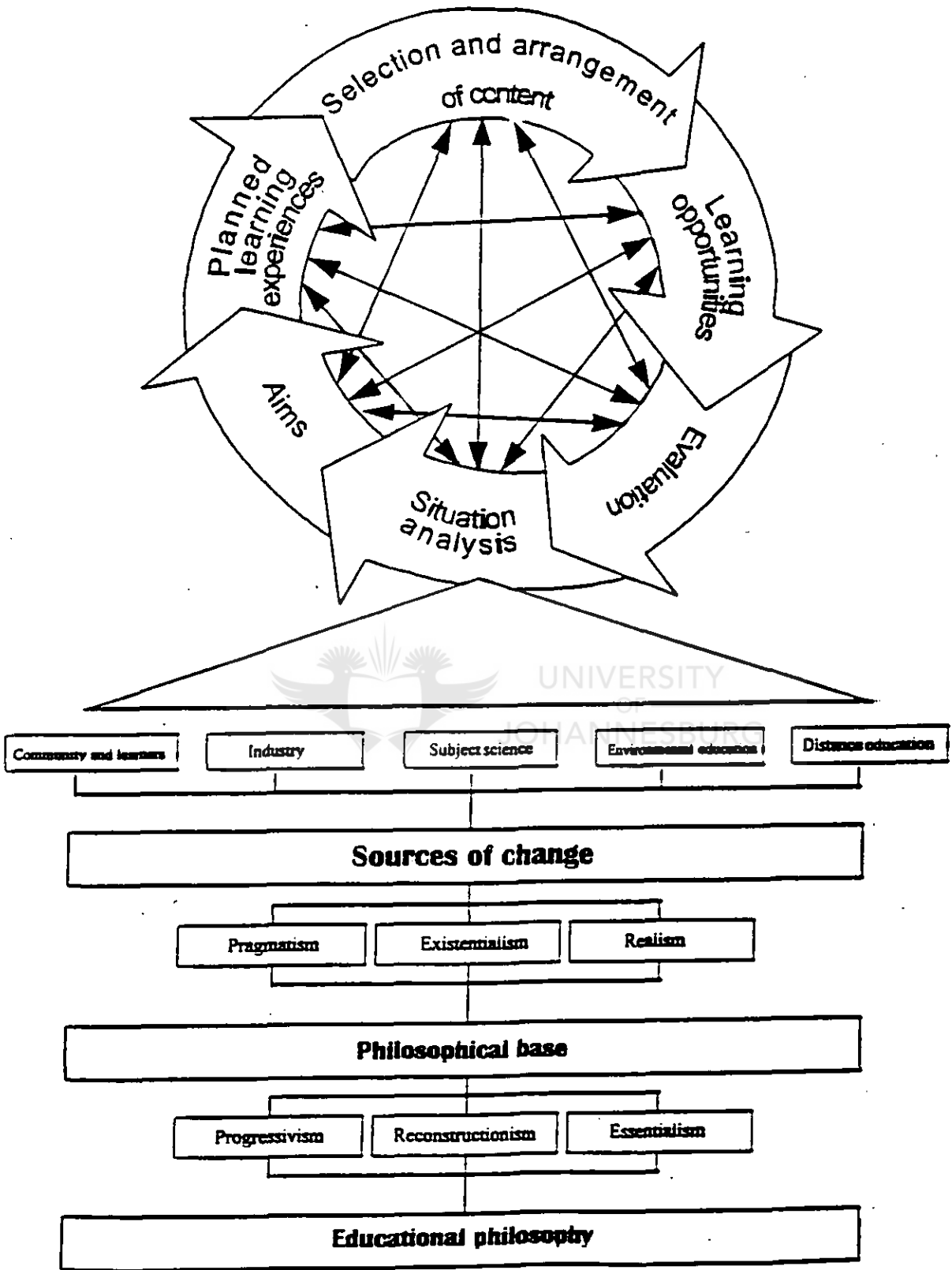


Figure 1. An eclectic curriculum model for Urban Agriculture

Reconstructionism influences this curriculum not only for having its roots in pragmatism but also for its human-centredness.

Reconstructionists hold a utopian vision of a just society in which all members contribute to the benefit of the group and thus to each other (Longstreet & Shane, 1993).

The only contribution of essentialism in this curriculum is its view that only the essentials needed for the course should be included, emphasising the basic ability to think, reason and solve problems:

Definition for the curriculum

Any definition of curriculum will vary according to the purposes which are to be accomplished (Zais, 1976). This curriculum can be viewed as a democratically conceived plan for learning and training. It includes all the vocational experiences acquired under the guidance of the distance education institution of learning and its cooperative partners in industry, as well as a decentralised learning and delivery system. It aims to structure learning outcomes by using democratically selected content, learning opportunities, didactic strategies and methods for evaluating learning outcomes. In this regard the requirements of the community, the agricultural industry and the distance education institution are critical.

Sources of change influencing the curriculum

The main sources of change, as shown in Figure 1, are the community and learners, employers in industry, the subject science, environmental education and distance education. As stated above, a curriculum must be dynamic in its approach and be able to meet the new needs, values

and challenges of a present and future society. This flexibility allows it to remain relevant and responsive to continuous changes not only in knowledge but also in the political, social, economic and agricultural fields, and adds value to students and the community it serves.

The community, learners and employers were instrumental in developing curriculum guidelines that emphasise democratic participation in decision-making to cater for new needs.

Purpose of the study

The purpose of this research was to develop curriculum guidelines for a distance education course in Urban Agriculture. The aim of the course is to empower urban farmers with the necessary education and skills and to convert urban open spaces into job opportunities. This will help to eradicate poverty and poor nutrition, and to provide a better quality urban environment based on sustainable agricultural practices. This translates into the ultimate goal: social, environmental and economic sustainability.

5.4.2 Method

Overview

This qualitative research study can be described as exploratory and descriptive. A qualitative study reflects an inductive, emerging design (Creswell, 1994). Therefore contextually-bound categories emerge from the respondents' data at the end of the research, after content analysis has been done.

The validity of the content analysis may be influenced by (1) the appropriateness of the categories to the data; (2) usefulness of content analysis categories; (3) relevance of the categories to the research question; (4) clarity of the categories (Wilson, 1989).

Data was compared with existing literature to ensure congruence, and this verified the data's validity and appropriateness. Results were compared with those of an independent coder for confirmation of usefulness. Categories were pertinent to the study and reflected its purpose. The clarity of the categories is reflected in the citations that support them.

Reliability implies that a particular technique would, if repeatedly applied to the same object, yield the same result each time (Babbie, 1990).

The data in this study converged to a large extent, confirming its reliability. Reliability of content analysis was addressed by using two independent coders who compared the data item by item and reached agreement on the congruence of the emerging categories.

The use of multiple analysts provides an opportunity to assess the reliability of coding, at least with respect to major themes and issues (Steward & Smadasani, 1990).

Participants

The sample size is not the determinant of research significance in a qualitative study; the major concern is information richness (Crabtree & Miller, 1992). This non-probability sampling method was purposive and convenient. The sampling population consisted of purposefully selected community leaders and community members, employers in the agricultural and horticultural industries,

lecturers at a distance education institution, and students and trainers in agriculture. The participants were selected because of their relevance in representing the target population in this study as well as being the elements of change. Other reasons were convenience of distance, availability and willingness to participate. Their opinions were considered germane for this exploratory purpose.

The number of participants varied from 6 to 12 per focus group session.

Procedures

Six semi-structured interviews or focus group sessions of 1-2 hours each were conducted from April to July 1996, with the researcher as the primary instrument for data collection and analysis. This inductive mode of the research process leads to theory being discovered, resulting in an emerging or evolving design. In the inductive model of thinking, a theory may emerge during the data collection and analysis phase of the research or be used relatively late in the research process as a basis for comparison with other theories (Creswell, 1994). At each session the participants were seated around a table to allow informal communication, and they were informed that the conversations would be tape-recorded.

Interviewing continued until data saturation occurred; that is, when emergent themes became repetitive. Focus groups were chosen to allow individuals freedom of choice based on democratic principles. Morgan (1984) found that focus groups provided an opportunity to ensure that the respondents' own thoughts and theories about a topic receive fair weight in comparison to hypotheses derived from prior theory and research.

A pilot study was conducted in April and May 1996 which included 3 semi-structured group interviews of 2 hours each. The reasons were mainly to test the researcher's questions and interviewing style and to see whether it would produce the kind of answers that could add value to the study.

Three follow up sessions were conducted in July 1996 using an independent, experienced moderator. These 3 focus groups formed the main body from which the major categories were generated. Data from the pilot study were used as collateral to add to, and indicate saturation of, the main three. Citations were taken from all 6 focus groups to strengthen the methodological rigor.

A protocol was used which included 6 questions and the research purpose. The following questions were asked:

1. What do you understand by the concept of urban agriculture?
2. What specific outcomes would you envisage in a curriculum for Urban Agriculture?
3. What do you think should be the content of a course in Urban Agriculture?
4. What learning opportunities will be suitable for the course.
5. What learning experiences do you think should be actualised by the learner?
6. How can effective assessment be achieved?

Participants were not informed before the time about the specific topics to be discussed but only about the general field of discussion. As introduction, respondents were asked what they understood by the concept of urban agriculture. Questions 2-6 were based on a model for curriculum design suggested by Krüger (1980). This model consists of a cyclic arrangement of the components, which

include a situation analysis, aims, planned learning experiences, suggested learning opportunities, selection of learning content and evaluation.

In Question 2 respondents were asked to indicate the aims they envisaged for a curriculum in Urban Agriculture, the content they regarded as most suitable for the course, the learning opportunities and experiences they envisaged as suitable, and how the effectiveness of the curriculum should be evaluated.

The moderator's task was to encourage all members in the focus group to participate in conversation, and to sum up their contributions before going on to the next question. Probing was done to elicit further discussion, especially in cases where more clarity and explanation were required.

Analysis of data



All the audiotaped interview responses from all focus groups were transcribed verbatim. The tape-recordings were kept for reference purposes. The unstructured, exhaustive themes or data from the transcribed recordings were coded by the researcher and an independent coder. Content analysis on the data was done according to Tesch (1990, as described by Creswell, 1994). Data was independently classified into categories and compared, with over 90% agreement.

Pertinent citations from all groups were included under each category. Saturated categories from the research data were compared with literature.

Research findings from the textual data were interpreted and structured to give form to the descriptive, emergent

product in the final text.

Internal validity was ensured through triangulation, by using various information sources, different moderators and coders. The rationale for this was to search for convergence in data. This accords with the qualitative research practice of using various sources of descriptions of the same event - that is, the use of data triangulation (Denzin, 1978, as referred to by Polkinghorne, 1994).

Reliability was evidenced in that thematic constructs occurred repeatedly throughout different focus group settings. The protocol used in data collection ensured replicability of questions in each focus group session.

5.4.3 Results and Discussion

The results from the main 3 focus groups will be discussed in terms of the emerging categories and will be substantiated by verbal citations from all 6 focus groups.

Respondents from all 6 focus groups felt that urban agriculture was not only about food production in cities but also about the sustainable, diverse utilization of urban open spaces. This included horticulture, agro-forestry and agriculture (animal and crop production). It was also seen in terms of sustainable development aimed at uplifting the socio-economic conditions of the urban communities without harming the environment. Categories and citations are shown in Table 1. Drakakis-Smith, Bowyer-Bower & Tevera (1995) recommend that much more positive and supportive policies be adopted for urban agriculture as a way of moving towards more sustainable cities in which waste may be recycled, environments improved, em-

ployment created, and health improved.

The following literature appears to support the respondents' views: According to Sanyal (1987), urban cultivation is probably the most important to the urban poor since it provides food - the basic necessity of life. Fien (1993) sees sustainable development as inter-locking environmental, social and economic sustain-ability.

Table 1. - Respondents' concept of urban agriculture

Category	Citation
Urban food production	"Production of food within the urban environment." "Agricultural mode of production in cities."
Diverse utilization of urban open spaces	"Utilization of land for flower production, agroforestry, livestock, bees." "Productive use of urban open spaces for herbs, medicinal plants and vegetables."
Sustainable development	"Sustainable agriculture." "Production for self-sustenance, while protecting soil fertility." "Grow and sell to the community."

Aims and objectives

The aims and objectives envisaged in a curriculum for Urban Agriculture are encapsulated in Table 2.

Wheeler (1983) sees the criteria for educational aims as consistent with human rights, democratically oriented, socially relevant, tending to the satisfaction of personal needs, and balanced.

A recurring theme throughout was to produce a practically competent person with critical thinking and problem-solving skills: "... to be skilled in propagating methods, practices and problem-solving techniques ... to be able to think critically and find solutions in a creative way ... to have practical skills and knowledge to demonstrate techniques ...". This is supportive of the pragmatist aim of teaching the learner to think critically.

Urban agriculture should lead to socio-economic empowerment of the community. This was a very strong emerging aim identified by all the groups: "... to uplift and feed families and obtain an income ... with the certificate they can apply for jobs ... to create job opportunities ... to create a communal spirit ... to improve human conditions, poverty and health ... to promote community responsibility, expose the sharing vision of communal living; improve the quality of life and community integration ... the community must be motivated to become self-sufficient ...". This is substantiated by Smit & Ratta (1992) who regard urban agriculture as a powerful and sustainable tool for reducing hunger and poverty by providing the poor with the capacity to feed themselves and to generate income. Indeed, the major advantage of urban agriculture is seen in its potential to improve the socio-economic situation of the poor (Rogerson, 1992).

Table 2. - Aims and objectives envisaged in a curriculum for Urban Agriculture

Aims	Educational objectives
Competency	Practical skills
Socio-economic empowerment	Thinking skills
Environmental conservation	Knowledge
Infrastructure and support service	
Entrepreneurship (Small business)	
Integrated course	
Open access and cost effective	
Appropriate level	
Flexibility	
Experiential	



Aims supporting environmental conservation were characterized by clear statements on waste management and the protection and conservation of natural resources: "... to protect the environment ... to realize the scarcity of water ... to prevent soil erosion by covering the topsoil with vegetation ... to recycle waste products which can

be sold again ... no one should dump rubbish, they should manage it, based on permaculture principles ...". A similar vision was found in the literature. Educators and researchers must cooperate in order to explore and produce curricula that will effectively address the needs of our nation in the reduction of solid waste and the consumption of natural resources (Boerschig & De Young, 1993).

Respondents envisaged that the curriculum would be aimed at stimulating entrepreneurship: "... to stimulate small business farming ... there must be a career path for going into commercial farming ... create own jobs ... to farm with chickens for eggs and manure to sell and goats for meat and milk ...".

The respondents considered the provision of an infrastructure and support services to be important aims for the sustainable practice of urban agriculture: "... town councils must provide useful land to practise urban agriculture ... there must be support services that go with it ... trainers must show farmers how to use practical guides, give advice and assistance ... local government must provide amenities ...".

Similar aims are envisaged by Smit & Ratta (1992) who state that more site-specific information and analysis of urban agriculture's practice and impact are necessary, followed by a planned programme to address the obstacles hampering growth and success. They recommend that an international networking system for exchanging information and technology would be of immense benefit to urban agriculture.

Respondents envisaged that the curriculum should provide an interdisciplinary course with a comprehensive, holistic approach to urban agriculture: "... it must be aimed

at everything from animal husbandry to agricultural production of food ... integrate it with environmental education, permaculture and agriculture ... integrate agriculture with finances, costing, communication, personnel management, marketing and environmental conservation practices ... take from various applicable instructional offerings or subjects ... to integrate horticulture, agriculture and nature conservation ...". This view is compatible with progressivist thought. For Dewey and other progressivist thinkers, the curriculum was interdisciplinary in nature, and books and subject-matter were part of the learning process rather than sources of ultimate knowledge (Ornstein & Hunkins, 1988).

The idea that the curriculum should aim at open access to all and be cost-effective was clearly expressed: "...it must be a 1-year short course and not be excessively expensive ... allow open access to all ... to allow the student entrance to other courses in Agriculture or Horticulture, receiving credits for modules passed ... give recognition for prior learning ...".

Snyman (1993) proposes a low-cost, interactive education and distance training model for South Africa via television, as this training system has been very successful world-wide for adult education and training, literacy upgrading and vocational training.

Respondents envisaged the course as being at an appropriate level: "... it should be a grassroots level course ... it should be very basic ...". They felt that the course should be aimed at flexibility: "... to allow for multiple entrance to other courses ... to create opportunities ... to accommodate adult basic education ... students must work at their own pace which the distance model amply allows, and training must not interfere with their social activities ... Urban Agriculture could be

divided into 3 integrated modules ...". Rowntree (1994) states that learner-centred aims in open learning could be pursued in community development projects, and that self-study materials could contribute to openness by enabling learners to study when and where they choose and to work at their own pace. Flexibility is intrinsic to the design of modular structures and is also an aspect of access, in that the student is offered many entry points to study and accreditation in the movement away from the traditional academic year (Nasta 1994).

Respondents visualised the curriculum as being aimed at experiential training based on sustainable practices: "... it should be experiential ... work within a particular community to ensure that urban open spaces are managed as a sustainable, responsible biodiversity ...".

The following literature appears to support this: Basu, Chantrill & Kashiwagi (1993) believe technical and vocational educators can play a key role in building indigenous capacity for sustainable development. They are training technicians who will be directly involved in industrial and agricultural production and who will ultimately implement more sustainable practices.

Educational objectives identified by the respondents include knowledge, practical and thinking skills: "... give people knowledge of how to grow certain crops specific to their area ... knowledge of organic gardening and compost making ... knowledge of herbs for medicinal purposes and cooking ... knowledge of pest management ... knowledge of agricultural farming ... knowledge of endangered medicinal species ... to produce a person skilled in hand crafts ... to develop critical and creative thinking ...". Zais (1976) points out that in terms of Bloom's (1956) taxonomy, knowledge and problem-solving are educational objectives of the cognitive domain, and

motor skills of the psychomotor domain.

Content for a course in Urban Agriculture

The respondents were asked what content they regarded as suitable for the course.

Criteria for selecting content were based on the curriculum aims and the respondent's recommendations of appropriate content for this course. Curriculum planners will want to select the content that is most effective and efficient in realising curriculum aims (Zais, 1976).

Respondents specified competency and a modular-based integrated Urban Agriculture course. The emergent categories of content are encapsulated in Table 3: "... there must be a choice ... content must be modular ... students should be able to select either Crop Production or Animal Husbandry ...".

The category Ecological Agriculture included a wide selection of content, chosen for its relevance and usefulness to the learner, community and employer. Zais (1976) identifies accepted standards for content selection to include (1) significance, (2) utility, (3) interest, and (4) human development.

Citations supporting Ecological Agriculture and its sub-categories include: "... organic and bee-farming for natural pollination of fruit trees and agricultural crops ... ecological farming ... agroforestry ... plant production, medicinal plants, vegetables, herbs and ornamentals trees, small animal production (poultry, rabbits, fish) based on permaculture practices ... pest management should include natural remedies to control insects, diseases and weeds ... use intercropping practices to control pests ... good soil preparation, composting and

mulching ... earthworm production ...".

In practice, diverse urban agriculture systems could form synergies whereby waste products of one system could be utilized in another. These sustainable permaculture principles are well documented in literature. Permaculture seeks to turn all inputs into products. Instead of allowing rain water to become soil-eroding run-off, it is collected to replenish ground water supplies. Animal manure is used as fertilizer, reducing reliance on chemicals to pollute waterways causing eutrophication (Johns, 1992).

Sustainability involves replenishing renewable resources such as soils threatened by erosion, drought or over-cultivation, and conserving non-renewable resources through recycling, increased productivity or product re-design (Blowers 1993).

Sustainable pest control strategies should include cultural, biological and physical control, rather than chemical control. Symptoms akin to those of myalgic encephalomyelitis have been linked to chronic exposure to vegetables treated with organophosphates (Purdey, 1992).

Respondents envisaged a major practical component for this course, as specified in Table 3. A practical guide addressing the specified practices and techniques should be developed as a total package together with the 3 modular study guides.

Respondents indicated that urban farmers should have knowledge of business management: "... include small business and a small amount of finance management ... budgeting ... entrepreneurial skills ... simple book-keeping ... personnel management ... marketing ... commu-

nication ...".

Table 3. - Categories of content and practical component for a course in Urban Agriculture

Module	Category of content and subcategories	Practical component
1	Ecological or Sustainable Agriculture - Permaculture and Organic Farming - Plant Production (elective) - Animal Husbandry (elective) - Sustainable Pest Management - Sustainable Soil Management	- Harvesting and post-harvest techniques - Compost making - Permaculture practices - Crop and animal production techniques
2	Business Management - Small Business Skills - Marketing - Personnel Management - Communication	- Soil preparation - Community involvement - Agroforestry methods
3	Environmental Education - Conservation - Pollution Control - Recycling - Health Care and Population Control - Aesthetics	- Earthworm production - Water conservation techniques

- Crop rotation practices
- Intercropping techniques
- Presentation skills
- Using audiovisual equipment in training

Technical and vocational education students should be exposed to environmental education because they can help protect the environment through their actions in the workplace (Basu, Chantrill & Kashiwagi, 1993). This statement, together with the aims of the course based on socio-economic and conservation concerns of respondents, demonstrates the importance of Environmental Education: "... content should include environmental aspects ... water and soil conservation ... recycling of organic matter ... appreciation for the environment ... rapid urbanization places pressures on the urban environment ... health aspects ... nutrition ... address air, soil and water pollution ... a holistic, integrated approach is necessary as urban agriculture is practised in an ecologically sensitive environment; one link in the chain affects all the others ...". Sustainable development means human development which is ecologically, socially and economically sound, and can be maintained over the long term (Basu, Chantrill & Kashiwagi, 1993). Viewpoints on sustainability also include aspects on health as illustrated in literature: Sustainability should be a means of meas-

uring the health of farms and their systems. These include: systems that improve and maintain soil productivity, quality and tilth; and systems that meet the needs of farming families for energy, health and well-being (Kiragu & Goode, 1990). Respondents also felt that "improving the environment could contribute to its aesthetic appearance".

Learning opportunities for the course

Categories of learning opportunities, as shown in Table 4, evolved from analyses of answers to the question: "What learning opportunities should be made available for the students to enable them to learn?"

Respondents felt that practical exposure to the agricultural industry, business and community farms would benefit students' careers: "... Identify centers nearest to students where they can get practical exposure and advice ... after completion of one module, students should be exposed to and shown practical skills ... exposes them to work done by agricultural extension officers ... local governments must develop an area which will serve as a model to train students for 3 months in urban agriculture, specifically what to do on a small area ... local governments can act as partners with academic institutions or the community and allocate areas and facilities where training can take place ... involve the private sector and other communities in sharing skills ... students can be taken to secondary business systems, charcoal or furniture manufacturers to show them another facet in the economy, from urban agriculture to a full-scale economy which may lead to the import and export trade ... make use of research institutions' infrastructure and facilities". Organize visits and short courses to training centers and markets ... arrange two- or-three day practical sessions or visits to community or experi-

mental farms to teach them how to apply their knowledge ...".

Respondents indicated that business skills could assist students in understanding the economy: "... showing students how different business systems operate could help them understand the economy ... exposing students to market demands could help them to produce according to the needs of the people ...".

The respondents considered practical assignments to be good learning opportunities that would contribute to vocational experiences: "... give hands-on training projects ... students must do practical projects on what they are learning ... let them erect structures or hothouses using plastic sheeting and sticks or iron to grow throughout the season ... give them practical assignments on organic farming, composting, raising seedlings, planting vegetables, herbs and fruit ... students can be asked to do practical training on a community farm to gain work experience in this field ...".

Providing training and support services creates learning opportunities contributing to work experience and benefiting the community: "... erect greenhouses for training and to generate seedlings to supply the community ... government structures can be used or hired to train students in seedling production ... students can draw from the knowledge of research or experimental farms ... compile a step by step manual using sketches and good explanations...".

Table 4. - Categories of learning opportunities and experiences

Learning opportunities	Learning experiences
- Practical exposure	- Practical work and projects
- Practical assignments	- Experiential learning opportunities
- Training and support services	- Community involvement
- Media, audio-visual aids	- Critical thinking and problem-solving skills
- Contact sessions	- Communication and presentation skills
- Basic business skills	

Respondents regarded media and audio-visual aids as learning opportunities with wide application: "... teaching can be done on tapes, because you can target a bigger section of the community and not only people who are literate ... at community centres students can be trained to use TV and video tape-recorders, or to get access to teletuition and telecommunication via satellite ... video, radio and slide shows or tape-recordings can guide students step by step ...".

Contact sessions were seen as learning opportunities to gain expertise: "... arrange contact tuition on a monthly or quarterly basis ... involve industry to give practical guidance and advise students ... arrange workshops and demonstrate how to do practical experiments ... teach them communication skills, transfer of skills, and how to use visuals as a form of communication ... student farmers in the same region should form cooperatives and jointly gain expertise by specializing in growing certain crops suited to the area, and during contact sessions draw information from each other ... contact sessions can lead to information exchange or community networking...".

Wallace (1985) supports these learning opportunities, stating that any curriculum which embraces vocational considerations will include: (1) work experience; (2) industrial visits; (3) careful vocational guidance throughout the course; (4) problem-solving and the practical application of skills and knowledge; (5) a relationship between the course and employment opportunities.

Learning experiences for the course

Respondents were asked to indicate what learning experiences they considered students would need to make use of to master the content of this course. Emergent learning experience categories from analyzed data are shown in Table 4. Respondents pointed out that learners should use learning opportunities to acquire learning experiences: "...the course must be interesting, and teach students to become creative, make sensible decisions and think about ways to improve the trade ... students should complete projects and make use of opportunities created for them ... students should grow their crops and learn what they have done wrong ...".

Respondents regarded critical thinking and problem-solving as important skills for students to develop: "... students use their own initiative in conveying skills and knowledge to the community ... students must be able to draw their own conclusions and know what differences are significant and how to interpret the differences ...".

In addition, by being involved in community projects "... students could establish a community garden themselves ..." and "... share indigenous knowledge about the elements or predictions of rain or other environmental conditions with students or colleagues ...".

Respondents felt that students should use or develop critical thinking and problem-solving skills: "... send students a product, such as a packet of seeds, and let them use it creatively in a research or practical project which will be evaluated ...".

Respondents indicated that presentation and communication skills are important learning experiences when working with communities: "... students should communicate with the community, especially using visual presentations ... students must be able to prepare a project proposal ...".

Evaluation

Respondents' views on how the effectiveness of the curriculum should be evaluated are shown in table 5.

Various methods of curriculum evaluation were suggested. Evaluation serves to identify the strengths and weaknesses of the curriculum before implementation, and the effectiveness of its delivery after implementation (Ornstein & Hunkins, 1988).

Table 5. - Curriculum evaluation

Category of evaluation

Competency-based

Formative

Practical examination

Oral examination

Self-evaluation

Assignments or projects

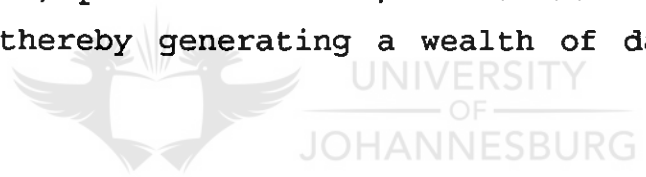
Summative

Participants of all the focus groups unanimously agreed that curriculum evaluation should be competency-based: "... evaluate whether the basic product has increased due to the educational and hands-on experiences that they have been practising in their areas ... if they can produce what they have been taught, they are competent ... look at how the students have performed their tasks and how that has benefited the community's living standards ...".

Respondents considered formative evaluation as a means to give continuous guidance on the effectiveness of the curriculum: "... the students can measure themselves continuously while doing projects ... students are evaluated on the job to establish whether they understand concepts learned and can apply them ... a continuous follow-up to ensure that they are conversant with urban agriculture and are empowered, and that the objectives of the course have been achieved ... it has to be an ongoing process of evaluating the projects on a regular basis to determine whether people have been successful or not ...".

A practical examination featured strongly as a way of evaluating the functionality of the curriculum: "... there must be a practical-based evaluation ... evaluate reports on practical results obtained ... give them a practical problem to solve ... students learn by doing and using their own imagination and should do a practical examination ...".

Some suggestions indicated that an oral or self-evaluation would suffice: "... think of an oral evaluation, not necessarily a written examination ... students must be able to sit back and look at their results, analyse and evaluate them and propose corrective steps ...". Reijntjes, Haverkort & Walters-Bayer (1994) agree, suggesting a village-level evaluation where each farmer reports on a wide range of criteria, including yield, taste, drought, pest resistance, conceivability and marketability, thereby generating a wealth of data and information.



Respondents also recommended that: "... students do assignments or projects, for example establish a community garden and see how much success they have ... students could be asked to do a small research project - recycling of materials or making compost, etc. - and be evaluated on that ...".

To assess the quality of the completed curriculum, respondents indicated that summative evaluation would be necessary: "... communities or industry should evaluate the final curriculum ...". For effective evaluation to take place, Wallace (1985) recommends that learners, employers and teachers give and receive feedback.

5.4.4 Conclusions

This eclectic curriculum design model has integrated

ideas from several sources to ensure a democratic base and has been influenced mainly by the philosophies of pragmatism and existentialism. The underlying influence of pragmatism is clearly expressed in the premises of cultivating critical thinking, preparing students to solve problems actively in a changing environment by integrating knowledge from different disciplines. Existentialism's influence is expressed in offering students a free choice by including electives and allowing students the freedom of practical problem-solving and experimentation, stressing self-actualisation. The influence of realism is to encourage logical and rational thought.

The educational philosophy of progressivism influences this curriculum in its interdisciplinary nature. Learning opportunities envisaged to be largely practically oriented and based on problem-solving techniques undergird this philosophy. The fundamental reconstructionist philosophy is expressed in the aims of the course: to improve socio-economic and ecological conditions for the betterment of society.

This eclectic design is influenced mainly by learner-centered and problem-centered designs. Learner-centeredness is expressed by designing the curriculum to meet the needs of the students. This curriculum provides opportunities to learn on one's own by active participation, problem-solving and involvement in projects as methods of critical learning. Life experience is gained by working in community-based or career-based environments to prepare learners for their vocation. Problem-centredness is expressed in that the curriculum addresses the community's real socio-economic problems in order to reconstruct society. Learning becomes meaningful because it addresses problems related to the real world.

5.4.5 Notes

1. The authors appreciate the editorial services of Keith Richmond (Centre for Courseware Design and Development, Technikon SA).

2. We thank the participants for their participation.

5.4.6 References

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5.5 CONCLUSION

In this chapter the quantitative and qualitative research findings were discussed by means of three journal articles. In the next chapter, conclusions will be drawn and recommendations made, regarding the outcomes for a curriculum in urban agriculture. Indications of the proposed content, learning experiences and opportunities as well as ways of evaluating a course in urban agriculture, will be included. Finally, aspects which require further research, will be indicated.

CHAPTER 6

CURRICULUM FRAMEWORK

CONCLUSIONS AND RECOMMENDATIONS

6.1 AIM OF THE CHAPTER

A curriculum framework for a course in urban agriculture is based on the findings of the literature research, and on the sources of change identified in the empirical study.

The motivating factors giving rise to this study are mainly socio-economic, ecological and educational and training (cf. section 1.2).

In this study an attempt was made to determine the feasibility of a distance education course in urban agriculture aimed at socio-economic upliftment and ecological sustainability (cf. section 5.2). At the same time, this situation analysis helped to determine the needs of the community and the role that local governments could play in establishing an infrastructure in which urban agriculture could be practiced sustainably (cf. tabel 5.3). These findings were explored in a quantitative research study.

Finally, the principles or determinants of curriculum design, as suggested by Krüger (1980:34), were adapted in the qualitative research study. The outcomes, content, learning experiences and opportunities and ways of assessment were democratically determined. This culminated in an eclectic curriculum design model, drawn mainly from learner-centred and problem-centred designs. Pragmatism and existentialism were the most important underlying

philosophies, while progressivism and reconstructionism were the main educational philosophies influencing the design model (cf. figure 1; section 5.4).

Essentialism and realism played a more subservient role in influencing this curriculum.

Results from both the quantitative and qualitative studies were used to draw conclusions and make recommendations regarding curriculum outcomes for a curriculum in urban agriculture.

6.2 CURRICULUM OUTCOMES

Guidelines on specific outcomes, as obtained from the research, indicate what the learners will do as a result of their learning experiences acquired from the course.

6.2.1 Guidelines on specific outcomes

The ensuing outcomes from the situation analysis will be directed by the educational philosophy, the needs and demands of the learners, the community, the employers, distance education and the subject science. The outcomes envisaged in a curriculum for urban agriculture should be directed towards the following:

(a) Socio-economic empowerment of the community (cf. sections 1.2.1, 1.2.4, 1.2.5, 1.2.6, section 5.2; table 1, section 5.3 and section 5.4).

This translates into outcomes based on stimulating entrepreneurship and producing food, creating jobs, improving nutrition and health, generating income and having a social impact on community interaction. Entrepreneurship, community gardens or food co-operatives could, among others, provide jobs for rural women who want to join their

husbands in cities. Organically-grown food crops could provide healthier food for the urban elderly, schoolchildren and the urban poor who lack purchasing power (cf. section 1.2.8).

Educating and training the trainer in sustainable urban agricultural practices should provide the key to the socio-economic empowerment of the community.

Specific outcomes associated with the socio-economic empowerment that should be included in the Urban Agriculture curriculum are:

Learners will

- use a variety of resources and research different ways of stimulating entrepreneurship in urban agriculture that could lead to successful new business ventures and innovative entrepreneurs.
- investigate the management aspects of a community garden and communicate the findings in a plan of action by making recommendations and clarifying training needs, marketing, financial planning, infrastructure establishment and the management of such a co-operative and its division of tasks.
- use creative thinking skills and identify innovative ways of job creation and community empowerment in an urban agricultural setting to accomplish social transformation.
- demonstrate responsibility to the health of others by using low input agricultural practices to grow nutritious vegetables that improve the health of the community and environment and are economically sound and ecologically sustainable.
- conduct a study and analyse how urban agriculture can contribute to the welfare, emotional growth, nutrition

and care of the urban elderly, disadvantaged school-children and jobless women agriculturists.

- identify ways of demonstrating that sound ecological and human values are life-supporting and compatible with a sustainable community and the concept of 'Ubuntu'.
- demonstrate the values and attitudes necessary for practising urban agriculture in a healthy, safe and conserving manner.

(b) Establishing an infrastructure and educational and other support services to practise urban agriculture.

The distance education institution of learning in partnership with local government, agricultural organisations and institutions may assist collaterally in providing the necessary infrastructure and educational support (cf. section 5.3; cf. par. 2.5). Support may also include a decentralised tutor system to counsel and assist students countrywide. Practical training centres or community farms should benefit students' careers greatly.

Specific outcomes supportive of establishing an infrastructure and educational support services are:

Learners will

- work in training centres of local governments, or research agricultural institutions and with communities and assist them in training and help them to establish an infrastructure for practising urban agriculture.
- communicate with communities by using audio-visual teaching aids and physically demonstrate sustainable urban agricultural practices in solving practical problems.

- do practical training on community farms for six months and obtain knowledge and practical skills which should include, management skills, permaculture practices, agroforestry, organic farming, intercropping, companion planting, bio-intensive gardening, recycling, biological, cultural and physical pest (insect, disease and weed) control, compost-making, mulching, ridge planting, crop rotation and practices reducing soil erosion and increasing soil moisture retention.

(c) Directing urban agriculture towards sustainability, which includes environmental protection and resource conservation (cf. section 5.2; table 1, section 5.3).

Environmental education demands a paradigm shift towards low external agricultural input to prevent environmental degradation and health implications (cf. par. 1.2.5, section 5.2; table 1, section 5.4, par. 1.2.3 and 1.2.5). This type of education also demands that domestic, organic waste products and renewable resources be recycled (cf. par. 1.2.7, section 5.2; table 1, sections 5.3 and 5.4) to ensure a substantial resource base. Improving the environment should also contribute to its aesthetic appearance. Sustainable development includes student behaviour consistent with environmental awareness, positive values and attitudes to protect it (cf. par. 3.5.2.1.3).

For the curriculum to be aimed at sustainability, environmental education demands that unchecked population growth should be addressed (cf. section 5.2; table 1). Unsustainable demographic factors or human population growth increases environmental stress, depletes energy, natural resources and materials, and increases pollution (cf. section 1.2.2.) and famine.

Specific outcomes supportive towards sustainability are:

Learners will

- demonstrate environmentally friendly, integrated pest management strategies for insects on vegetable crops.
- design a landscape which reduces water run-off and soil erosion on a sloping area.
- demonstrate sustainable agricultural practices that will improve soil fertility without using inorganic fertilisers.
- demonstrate sustainable control measures against insect pests, pathogens, nematodes and weeds that benefit the environment and are not hazardous to human health.
- demonstrate five different agricultural practices that will conserve water.
- use a variety of resources and investigate different recycling methods of organic wastes that have application in urban agriculture and in nature conservation practices and write a report on their findings.
- conduct an experiment on different water conservation practices, take soil moisture readings on a weekly basis until the crop is harvested and interpret the data, draw conclusions and display results as line graphs.
- do a research project on values and attitudes and critically explain why individual attitudes do not always correspond to what they should be doing to protect the environment and improve its aesthetic value.
- demonstrate various ways of cultivating environmental awareness and positive values and attitudes towards enhancing a balanced, healthy and aesthetically pleasing environment.
- use audio-visual and other communication skills and demonstrate to communities that overpopulation causes depletion of the natural resources, increases pollu-

tion, diseases and reduces values and attitudes that are conducive to environmental protection.

- demonstrate three different farming practices that mimic natural ecological processes and participate in discussions of sustainability.

(d) Developing critical thinking and problem-solving skills (cf. sections 5.2 and 5.4).

Specific outcomes conducive to critical thinking and problem-solving are:

- Students will identify and analyse different urban agricultural problems and apply cross-curricular content in a creative way to decision-making and practical problem-solving practices in order to help communities.
- Students gather data and apply different cognitive, psychomotor and affective skills in a responsible manner in resolving personnel, financial, product and conflict management matters

(e) Entrepreneurship or career development (cf. section 5.4).

Specific outcomes pertaining to entrepreneurship or career development are:

- Students will plan and implement a business proposal for a community farm, based on co-operative business principles
- Learners will investigate various career opportunities linked or resulting from urban agricultural practices and explain each one's contribution to the practice of urban agriculture and entrepreneurship

- Learners will identify qualities necessary for becoming successful entrepreneurs and give reasons for the choices

(f) Learner involvement in entry levels, content, assessment and outcomes for the course

The course should not only be affordable and allow for multiple entry and exit levels to other courses but should give recognition to prior learning (cf. section 5.4) and involve learners in the outcomes, the content and assessment practices (section 5.4).

Specific outcomes associated with the above are:

- Learners will make their own judgement and suggest what prior knowledge should be accredited, and what the entry requirements for the course in urban agriculture should be
- Learners will critically judge the course and indicate what core content should be included, how their competencies should be assessed and what specific outcomes would be most valuable for improving their competencies and contributing to socio-economic and environmental upliftment

(g) Integrating knowledge

Specific outcomes that apply to the integration of knowledge are:


- Work together with communities on an environmental resource conservation problem, access as many sources of information as possible and infuse environmental education with ecological agriculture to optimise conservation practices and production of crops and cultivate

environmentally literate citizens who will have a positive impact on the environment

- Solve conflict problems and disputes on overexploitation of natural resources by integrating personnel management principles with permaculture and ecological agricultural principles and practices in finding solutions to these problems, ensuring optimal sustainable use of resources
- Use as many sources of information as possible and educate and train communities on the adverse effects of overpopulation on natural, social, economical, political, and environmental and health aspects

(h) Gathering information and knowledge (cf. sections 5.2 and 5.4)

Specific outcomes pertaining to this are:

- 
- Students will do research and gather data on various urban agricultural aspects
 - Students will search for new knowledge and develop their own knowledge and use sustainable technologies in problem-solving projects

(i) Providing information on infrastructure (cf. section 5.3).

A specific outcome reflecting this is:

- Learners will investigate and provide information on the infrastructure and resources required by urban farmers, and indicate how their needs should be addressed

(j) Developing communication and management skills (cf. section 5.4)

A specific outcome directed at this is:

- The trainer will use communication and management skills and communicate effectively with people on different educational levels and understand the needs of the community before training them in the skills that they lack

(k) Using urban open spaces sustainably and productively
(cf. section 5.2, 5.3, 5.4)

A specific outcome could be:

The trainer will empower urban farmers in using urban open spaces sustainably and productively and contribute to socio-economic and ecological sustainability

(l) Educating the community (cf. section 5.4)

Specific outcomes based on this are:

- The learner will educate the community in ecological agriculture allowing them to interact with the environment and its supportive ecosystems, increase their environmental awareness and assist them in interdisciplinary problem-solving and decision-making in order to become responsible citizens
- The trainer will educate the community in business management and communication skills empowering them in marketing their produce and improving their entrepreneurship, selling, productivity and communication skills

(m) Developing critical thinking skills of communities
(cf. section 5.2 and 5.4)

The following specific outcomes apply:

- Learners will assist communities to apply new sustainable knowledge which has relevance to problems in urban agriculture and share in their indigenous knowledge of problem-solving
- Learners will train communities in understanding the underlying principles of ecological agriculture, business management, environmental education and permaculture and integrate this knowledge and apply it to their specific problem situations
- Learners will teach communities to analyse the problem situation by investigating its various aspects or components before possible solutions are discussed
- Learners will train communities the skills of combining, synthesising and integrating knowledge in a holistic way in order to gain a better understanding in providing solutions to agricultural problems
- Learners will train communities how to judge their own competencies through self-assessment of their practical work

(n) Teaching values and appreciation for aesthetics (cf. section 5.4)

The following specific outcomes pertain to values and appreciation for aesthetics:

- Learners will teach communities positive attitudes towards conservation of resources and values of appreciating the environment and aesthetics, as well as an

awareness and concern for the environment and sustainable development

(o) Teaching practical skills (cf. sections 5.2 and 5.4)

Specific outcomes on teaching practical skills are:

- Learners will train and empower urban agriculturists in becoming practically competent people with hands-on skills who can participate actively in sustainable agricultural practices
- Students will demonstrate competency by successfully complete an innovative, urban permaculture garden design, grow different vegetables, improve the water absorption capacity and nutrient concentration of the soil and make use of all available structures and available energy sources on the site in accomplishing it
- Learners will use cross-curricular themes and an interdisciplinary approach to urban agriculture when teaching communities food production, health education, loss of species diversity and population control with the purpose of making farming and conservation more compatible
- Students will demonstrate their practical critical-thinking and problem-solving skills in production techniques as well as their communication and presentation skills when transferring knowledge, values and practical skills to the community
- Students will demonstrate to communities an awareness of the environment, indicate current problems and the impact of humans on it and promote active citizenship.

- Students will continuously assess their own competency by doing practical assignments and production related projects.

6.2.2 Guidelines on content and arrangement thereof

The guidelines on the core content, as indicated by the research data, are as follows:

(a) The core content should be modularised competency-based and integrated (cf. section 5.4). Students should have the freedom to choose from available content (cf. section 5.4). From a learner-centred perspective, the content should trigger interest in students and prepare them for life (cf. 2.5.3).

(b) The curriculum content should serve a specific purpose and should be directed towards real life. The selection of content should be subjected to the findings of the situation analysis which allowed for wide democratic participation (cf. figure 5.1) in setting the outcomes for the course (cf, section 5.4).

(c) Identified core content which should meet the outcomes of the course, would include Ecological or Sustainable Agriculture. This should lead to agricultural practices that prevent the over-exploitation of natural resources, maintain land quality, recycle nutrients, conserve water and control pests in an ecologically responsible way. In order to help achieve all this, the curriculum should also include Permaculture, Organic Farming, Sustainable Pest Management, Sustainable Soil Management and the electives: Plant (Crop) Production and Animal Husbandry (cf. section 5.4).

(d) The identified core content on Business Management, should help improving long-term agricultural productivity and economic sustainability. It should assist the community in earning a livelihood and provide urban farmers with the knowledge and skills needed to run a small business, market products and display effective and persuasive business communication skills. Other subjects which could assist urban farmers are: Entrepreneurial or Small Business Skills, Marketing, Personnel Management and Communication (cf. section 5.4).

(e) Core content on Environmental Education, aimed at raising awareness, knowledge and skills, and training technical and vocational students in sustainable development, should be included in the curriculum (cf. section 5.4).

The content should address environmental problems in agriculture which include desertification, depletion of soil nutrients, soil erosion, over-population, pollution, decrease in biodiversity, salinisation, waterlogging, high external input of fertilisers, pesticides and fossil fuels (cf. par. 3.2.1.3).

Environmental Education should be included owing to its inter-disciplinary nature which focuses on interaction between socio-economic and ecological systems. It should commit students in action-taking when assessing destructive human impact on the environment and lead to effective citizen participation in decision-making processes (cf. par. 3.5.2.1.3).

Appropriate content based on conserving natural resources, reducing pollution and population growth, improving and beautifying the environment, and integrating environmental protection and sustainable human development, include: Conservation, Pollution Control, Aesthet-

ics, Recycling, Health Care and Population Control (cf. section 5.4; table 3).

(f) The practical component of this course should include projects which stimulate problem-solving, creative and critical-thinking skills (cf. section 5.4). The content should include indigenous knowledge and creative ideas in problem-solving.

(g) Students should be exposed to content on practical training which describes sustainable agricultural techniques and practices. (See section 5.4; table 3). This should ultimately be accomplished by physically showing students the techniques during workshops, student days or organised practicals, or by using practical self-guided instruction manuals. This will ensure that students implement sustainable agricultural practices correctly.

(h) As part of the content, conservation techniques, agroforestry, permaculture, intercropping and crop rotation practices, compost-making, earthworm production and techniques for improving crop management and soil cultivation should be demonstrated by students and they should be exposed to participate in these techniques (cf. section 5.4; table 3).

(i) Presentation skills and the use of audiovisual equipment in training, (cf. section 5.4; table 3) which includes audio-cassette tapes, slides and videos should form part of the practical guide content.

(j) The content should be arranged in a logical sequence, which would allow learners to understand certain concepts before integrating them in problem-solving and real-life situations. The content should be organised in such a way that students will be able to relate to it, and then extrapolate further across the curriculum.

(k) The content should be selected, among other things, for its significance in the course, its utility and interest to students, and its potential to improve human development (cf. section 5.4).

6.2.3 Guidelines on learning opportunities

The merit of including learning opportunities should be judged by their appropriateness to distance education students and by whether or not they lead to competencies that could be integrated with the learners' personal experiences and knowledge.

(a) Students should be given practical exposure which includes visits to the agricultural industry, small businesses and community farms (cf. section 5.4). This could help students to acquire practical skills and competence in these fields.

(b) Students should be exposed to practical skills and work done by agricultural extension officers. This could be accomplished by organising short courses and visits to training centres, experimental farms and fresh produce markets (cf. section 5.4 and table 5.4).

(c) Learners should be given practical assignments, (cf. section 5.4; table 4) that encourage problem-solving and creativity, and that contribute to vocational experiences.

(d) Training and support services should be provided (cf. section 5.4; table 4). The availability of such an infrastructure should be supportive to learners and the community, (cf. section 5.3) and should provide learning opportunities conducive to vocational experience and the needs of distance education students.

(e) Exposure to media, audio-visual aids and tele-tuition should provide learning opportunities that could guide learners in a step-by-step manner, enabling them to gain work experience (cf. section 5.4).

(f) Contact sessions should be provided to create learning opportunities whereby distance education students could gain expertise. Industry should also be involved in giving practical guidance and advice. Workshops should be arranged to demonstrate and apply practical experiments, teach communication skills and transfer skills. Students should also benefit from contact sessions with farmers or farmer co-operatives in the same region, gaining expertise and drawing information from one another (cf. section 5.4).

(g) Learners should be given research projects and be engaged in community outreach programmes (cf. par. 2.2.1).

(h) Distance education students should be given co-operative learning opportunities to be done at their own pace at work, guided by mentors or electronic technology integrated with printed media (cf. par, 2.2.1). This is cost effective and will allow them to incorporate their own prior knowledge into new opportunities and apply knowledge to real-life problems.

(i) Distance education systems should provide developmental opportunities to employed persons aimed at improving national productivity, lifelong learning, recognition of prior learning, flexibility in learning, open access, learner support and the quality of learning (cf. par. 2.2.2).

(j) Distance education institutions should be learner-centred and increase learning opportunities to improve learner success by providing learning centres and support groups (cf. par. 2.2.2 and 2.3).

(k) Learning opportunities for distance education students should be aimed at self-directed learning which should include interactive video training, computer assisted instruction and group discussions (cf. par. 2.3).

(l) Distance education students should be allowed to have a democratic say in the choice of learning opportunities by sharing responsibility in course planning (cf. par. 2.3).

(m) Distance education institutions should accommodate different learning styles by offering them auditive, visual and verbal learning material (cf. par. 2.3) and self-study materials to learn when and where they want and at their own pace (cf. par. 2.4).

(n) Distance education institutes should provide for the availability of books (mobile libraries) and learning opportunities that enhance self-directed learning (cf. par. 2.3).

(o) Learning opportunities for adult learners should be based on active practical problem-solving and applied research that enhance competence (cf. par. 2.3).

(p) A mixed mode of teaching-learning should provide increased learning opportunities and deliver many quality graduates rapidly and cost-effectively (cf. par. 2.4).

(q) Technology-based learning opportunities offer distance learners live lecturer-student and student-student contact irrespective of distance (cf. par. 2.4).

(r) A tutor support system should provide distance education students with decentralised support services which should increase learning opportunities (cf. par. 2.5).

(s) Learning opportunities should be increased by allowing more than one examination and registering opportunity per year (cf. par. 2.5).

(t) Multimedia and technology should provide learner-support and bridge the problems of social isolation and motivational support in distance education (cf. par. 2.7.1) leading to more learning opportunities and independence.

(u) Study-centres should offer technology supported learning facilities and learning opportunities to students who do not have access to technology (cf. par. 2.7.1) and in so doing assist in complementing individualised learning with collaborative learning.

(v) Technology should provide learning opportunities which increase interactive participation in distance learning, bringing student and lecturer closer by removing the distance in distance education (cf. par. 2.7.1).

6.2.4 Guidelines on learning experiences

Learning experiences should be appropriate learning actions that allow learners to be actively involved in learning to become competent.

(a) Students should acquire learning experiences by making use of effective learning opportunities (cf. section 5.4).

(b) By doing practical work and projects, students should gain learning experiences which are relevant to real-life problems and should be able to approach problem-solving in an interdisciplinary manner. This should allow distance education students to pursue their own interests and to pace themselves.

(c) In-service training provides student-trainers with experiential learning opportunities (table 4) which, in turn, lead to learning experiences.

(d) Community involvement (cf. section 5.4; table 4) should promote the exchange of ideas, knowledge and skills and should provide learning experiences in group dynamics as well as insight into contrasting viewpoints and perspectives.

(e) Critical-thinking and problem-solving skills should be gained from learning experiences, observing and explaining phenomena holistically, or by analysing problematic situations in the agricultural or environmental field.

(f) By participating in group discussions with tutors, workshops or seminars, students could gain learning experiences in communication and presentation skills (cf. section 5.4; table 4). This student-centred approach allows for democratic participation by students.

(g) Learning experiences must contribute to the full personal development of distance education students and to the social and economic development of the nation (cf. par. 2.2.2).

(h) Learner activities should be based on an outcomes-based approach of accessing and applying knowledge, problem-solving skills and using a variety of technologies

(cf. par. 2.2.2) to ensure competent learners and an effective workforce (cf. par. 2.9).

(i) Learning experiences for distance education students should be purposeful and aimed at self-directed learning with the emphasis on the learning processes (cf. par. 2.3) so that learning becomes self-motivated and rewarding.

(j) Distance education students should learn by choosing their own learning experiences and direct their own lives (cf. par. 2.3).

(k) Distance education students should be solving problems which encourage emergent learning whereby innovative learning experiences may be obtained (cf. par. 2.3).

(l) Adult learners have a wealth of their own experiences and should be allowed to build new knowledge on this through experiential learning and problems based on life situations and not subjects (cf. par. 2.3).

(m) Learning experiences for adult learners should be flexible, life-long and project-driven (cf. par. 2.3.3).

6.2.5 Guidelines for assessment

Assessment is important in determining whether students have achieved the outcomes successfully.

(a) Criteria for assessment should be competency-based (cf. section 5.4; table 5). Students are competent if they can produce or perform their tasks to harmonise with the principles of sustainable development, based on educational and practical experiences.

(b) Formative assessment (cf. section 5.4; table 5) should include ongoing projects and assignments. This would allow students to measure their success or be assessed regularly to determine whether they understand and can apply their knowledge and do the required specific outcomes.

(c) Practical examinations (cf. section 5.4; table 5) during or after training should feature strongly as a way of assessing competence. Students should be given practical problems to solve, allowing them to express their creativity, imagination and problem-solving abilities.

(d) Oral examinations or self-assessment exercises (cf. section 5.4; table 5) should be included. Oral examinations would allow students who are not conversant in writing to be assessed fairly. Self-assessment exercises should allow students to look at their results critically, analyse and judge them and propose corrective steps. Students could collectively assess their yield, sustainability of crop production, pest management strategies, the taste of their produce and its marketability, thereby sharing a wealth of knowledge and information (cf. section 5.4).

(e) Students should do extensive assignments or large projects, and should be assessed on the outcomes. Students could, for example, be asked to do research projects or establish community gardens. These could be monitored continuously (formatively) or at the end of the course (summatively) (cf. section 5.4).

6.3 COMMENTS

The following final comments on the proposed Urban Agriculture curriculum framework provide essential information in mediating the curriculum:

(a) Data from this research revealed the feasibility of a course in Urban Agriculture based on sustainable use and management of the environment (cf. section 5.2).

(b) Trainers and urban agriculturists should be able to apply ecological agricultural principles and concepts in farming practices (cf. section 5.2).

(c) An infrastructure for practising urban agriculture should be established. Local governments should provide assistance, giving high priority to access to land, develop a basic infrastructure and provide extension services (cf. section 5.3).

(d) Urban agriculture should be seen by local governments and policy makers as steps towards developing sustainable cities with the concomitant improvement in the socio-economic conditions of the urban poor without environmental degradation.

(e) A sound infrastructure should be constructed to accommodate needs of cultivators and to utilise urban open spaces to the benefit of the community (cf. section 5.3) and training of the trainers of urban farmers.

(f) The eclectic curriculum design model for urban agriculture has a democratic base and is influenced mainly by the philosophies of pragmatism and existentialism. The underlying influence of pragmatism is clearly expressed in the premises of cultivating critical thinking and preparing students to solve problems by integrating knowledge from various disciplines.

(g) The existentialist influence is expressed in offering students a free choice by including electives and allowing them the freedom of practical problem-solving and

experimentation, stressing self-actualisation (cf. section 5.4).

(h) The educational philosophy of progressivism influences this curriculum because of its interdisciplinary nature. It is envisaged that the learning opportunities that will undergird this philosophy will be largely practically oriented and based on problem-solving techniques, (cf. section 5.4).

(i) The fundamental reconstructionist philosophy is expressed in the purpose of the course: to improve socio-economic and ecological conditions for the betterment of the community (cf. section 5.4).

(j) This eclectic design is influenced mainly by learner-centred and problem-centred designs. Learner-centredness is expressed by designing the curriculum to meet the needs of the students. This distance education curriculum provides opportunities to learn on one's own and at one's own pace and by active participation, problem-solving and involvement in projects as methods of critical learning. Student trainers gain life-experience by working in community-based or career-based environments which prepare them for their vocation (cf. section 5.4).

(k) Problem-centredness is expressed in that the curriculum addresses the community's socio-economic problems. Learning becomes meaningful because it addresses problems related to the real world (cf. section 5.4).

6.4 RECOMMENDATIONS

The following recommendations are supportive of a transformational OBE curriculum:

(a) Involve local governments and the horticultural and agriculture industries in providing an infrastructure for practising urban agriculture and assisting in the practical component of the course.

(b) The course should lead to sustainable utilisation of urban open spaces which aims to uplift the socio-economic conditions of urban communities without harming the environment. It should also lead to more sustainable cities in which waste should be recycled, environments and health improved, food provided, employment created and communities empowered to become self-sufficient.

(c) The curriculum should provide for a comprehensive holistic approach which addresses ecological agricultural aspects, conservation and environment protection as well as business management skills.

(d) The curriculum should provide open access to all, be cost-effective, give recognition to prior learning and strive to achieve flexibility (cf. section 5.4).

(e) Students must be allowed to work at their own pace (which the distance education model allows) and interactive self-study material should enable students to study when and where they choose.

(f) The core content of the course should be modularised to allow for flexibility. For each module passed, students should obtain credits. These credits should contribute to the entry requirements for other courses in horticulture or agriculture, offering maximum entry points of study.

(g) Media for the course should consist of user-friendly study guides plus workshops or the written word plus video-cassettes (cf. section 5.2; section 5.4). Other

audio-visual aids might include television satellite transmissions from African farms or elsewhere, to students sitting in classrooms during contact sessions (cf. section 5.4).

6.5 CONCLUDING REMARKS

A strength of this study is that eclecticism in the envisaged curriculum is based on democratic ideals and principles. It acknowledges the fact that knowledge is not constant and that the needs of the community and learners should be taken into account. This eclectic design is flexible and has its own premises.

It is envisaged that a basic one-year course in Urban Agriculture should be cost-effective, modularised and allow open access to all (cf. section 5.4). A strength of the course is reflected in allowing students opportunities and entrance to other courses in agriculture, horticulture or nature conservation (cf. section 5.4) and should facilitate access to career paths.

A strength of the proposed course is that it envisages to give recognition to prior learning (cf. section 5.4) which strengthens the concept of lifelong learning.

The curriculum should meet the needs of the students, the community and employers, and it should make use of the opportunities available in distance education to meet these needs. Not all students have sufficient access to computers to take full advantage of all the opportunities offered by distance education. This can be regarded as a weakness in the course.

A strength of the proposed curriculum is that it envisages to create awareness of the earth's carrying capacity within which we need to live and convey the need to prac-

tise sustainable, ecological agriculture and conserve the earth's resources, vitality and diversity. The curriculum should be aimed at restoring nature and ecological systems in cities by transforming the urban landscape into green, species-rich open spaces, where food, health, beauty and wealth could be produced.

A strength of the proposed curriculum is that it lays the foundation for socio-economic sustainable development of the urban community.

A strength of the study is that the curriculum be instrumental in implementing an interdisciplinary approach to problem-solving. It should instil in students the need to take action to resolve environmental and agricultural problems in a critical, holistic and integrated manner.

The curriculum should be designed to reflect the strength of learner-centredness which is flexible and allows students to choose what they want to learn according to their needs. It should allow students to self-assess their own competence.

A strength of the curriculum is its vision of shaping farming systems to meet the needs of the environment and the community, while maintaining or enhancing the quality of the environment and conserving natural resources.

The curriculum envisages to strengthen local capacities to become innovative and to experiment, and test students' ideas. The curriculum should therefore encourage a participatory approach whereby groups of farmers could learn practical skills from trainers, industry and from each other.

A weakness of the curriculum is its comprehensiveness, but a strength is its promotion of an integrated approach

to education and training, and the improvement of access, flexibility and quality.

6.6 RECOMMENDATIONS REGARDING FURTHER RESEARCH

Aspects which require further research should be aimed at:

- Community outreach projects
- Experimentation in raising the soil's organic matter content with organic manures and other organic matter and the subsequent influence on crop production
- Studying the influence of allelopathic plants on crop production
- Studying the influence of companion planting on crop production
- Experimentation in water conservation methods, natural pesticides and agroforestry projects versus monocultures with regard to soil improvement and pest control
- The effect of different media and technologies on distant education students' assessment results
- Studying the effect of urban agriculture on the socio-economic conditions of urban farmers

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APPENDIX A





29 February 1995

Technikon SA

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Dear Respondent

Technikon SA wishes to offer a two-year certificate course in environmentally friendly Urban Agriculture. We regard your information as very valuable and by participating you are helping us in our research. Will you please assist us by completing this questionnaire and return it to us in the post-paid envelope as soon as possible?

UNIVERSITY
OF
JOHANNESBURG

Urban agriculture can improve the city environment by sustainable waste management by recycling solid wastes and waste water. Urban agriculture can convert degraded and unkempt urban open spaces into healthy green areas and provide food, work, and income to entrepreneurs. It can also be applied to school gardens, hospital gardens, church gardens, community gardens, private gardens, municipal open spaces, nature conservation areas and for educational, environmental educational and entrepreneurial purposes.

With this course we envisage to train the trainer. The following four subjects are required for the Technikon SA Certificate:

URBAN AGRICULTURE

Urban Agriculture I (Agro-urbanisation; recycling wastes; productive use of urban open spaces; agroforestry; edible plants; sustainable urban agriculture)

Soil Science I (Characteristics of soil; soil classification and

identification; soil fertility; environmental influences on soil)

Urban Agriculture II (Urban open spaces a potential for market gardening; policy on urban agriculture in South Africa; productive urban open space management; urban agriculture; training and extension for open space utilisation; entrepreneurial ventures in urban open spaces)

Environmental Studies I (The natural environment; ecology and ecosystems; the human environment)

Thank you for your participation and cooperation.



WILMA GAUM
SENIOR LECTURER



UNIVERSITY
OF
JOHANNESBURG

APPENDIX B



QUESTIONNAIRE: URBAN AGRICULTURE (1)

1. Please answer all the questions below by marking the appropriate box with an "X".
2. The information you provide is confidential and your anonymity is ensured as your name appears nowhere on the questionnaire.
3. Your participation in this survey is highly valued and appreciated.
4. Please return the questionnaire before 1 May 1995.

For office use only

A CERTIFICATE COURSE: URBAN AGRICULTURE

A.1 Do you think that a course in Urban Agriculture is important in the new South Africa?

Definitely	1	2	3	4	5	Not at all
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(1-3)

(4)

A.2 Please state how many of your staff or others would be interested in a one year certificate course in Urban Agriculture.

	Number interested
Staff	
Others	

(5)

(6)

A.3 What medium do you regard as being best for this course?

User-friendly study guide	1
Written word plus video cassette	2
User-friendly study guides plus workshops	3
Printed media plus audio-based media (radio)	4
Printed media plus computer-based media	5
Other (please specify)	6
.....	

(7)

(8)

(9)

(10)

(11)

(12)

A.4 Do you think that it is possible for a technical course in Urban Agriculture to be offered countrywide through distance education (through user-friendly correspondence education)?

Yes	1
No	2
Unsure	3

(13)

A.5 How can urban agriculture contribute to environmental education?

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(14-15)

B URBAN AGRICULTURE

B.1 Indicate the extent to which you agree or disagree with the following statements.
(Make a cross on the value that is closest to your opinion on a scale of 1-5)

	<i>Definitely</i>			<i>Not at all</i>		
	1	2	3	4	5	
1. It is necessary to improve the technical knowledge and skills of horticulturists, extension officers, farmers, teachers and community leaders and trainers regarding urban agriculture.						<input type="checkbox"/> (16)
2. I think a certificate course in Urban Agriculture based on healthy and sustainable food production is important in the new South Africa.						<input type="checkbox"/> (17)
3. Population growth influences food security.						<input type="checkbox"/> (18)
4. Urban spaces should be used more productively.						<input type="checkbox"/> (19)
5. Urban agriculture could tribute to job creation.						<input type="checkbox"/> (20)
6. I think it is important to reduce the food crisis of the urban poor in South Africa.						<input type="checkbox"/> (21)
7. There is a need to teach people how to produce their own food through the sustainable use of resources.						<input type="checkbox"/> (22)
8. Domestic waste products and waste water can be used more productively in urban agriculture.						<input type="checkbox"/> (23)
9. High input fertilizers and pesticides in agriculture have a negative influence on the environment and human health.						<input type="checkbox"/> (24)
10. Farmers should accept responsibility for environmental offences.						<input type="checkbox"/> (25)
11. Environmental education is important in agriculture.						<input type="checkbox"/> (26)

B.2 How much land per individual should local governments allocate for urban agriculture in the lower income group areas?

Less than 10m ²	1
10-24m ²	2
25-39m ²	3
40-54m ²	4
55-70m ²	5
More than 70m ²	6
Unsure	7

(26)

B.3 What policies in respect of urban agriculture should local governments regard as important for urban agricultural purposes?

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(27-28)

B.4 What assistance can be provided by local governments regarding access to land?

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(29-30)

B.5 What assistance can be provided by local governments regarding urban agriculture?

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(31-32)

B.6 What do you think are the major problems that could be encountered in urban agriculture?

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(33-34)



B.7 What thoughts do you have regarding the provision of water, recycled water or waste water for urban agriculture?

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(35-36)

B.8 How can other urban wastes be utilized for urban agriculture?

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(37-38)

B.9 How would you like urban open spaces to be used? (MARK TWO ONLY)

For planting medicinal plants	1
For planting trees for wood	2
For planting vegetables	3
Community farms	4
For planting trees for fruit	5
Sport facilities	6
For planting herbs	7
For planting flowers	8
To put up kiosks / spaza shops	9
Parks	10
Other (please specify)	11



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(39)

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(40)

B.10 Please suggest areas that can be used for urban agriculture?
(For example: pipeline servitudes, etc.)

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(41-42)

THANK YOU VERY MUCH

APPENDIX C

URBAN AGRICULTURE FEASIBILITY STUDY
(ANNEXURES A TO J)

**URBAN AGRICULTURE
FEASIBILITY STUDY
RESEARCH REPORT 1**



DIRECTORATE: RESEARCH

EXECUTIVE SUMMARY

During mid-1995 a research survey was conducted to determine the feasibility of introducing a two year certificate in Urban Agriculture in the Programme Group Applied Sciences.

Out of a total of 1290 questionnaires which were mailed out, 273 questionnaires were returned which represents a response rate of 21.2%.

Some of the pertinent findings are given below.

1. The majority of the respondents (80.9%) believe that a course in urban agriculture is important.
2. In 93.3% of all cases the respondents indicated that between 1 and 10 of their staff members will be interested to study such a course and in 84.5% of all cases the respondents indicated that they know of between 1 and 10 other people who would be interested to study this course.
3. 51.2% of the respondents indicated that the best medium to use for this course are user-friendly study guides plus workshops. 18.3% of the respondents indicated that they prefer the written word plus video cassette as medium for this course.
4. More than half of the respondents (66.3%) feel that it is possible for a technical course in Urban Agriculture to be offered country wide through distance education. 18.7% of the respondents were unsure if this is possible.
5. The majority of the respondents (87.5%) feel that it is necessary to improve the technical knowledge and skills of horticulturists, trainers, extension officers, farmers, teachers and community leaders regarding urban agriculture.
6. A certificate course in urban agriculture based on healthy and sustainable food production is seen as important by most of the respondents (83.5%).
7. 87.5% of the respondents feel that population growth influences food security.
8. The majority of the respondents (84.2%) feel that urban spaces should be used more productively.
9. Most of the respondents (78.0%) could contribute to job creation.
10. The majority of the respondents (90.8%) feel it is important to reduce the food crisis of the urban poor in South Africa.
11. 93.0% of the respondents think there is a need to teach people how to produce their own food through the sustainable use of resources.

12. The majority of the respondents (87.3%) feel that domestic waste products and waste water can be used more productively in urban agriculture.
13. More than half of the respondents (60.8%) feel that high input fertilizers and pesticides in agriculture have a negative influence on the environment and human health.
14. Almost three quarters of the respondents (74.9%) feel that environmental education is important in agriculture.
15. 33.7% of the respondents indicated that less than 24m² of land should be allocated by local government for urban agriculture. 21.8% of the respondents feel that more than 50m² of land should be allocated. 25.3% of the respondents are unsure regarding the size of land that should be allocated for urban agriculture.
16. 23.9% of the respondents indicated that they would prefer to plant vegetables in open spaces. 14.9% of the respondents indicated that they would prefer open spaces to be used for community farms and 14.7% of the respondents feel that urban open spaces should be used for parks.



1. INTRODUCTION

This report forms part of research which was done during mid-1995 on the feasibility of introducing a two year certificate in Urban Agriculture in the Programme Group Applied Sciences.

The findings of this research are compiled in two reports as two different questionnaires were mailed out. The first questionnaire (see Report 1) were sent out to parties concerned in the industry, while the second questionnaire (see Report 2) were sent out to prospective students.

This report contains findings of the first questionnaire (example attached as annexure A) of which 1290 questionnaires were mailed out.

273 questionnaires were returned which represents a response rate of 21.2%.

2. *Certificate course: Urban Agriculture*

Importance of a course in urban agriculture

Definitely important	60.8%
2	20.1%
3	10.3%
4	3.7%
Absolutely unimportant	5.1%

Number of staff members that would, according the respondents, be interested in this course.

Staff members	%
2	28.9%
1	23.7%
8	2.6%
10	6.6%
4	6.6%
5	4.6%
20	3.3%
3	11.8%
6	6.6%
7	1.9%
15	1.3%
10% of the Council will be interested	0.7%
150	0.7%
26	0.7%

Number of other people that would, according to the respondents, be interested in this course.

Persons interested	%
1	20.0%
10	21.4%
3	8.7%
5	7.4%
15	2.5%
100	6.0%
2	7.4%
50	6.0%
8	10.0%
7	3.6%
4	5.0%
6	1.0%
40	1.0%

Medium for course

User friendly study guides	11.2%
Written word plus video cassette	18.3%
User-friendly study guides plus workshops	51.2%
Printed media plus audio-based media (radio)	4.4%
Printed media plus computer-based media	6.3%
Project set and evaluated	0.3%
Hands-on training and people contact (practicals and demonstrations)	3.9%
Experiential learning at workplace with employer (fieldwork training)	3.4%
Radio and TV series	0.7%
Formal lecturers	0.3%

Do the respondents think it is possible for a technical course in Urban Agriculture to be offered country wide through distance education?

Yes	66.3%
No	15.0%
Unsure	18.7%

How can urban agriculture contribute to environmental education.

See annexure B for verbatim responses.

It is necessary to improve the technical knowledge and skills of horticulturists, extension officers, farmers, teachers and community leaders and trainers regarding urban agriculture.

Definitely agree	70.0%
Agree	17.5%
Unsure	7.4%
Disagree	2.0%
Definitely disagree	3.1%

A certificate course in Urban Agriculture based on healthy and sustainable food production is important in the new South Africa.

Definitely agree	56.0%
Agree	27.5%
Unsure	10.6%
Disagree	4.1%
Definitely disagree	1.8%

Population growth influences food security.

Definitely agree	70.0%
Agree	17.5%
Unsure	7.4%
Disagree	2.0%
Definitely disagree	3.1%

Urban spaces should be used more productively.

Definitely agree	65.8%
Agree	18.4%
Unsure	8.1%
Disagree	5.9%
Definitely disagree	1.8%

Urban agriculture could contribute to job creation.

Definitely agree	52.6%
Agree	25.4%
Unsure	12.5%
Disagree	7.7%
Definitely disagree	1.8%

It is important to reduce the food crisis of the urban poor in South Africa.

Definitely agree	70.0%
Agree	20.8%
Unsure	5.5%
Disagree	2.2%
Definitely disagree	1.5%

There is a need to teach people how to produce their own food through the sustainable use of resources.

Definitely agree	71.5%
Agree	21.5%
Unsure	2.5%
Disagree	2.5%
Definitely disagree	1.8%

Domestic waste products and waste water can be used more productively in urban agriculture.

Definitely agree	64.0%
Agree	23.3%
Unsure	8.7%
Disagree	3.3%
Definitely disagree	0.7%

High input fertilizers and pesticides in agriculture have a negative influence on the environment and human health.

Definitely agree	38.9%
Agree	21.9%
Unsure	21.1%
Disagree	15.1%
Definitely disagree	3.0%

Farmers should accept responsibility for environmental offenses.

Definitely agree	52.6%
Agree	22.3%
Unsure	19.3%
Disagree	4.0%
Definitely disagree	1.8%

Environmental education is important in agriculture.

Definitely agree	72.4%
Agree	21.7%
Unsure	4.1%
Disagree	1.1%
Definitely disagree	0.7%

Allocation of land by local government

Less than 10m ²	11.9%
10 - 24m ²	21.8%
25 - 39m ²	8.4%
40 - 54m ²	10.8%
55 - 70m ²	8.4%
More than 70m ²	13.4%
Unsure	25.3%

What policies in respect of urban agriculture should local governments regard as important for urban agricultural purposes?

See annexure C for verbatim responses.

Government assistance regarding access to land.

See annexure D for verbatim responses.

Local government assistance regarding urban agriculture.

See annexure E for verbatim responses.

Major problems that could be encountered in urban agriculture.

See annexure F for verbatim responses.

Thoughts the respondents have regarding the provision of water, recycled water or waste water for urban agriculture.

See annexure G for verbatim responses.

How can other urban wastes be utilized for urban agriculture.

See annexure H for verbatim responses.

Use of open spaces

For planting medicinal plants	6.1%
For planting trees for wood	4.4%
For planting vegetables	23.9%
Community farms	14.9%
For planting trees for fruit	7.4%
Sport facilities	10.1%
For planting herbs	1.3%
For planting flowers	1.8%
To put up kiosks	2.0%
Parks	14.7%
All of the above apply	2.6%
Industrial / residential use	0.2%
Recreational facilities and open spaces	0.9%
Protection of indigenous species	0.2%
Depends on social and economic maturity of community	0.2%
Greenbelts	0.2%
Multiple answers (<i>see annexure I for verbatim responses</i>)	9.1%

Areas that can be used for urban agriculture

See annexure J for verbatim responses.

ANNEXURE A: URBAN AGRICULTURE QUESTIONNAIRE



QUESTIONNAIRE: URBAN AGRICULTURE (1)

1. Please answer all the questions by marking the appropriate box with an "X".
2. The information you provide is confidential and your anonymity is ensured as your name appears nowhere on the questionnaire.
3. Your participation in this survey is highly valued and appreciated.
4. Please return the questionnaire before 1 Mei 1995.

A CERTIFICATE COURSE: URBAN AGRICULTURE

For office use only

A.1 Do you think that a course in Urban Agriculture is important in the new South Africa?

Definitely	✓ 1	2	3	4	5	Not at all
------------	-----	---	---	---	---	------------

(1-3)

1

(4)

A.2 Please state how many of your staff or others would be interested in a one year certificate course in Urban Agriculture.

	Number interested
Staff	2
Others	

2

(5)

...

(6)

A.3 What medium do you regard as being best for this course?

User-friendly study guide	1
Written word plus video cassette	✓ 2
User-friendly study guides plus workshops	3
Printed media plus audio-based media (radio)	4
Printed media plus computer-based media	5
Other (please specify)	6
.....	

(7)

(8)

(9)

(10)

(11)

(12)

A.4 Do you think that it is possible for a technical course in Urban Agriculture to be offered countrywide through distance education (through user-friendly correspondence education)?

Yes	✓	1
No		2
Unsure		3

(13)

A.5 How can urban agriculture contribute to environmental education?

.....
One should encourage people to help in available
helping to be...

C 1 1

(14-15)

URBAN AGRICULTURE

B.1 Indicate the extent to which you agree or disagree with the following statements.
(Make a cross on the value that is closest to your opinion on a scale of 1-5)

	Definitely			Not at all		
	1	2	3	4	5	
1. It is necessary to improve the technical knowledge and skills of horticulturists, extension officers, farmers, teachers and community leaders and trainers regarding urban agriculture.			✓			3 (16)
2. I think a certificate course in Urban Agriculture based on healthy and sustainable food production is important in the new South Africa.	✓					1 (17)
3. Population growth influences food security.	✓					1 (18)
4. Urban spaces should be used more productively.	✓					1 (18)
5. Urban agriculture could tribute to job creation.	✓					1 (19)
6. I think it is important to reduce the food crisis of the urban poor in South Africa.		✓				2 (20)
7. There is a need to teach people how to produce their own food through the sustainable use of resources.	✓					1 (21)
8. Domestic waste products and waste water can be used more productively in urban agriculture.	✓					1 (22)
9. High input fertilizers and pesticides in agriculture have a negative influence on the environment and human health.	✓					1 (23)
10. Farmers should accept responsibility for environmental offences.			✓			3 (24)
11. Environmental education is important in agriculture.		✓				2 (25)

B.2 How much land per individual should local governments allocate for urban agriculture in the lower income group areas?

Less than 10m ²	✓ 1
10-24m ²	2
25-39m ²	3
40-54m ²	4
55-70m ²	5
More than 70m ²	6
Unsure	7

(26)

B.3 What policies in respect of urban agriculture should local governments regard as important for urban agricultural purposes?

Recycling waste water, recycling of municipal open spaces for gardens

011
(27-28)

B.4 What assistance can be provided by local governments regarding access to land?

Beitbasatelling in garden
in water with more bekatyher

011
(29-30)

B.5 What assistance can be provided by local governments regarding urban agriculture?

Give the people like kunsuwa

011
(31-32)

B.6 What do you think are the major problems that could be encountered in urban agriculture?

Money - Lack of

011
(33-34)



**ANNEXURE B: VERBATIM RESPONSES:
HOW CAN URBAN AGRICULTURE CONTRIBUTE TO
ENVIRONMENTAL EDUCATION**

VERBATIM RESPONSES: HOW CAN URBAN AGRICULTURE CONTRIBUTE TO ENVIRONMENTAL EDUCATION?

1. Job creation and people will learn to be self-sufficient (10.6%)
 - * People learn to help themselves (produce own food) and to utilize possible resources. Job opportunities, participating action.
 - * Helps self sustainable communities to develop, teaches people to appreciate resources, less pollution.
 - * RDP – better environment for the jobless. Better employment opportunities and job experience.
 - * Involving participants in preserving the natural environment by becoming self-sufficient in basic needs such as food and firewood.
 - * Encourage communities in planting evergreen trees, generate own income, making use of open spaces
 - * If people is learnt how to provide food for themselves then job opportunities will come to bring income.
 - * Growing of food (vegetables)
 - * Job opportunity, source of food, better use of available land.
 - * Food for the whole community (teach one woman to plant food and you will feed the whole family)
 2. Educating the people (4.8%)
 - * School pupils, business participation must go hand in hand with education. Theory is not enough – practical must be included to prove that it can work.
 - * To teach the people in the community the basic skill of agricultural and environmental health will improve the well being of the community.
 - * Daar word genoeg landbouers opgelei, die beginsel van stedelike landbou moet net sterker deurgegee word – dan sal dit die omgewing beter dien.
 - * Environmental education is severely neglected at grass-root level. The proposed course does not give sufficient emphasis on this area.
 - * More attention can be given to the whole question – perhaps the degradation of natural resources could be the reason for urban agriculture.
 - * Education at all levels from preliminary to secondary school, involve parents in environmental projects.
 - * Use present examples as a platform for students and schoolchildren to educate them
 - * There is a great need of educating our people about the importance of trees, herbs that can be used to cure ailments and beautifying our environment just like in the suburbs.
 - * Environmental education should be the basis.
 - * Involve school children in promoting environmental education through agricultural teaching.
 - * Training trainers to develop the community by empowering them with the same skills.
 - * School children can be involved at school garden projects (thus teaching their parents / neighbours or friends.
 - * Through involvement of children and schools at different levels but will only succeed if economical benefits can be translated.
- It will create a general awareness/interest (26.4%)
- * People will become more interested and aware of the environment (especially city children).
 - * General awareness in the community.
 - * People will be made aware of the total ecosystem they are living in as well as the importance of improving and conserving the environment they're living in.
 - * They will understand how dependant they are on natural resources and will conserve resources. Further – it will give knowledge, skills, attitudes. with attend to environmental difficulties. It is 'real' education.
 - * Awareness: nature of different resources, market value, value of conserving resources.
 - * Awareness of the need to protect soil and water.
 - * It will create an interest and students will then be more open to the many articles / programmes to be found in the media.
 - * It would make people more aware of their environment and what is being done to destroy and/or improve the environment.
 - * Could make people aware that agriculture is part of our environment.

- * It will create an awareness about the contribution and interdependence of the environment.
- * Love for nature, environmental awareness, use unused land and prevent erosion.
- * In the western society in general and in the townships people have no knowledge or interest anymore in urban agriculture. They don't see ground as a valuable resource anymore.
- * Awareness of natural process, love for nature, understanding of rural concerns, urban agriculture is not only work, but beauty and fun too.
- * Increase awareness of physical environment, provides a starting point for environmental education
- * Increase awareness which will have spin off benefits with regard to pollution
- * Though putting urban young people in touch with the soil / nature and make them better informed and involved.

4. Produktiewe benutting van ons hulpbronne (9.9%)


- * Produktiewe benutting van oop spasie asook benutting van afvalstowwe, voedselvoorsiening.
- * Teach people to utilize available land effectively and to use limited resources to its best potential. Teach conservation methods.
- * Beter benutting van die omgewing, Sustainable use of natural resources
- * Sustainable use of natural resources
- * Litter control, more recycling, less wastage of resources.
- * Better use of resources, e.g. farmland, water.
- * Recycling
- * The emphasis should not be on environmental education but on productive and effective use of all urban space.
- * Opheffing van bevolking deur selfonderhoudsprogramme, beter benutting van hulpbronne wat lei tot gesonder lewensomstandighede.
- * Omgewingsopvoeding is 'n noodsaaklike voorvereiste om besoedeling af te skaal, hersirkuleringspogings winsgewend te maak, spaarsamige gebruik van hulpbronne te verseker, meerdoelige gebruik van hulpbronne te ontwerp en die ekonomie te stimuleer met omgewingsvriendelike produkte, verpakkings en prosesse. Omgewingsbewaringsbeginsels sal aan baie mense oorgedra word.
- * Making use of waste and unused land
- * Better use of available resources
- * Emphasizes on sustainable utilization of the natural resources of our environment.
- * They can make use of limited resources fruitfully as well as observe the vulnerability of the urban resource. Recycling will keep urban areas clean, income will also be generated and job creation will take place.
- * It will educate people with an appreciation for the environment
- * Land should be managed carefully, potential of open spaces, problems that pollution and neglect of open spaces bring about, develop unused open spaces
- * Recycling, bring about a judicious use of the environment
- * Recycle wastes, re-use of water and other wastes
- * Promote effective use of open spaces, also plant vegetables.
- * Managing waste and undeveloped areas
- * Demonstration of the importance of sustainable natural reserves
- * Create an awareness of renewable resources
- Through empowerment of local management.
- Understanding the environment better and thus create an environmental consciousness (7.0%)
- * Understanding the impact of pollution and the dynamics associated with soil science and plant nutrition would lead to an environmental consciousness.
- * Communities will show new interest in their surroundings, bring youth closer to the environment and agriculture cleanliness around townships may get some attention, development of parks and recreation beautifying the surroundings providing vegetables for the hungry.
- * Through appreciation, teach them pesticides dangers, fertilizer use, water use, soil / air pollution.
- * Green the cities, increase understanding of plants and man's dependence on environment, sustainable utilization of resources, recycling, create an interest in the environment.

- * Learn to have appreciation for plants, soil and environment
 - * Urban agriculture provides sustainable cities and the capacities of food production. It is a local project which teaches the community and individuals to understand the interaction between plants, weather, soil, seasons and food – thereby putting people in touch with their own environment.
 - * Understanding the effects of environmental degradation on food production, provide framework of understanding for community decision making.
 - * Through practising it successfully we would be educated and become environmentally conscious.
 - * Consciousness about importance of not dumping plastic and non-decaying containers and the effect these have on soil.
 - * Realize value of open spaces
 - * Hierdeur kan mense die waarde van die omgewing beseef en daaraan begin werk om die omgewing nie te vernietig nie, maar te bewaar.
 - * If managed correctly we would have a better understanding of the balance in nature and the interaction between the two.
 - * People can learn to take responsibility for their world.
 - * Participation will help people to take responsibility for their environment
 - * It promotes an awareness and understanding, sustainable use of resources.
 - * Greater understanding of processes of food production
 - * To improve the use and understanding of the environment as a natural and unrenovable resource. It would help to turn low usage areas into potential money making businesses.
- Urban agriculture, with the course contents as indicated will have very little value if any at all.
 Test viability, bring cost or value of land into consideration, chlorinated water will have a negative effect on plant growth, production, pest control even a larger problem.
- Environmental conservation (9.2%)
- * Hoe grond verbeter en bewaar kan word. Identifikasie van eetbare plante, gebruik van plantmateriaal tot voordeel van mense.
 - * Bewaring van enige beskikbare grond en water (natuurlike hulpbronne), belangrikheid van herwinning, higiëne van voedsel.
 - * Verantwoordelike gebruik van water, grondherwinning, wisselbou, hergebruik van water, vermindering in besoedeling, produktiewe benutting van oop spasies.
 - * Bewaring van natuurlike hulpbronne as geheel.
 - * Preserve water, clean the environment, bring nature to the community
 - * Rommelstrooi en afkap van bome sal verminder word, die gemeenskap sal die waarde van bewaring leer.
 - * Logical motivation to preserve the environment.
 - * Learn to plant 10 trees for every one tree that is chopped for firewood / paper.
 - * It will teach recycling, soil conservation, environmental sensitivity, recycling and it would be a aesthetic improvement to the environment.
 - * Omgewingsopvoeding sluit in die bewaring en ontwikkeling van die omgewing.
 - * Waarde van plante oordra aan mense
 - * Reduce unwanted waste
 - * Beheer afval produkte – beter beheer van afvalprodukte
 - * Making it environmentally friendly
 - * By showing the link between conserving environment and how agriculture can benefit the user.
 - * There will be no room for refuse dumping as all empty spaces will be usefully utilized.
 - * Clean rivers, stormwatersystems, appreciation of nature.
 - * Teach conservation, sustainable living and farming
 - * By promoting sustainable land management especially the use of environmentally friendly activities
- It is all part of primary health care and market gardening (the beginning toward formal parks and playgrounds)
 Hands-on experience of biological processes and the effects of pollution can be pointed out.
 Utilization of unused land can help to improve general conditions of the people. Municipal bylaws should be revised.

13. **Soil Conservation (2.2%)**
- * Understanding soil and its importance, we can hope to conserve it. Water management and water care will help promote environmental education.
 - * Better utilization of soil – soil conservation.
 - * Stabilizing soil and producing food.
 - * Use soil conservation techniques and chemical free farming methods.
 - * Enriches soil, beautifies the area
 - * Awareness of soil and soil improvement – so erosion and misuse of soil can be prevented
14. **Participation of whole community**
- * By involving as many residents as possible to develop and maintain open spaces in their respective residence is the first step to environmental education.
 - * Active participation of the whole community through community farming, community receive something from the environment and will therefore participate in conservation, they will realise the value and importance of land
15. **Integration of town and country will take place**
16. **Practical experience**
17. **Currently such a course will not be afforded by those whom it is intended to benefit. Consult with people and establish their needs.**
18. **Permaculture, organic fertilization, waste management**
19. **Empower people, keep them busy. Edible medicinal plants**
20. **There is a need for permaculture**
21. **Houdingverandering by mense oor die regering (grond behoort nie net aan die regering nie, maar kan deur mense benut word.**
22. **Protection of top soil, awareness of value of growing plants, opportunity to grow multi-plants, retention of organic material.**
23. **By launching a series of projects.**
24. **Basic principles, identifying resources amongst waste products, greening the township environment.**
25. **I do not know, I would suggest that this is the wrong focus for the course.**
26. **To educate, not to pollute; grow food at your home, beautify your immediate environment (respect for it, a place to rest, something to be proud of).**
27. **If someone produces material linking the elements of urban agriculture to major environmental principles, it is a leap forward.**
28. **Urban agriculture can prove that the theoretical abstract environmental education can work practically (1.3%)**
- * **Theory in action**
 - * **A practical, useful way of learning about sustainability, ecological process, small scale agriculture, social interaction and community empowerment. Visible evidence of ecological principles at play.**
29. **Environmental awareness, resource conservation, recycle water, knowledge of organic alternatives, productive use of vacant and under utilized land.**
30. **It can have a positive or negative effect on the environment.**
- * **We must make the people aware of the environment and that agriculture projects can disturb the environment as well.**
31. **As long as Urban Agriculture is taught and practiced along strict environmental guidelines, it's contribution to environmental education would be valuable.**
32. **Help the environment and the community**
33. **Meer gespesialiseerde persone**
34. **By reaching communities and local government so that they can better manage their environment**
35. **By building capacity for the development of sustainable areas**
36. **Women's role is central, children participate**
37. **Integrate ecological principles into agricultural practices**
38. **By introducing it to community service organisations, groups or women's groups**
39. **It can be of use to the residents to inform them of the necessity of the proper development and usage of land – even in a town – and to supply the necessary medium to upgrade the population**

- 40. I do not think it will have a major impact
- 41. Contributing to knowing where and how to utilize unused open spaces, how to protect the environment
- 42. Demonstrate optimal / sustainable use of available resources using low impact technology and design.





**ANNEXURE C: VERBATIM RESPONSES ON POLICIES IN
REGARD TO URBAN AGRICULTURE THAT LOCAL
GOVERNMENTS SHOULD REGARD AS IMPORTANT FOR
URBAN AGRICULTURE**

VERBATIM RESPONSES ON POLICIES IN RESPECT OF URBAN AGRICULTURE THAT LOCAL GOVERNMENT SHOULD REGARD AS IMPORTANT.

1. Sustainable waste management on recycling waste water. Use municipal open spaces for gardens.
2. That each street should have a row of trees. Enough space be allocated for growing vegetable gardens.
3. Townplanning (5.7%)
 - * Develop and design public open space in such a way that it can be used (economically) for urban agriculture. (urban planning and support systems). Town planning.
 - * It should be provided for intown planning schemes, structure plan and development plan.
 - * Policies which refers to the Town Planning Schemes and structure plan.
 - * Spatial planning for industry, agriculture, housing, greenbelts – with transport
 - * Townplanning, land–use, provide space for food production
4. Regarding access to land (19.0%)
 - * Allocation of land should be done by local government. Application by interested farmers should be subjected for approval by the local government, type of crops to be planted should be subjected for approval as well.
 - * Ground can be made available in suitable areas and possibly be leased by the public on condition that the gardens are worked by the community themselves:
 - * Land tenure, accessibility, monitoring of status. (Make land available (not for free – rent), ensure land are used properly with proper agricultural activities,
 - * Open access to markets, make open spaces available for agriculture, industrialisation (factories) should be in areas with soil with poor agricultural potential.
 - * n Sekere hoeveelheid grond moet uitgehou word en beskikbaar gestel word aan persone wat daarvoor kwalifiseer.
 - * No land should be underutilized, allocated land for growing food should not be used for other things, land should be taken away from those that are not using it.
 - * Provide land if need arises.
 - * Use available land that is not used for other purposes rather than make specific allocation
 - * No rights to own land, no subsidies to be granted.
 - * Benutting van woonerwe moet voorrang geniet. Sites of botanical importance should not be disturbed.
 - * Dit moet geensins die oop ruimtes in parke vir verfraaiing en ontspanning beïnvloed nie.
 - * Verander beleid om onontwikkelde oop ruimtes op belastingbetalers se rekening in stand te hou deur liewers die grond uit te huur vir stedelike landbou.
 - * Allocate the land for the poor, allow that the land be used for urban agriculture, no payment for the processing of the application by local government.
 - * Local authorities can not allow people to use open ground in building areas for urban agricultural purposes because this will allow people coming from rural areas to squat and steal.
 - * Provision of land, support for markets of goods produced
 - * Land should be allocated to only those who would use it effectively, people should practice their farms the way they want to (minimal government interference).
 - * Geen beleid, behalwe dat die stedeling maklik toegang tot die huidige landboustreke vir advies moet verkry.
 - * To make land available to everyone, to ensure that land gets utilized properly, land should be available for free agricultural activities must be done properly.
 - * Policies should stimulate the use of land. i.e. through reduced rates of land.
 - * Land tenure
 - * The release of land under ESKOM powerlines.
 - * Policy makers should provide a lee–way in which accomodation of requirement can be made available.
 - * Die beskikbaarstelling van oop onbenutte areas
 - * Die benutting van woonerwe moet voorrang geniet en verdere ondersoek is nodig i.v.m. die beskikbaarstelling van bykomende grond by informele nedersettings.

- * Planned park areas in low income areas can be used as food gardens until the need for parks arises.
- * Supply water and land
- * Zoning agricultural soils, strengthening legislation against resource management, policy which provide for the disadvantaged to gain access to agricultural land.
- * Set aside land for this purpose
- * Good control over the usage of such land
- * Public open spaces must be used productively, must be made available to the community. Legislation towards servitudes must be put in place to ensure that the community can utilize it.
- * Policy on land availability – in context and in relation to other land uses and taking the impact on the environment into consideration.
- * Land allocation size for what use? – Jobless people only, size of households, age of interest parties, gender issues.
- * Vrugbare land moet aan die gemeenskappe gegee word vir sukses.
- * Provision / allocation for land
- * Land ownership, hectares allocated
- * Encourage by making municipal land available on loan base
- * Agricultural property should be in reach of every urban dweller
- * Besikbaarheid, waarde van grond (studies moet gedoen word om te besluit watter grond gebruik kan word).
gebruik kan word (4.3%).
- * Identifiseer en allokeer grond.
- * Formuleer beleid sodat stedelike landbou wel mag plaasvind, wys terreine uir (komitee moet persele vind)
- * Establish the accurate value of the land by taking the people's life stule into account.
- * Recognition of importance of urban agriculture from planning schemes (suitable/adequate land), defining type of agricultural usage for local areas, policies should encourage such usage of land.
- * Identify prime land, provide only community gardens, promote backyard gardens
Promotion (3.8%).
- * Food severity promotion. Small slave commercial production to be promoted.
- * Create markets where products can be sold.
- * Promotion (urban employment, training, agriculture)
- * It should be promoted
- * Training must support the implementation process
- * Assist with development of marketing channels, provide information.
- * Promote the concept by providing guidance and advice.
- * Promote it in the appropriate areas
- * Family / community involvement (5.2%).
- * Involve the whole family unit – not only school children in the educational process.
- * The gardens must be established and worked by the communities themselves and all benefits must be fed back into the community.
- * It must add in the upliftment of the community, more productive use of urban open spaces, community involvement.
- * Empowerment of individuals and communities to develop urban land.
- * Large scale economic farms, small household gardens.
- * Active community participation
- * Community project policies
- * Allotment system similar to that in the UK. Utilize plant species with ethnobotanical uses.
- * To be decided by the community
- * It should be community driven – government assist. Workshop the issue on policies
- * Projects for all. Dedicated cooperation for the entire family, ongoing/uplifting commitment
- * Local control and management over urban agriculture. Proper control (4.3%).
- * Proper control should be exercised to ensure good agronomic practises are enforced.
- * Control of urban livestock. sanitary health, market points

- * Permit and control
 - * Overall control of land allocation, make public spaces available
 - * Control: to ensure fair and productive practices
 - * Provision allocation and control of land degree to which staff of local authority should be involved in ongoing project e.g. planting/harvesting
 - * Local government must be in charge and the distribution must be done by local government
9. Kontroleer komposhoop bedryf, elke eienaar moet die boom voor sy huis as sy eie aanneem.
10. Water at full cost, some reduction in rents (say half) from their full economic value. Area (but not individual) locks and fencing.
11. Realize / be aware of the importance of urban agriculture (6.2%).
- * The awareness to improve the urban environment. Realize the importance of urban agriculture.
 - * Local government should regard urban agriculture as important, realize it would reduce the food crisis in South Africa.
 - * An understanding of the importance of urban open spaces. A positive attitude towards the importance of urban agriculture.
 - * Open mind to utilization of OS for agriculture
 - * A positive attitude to the importance thereof.
 - * Accept that urban agriculture is an important component of urban agriculture
 - * Encourage vegetable gardens
 - * Change policies and bylaws to accept urban agriculture as an important service to the community.
 - * It should be appropriate and sustainable so that urban agriculture could be regarded as important.
 - * Local government should accept urban agriculture is necessary and desirable, therefore they should encourage it.
 - * Support urban agriculture in principle
 - * Allow urban agriculture
 - * Realize it is a must
2. There should still be enough space for active and passive recreation, users should pay for water used, it should be managed by residents and not by government.
3. Agriculture should not be urbanised – get agricultural specialists on this issue.
- * In no way can open areas on zoning schemes be seen as potential urban agricultural land.
4. Integration of this environmental production within the whole environmental planning, development and upgrading development process.
5. Tipe gebruik van grond, water en grond beheer, opvoedkundige program vir gebruikers, keuse van gebruikers.
- Storm water control, open space planning.
- Food security / production
- Job oppertunities (3.3%)
- * Using open spaces to provide food and job oppertunities. Create nature conservation
 - * Doelbewuste poging vir werkskepping, identifiseer oop ruimtes, opstel van omgewingsbewaringsbeleid.
 - * Food security, job creation
 - * Job creation
 - * Creating jobs
 - * To help the lower income groups to help themselves
- Forced recycling, Proper utilization of land, education, community participation.
- Urban agriculture should play a major roll in RDP. Allocate 10% of funds to the encouragement of urban agriculture.
- Allotment policy
- Create infrastructure and transfer structure to community committee.
- Socio-political factors must be considered. Consultation with communities is vital.
- Access to research, extension, information. Involving NGO's and private sector.

25. **Education / training (2.4%).**
- * Social workers can train communities.
 - * Train farmers further, create a marketing structure, channel financing, give technical back-up.
 - * Carry out environmental education concepts, create jobs, .
 - * Community education should allow for urban agriculture to take place. Health policy should include what to grow, planning policy should allow for urban agriculture to take place.
 - * Environmental education
 - * Teach school children how to grow food
26. **Herwinning van afvalmateriaal, recycling water (3.3%).**
27. **Recycle water, use servitudes for urban agriculture – additional land for housing shouldn't be used.**
28. **Sustainability (5.2%).**
- * Ecological sensitivity, sustainability
 - * Self-sustainability
 - * Sustain resources, combat pollution, awareness of environment, conflict management
 - * Sustain living / non-living resources
 - * Assuring that practices are sustainable, access to land is fair, marketing channels are open, inputs are available.
 - * People must take responsibility for the land allocated to them to ensure that they use it to sustain themselves
 - * All natural resources must be sustained effectively; ground not utilized, with agricultural abilities should be made available.
 - * Economical sustainability
 - * Sustainable land management (continued production, environmentally friendly activities, maximum production per unit area, economic viability)
 - * Attitudes should strive towards sustainable development of available resources
9. **Negotiate policies with NGO's and other interested and affected parties.**
0. **Infrastructure planning, provision of street markets, urban waste disposal and recycling.**
1. **Subsidise vegetables and tree seedlings, zone residences.**
2. **Land use policy, food pricing policy, urban pollution prevention policy.**
3. **Nature conservation – pollution control and water resource control.**
4. **Water usage (1.9%)**
- * Water supply policies, recycling of sewerage and related health regulations regarding usage of recycled water
 - * Recycling waste water, progressive land-use policies, flexible land-use, water and waste management policies new housing development
 - * Importance of water
 - * Treated sewerage water, run-off water
5. **Implement agriculture at grassroot level in schools, assist in making land available.**
6. **Prevent pollution, access to land, support food-security policies, health care policies in regarding to urban agriculture.**
7. **Environmental production awareness, land tenure, security**
8. **Encourage urban agriculture, financial support in the form of extension officers, help people to help themselves.**
9. **Provide security, ownership should be legally transferred to entrepreneurs, evaluate beneficiaries**
0. **Development of people**
1. **Involve young people, no gender must be considered**
2. **Stabilisation of agricultural soil**
3. **Full booking of an agricultural agency to ensure proper farming practices**
4. **The space to provide for your own food, water concessions in regard to water use.**
5. **The system must be created, a trained farmer allocated to it to qualify to get permanent residence on a piece of land.**
6. **Environmental protection policies. physical planning policies.**
7. **Respect for the environment, develop a culture in which all individuals are responsible and accountable for**

- the quality of the environment learnt to treat water resources as a scarce commodity and to use it sparingly.
48. Minimal interference
- * Self-help
- 49 Use local land taxes for urban agriculture, food security, promotion of feeding schemes.
- 50 Manage poverty. Improve the lives of the poor urban comprehensive land-use plans – incorporate food production and socio-economic structures. Assess impact of food production community participation.
- 51 No squatters, make use of professional advice, only interested persons or people with a farming diploma / certificate.
- 52 Provision of land, proper use of allocated land, recycle all waste, education, monitoring and evaluating the above.
- 53 Supportive technology should be available for those that want to participate in urban agriculture.
- 54 Tax reductions for productive garden owners.
- 55 Uncontrolled domestic animals in the streets should be prevented
- 56 Productive greening and use of open spaces in built up areas
- 57 Change bylaws
- 58 Policies should ensure that unhealthy environment is not promoted through urban agriculture.
- 59 Set down guidelines, management principles, pay as you earn.
- 60 All parties must share the responsibility
- 61 Land accessibility and finance.
- 62 Opheffing
- 63 Provide land, skills and knowledge.
- 64 POS in established suburbs remain as is or be developed into parks, the creation of urban agriculture should be subjected to an EIA so that the concerns of all communities can be considered.
- 65 Identification of suitable areas, opening strategies, identifying participants, tax benefits for interested companies.
- 66 It is a free market, safeguard water, soil labour, capital. No subsidy, make land available.
- 67 Open spaces must consist of sport, nature, parks, bird sanctuaries and urban agriculture.
- 68 The issue of land-ownership should be clearly spelt out.
- 69 Too little is known to form policies.
- 70 Avoid just putting people all over to keep places suitable..
- 71 Land availability, policy with regard to provision and usage of water, health policies, policy for sale of produce.
- 72 Protect soil, individual rights to use land, control of land and water usage
- 73 Make profitable .
- 74 Land ownership rights, control allotments through regulation, protect ownership through population exploitation.
- 75 Provision of facilities, information structures
- 76 Use open spaces, influence of urban agriculture on the city, the amount of open space that should be used, entail more than just that required for personal use.
- 77 Wateruse, supply and cost. Waste management infrastructure and education, land allocation policy, land-use planning and zoning.
- 78 Zone land, use of chemicals, use of implements, policies regarding riverbank



**ANNEXURE D: VERBATIM RESPONSES ON ASSISTANCE THAT
THE LOCAL GOVERNMENT CAN PROVIDE REGARDING
ACCESS TO LAND.**

VERBATIM RESONSES ON ASSISTANCE PROVIDED BY LOCAL GOVERNMENT REGARDING ACCESS TO LAND.

1. **Beskikbaarstelling van grond en water wat meer bekostigbaar is. (gebruikers moet kostes van water self dra) (3.6%)**
 - * Low electricity and water rate.
 - * An affordable rent on land and make water available to tenants
 - * Put land aside for agricultural use, or provide free water.
2. **Solution of legible and people with potential and capability or skills to be farmers**
3. **Make unused land available (19.0%).**
 - * Make undeveloped, unusable land available so that unused land will be utilized. Allocate land.
 - * Land could be made available for urban agriculture
 - * Local government should regard access to land for food and job oppertunities
 - * Allow use of available land
 - * Local government should issue land under group ownership, with all names of land users on record. Access to land should be granted to these users only.
 - * **Beskikbare grond wat onbenut is.**
 - * Track down various owners of unused land and help make it available. Support NGO's involvement in urban agriculture.
 - * Provide suitable land for urban agriculture with the neccessary infrastructure.
 - * Municipality can allocate land
 - * Make degraded and public land available for purchase
 - * Supply and control land Allocate open areas
 - * Make certain undeveloped, improductive, underutilized land available (permanently / temporarily) for urban agriculture.
 - * Make land available for community gardens, provide alterantive pathways for pedestrians
 - * Undeveloped public open spaces may be made available
 - * All unused or inefficiently used land should be listed and financial and technical support given to make land suitable for urban agriculture
 - * Allocate 50% of municipal open land to urban agriculture and community gardens
 - * By providing land
 - * Allocate a percentage land to urban agriculture
 - * To make land accessible to anyone involved
 - * It should be possible to accommodate urban agriculture, however it would be necessary to incorporate it into the urban open space planning system.
 - * Unused land should be brought under attention of local community
 - * Access and allocation will need to be controlled – areas adjoining the residential areas – residents having first choise
 - * To make land available to those interestød in urban agriculture at an affordable price. It must be for free.
- Identifiseer grond proaktief (11.6%).**
 - * Identifiseer (onbenutte oop ruimtes) grond proaktief asook skakeling met gemeenskappe.
 - * Consider land.
 - * The identification of land for urban agriculture
 - * **Beskikbaar stel van oop ruimtes vir landbou volgens 'n definitiewe plan.**
 - * Assistance with evaluating land for development and the initial clearance of the land.
 - * Identification of land, providing an infrastrucutre
 - * Local government can supply land ina proactive manner
 - * Indicate areas that can be used for urban agriculture, use allotment system with low rental for larger schemes, otherwise use existing gardens or plots.
 - * Onbenutte oop ruimtes identifiseer en met goedkeuring van die raad beskikbaar stel

- * Envoel Dept. of Urban Agriculture who should identify land, give jobless people access (without charge for a certain period of time).
 - * Earmark land for this purpose in structure plan
 - * Decide what land is available and for what purpose may it be used
 - * Identify suitable areas for agriculture / permaculture, zone green belts, subsidies
 - * Advising on which areas are business and which commonage.
 - * Together with Town planners / horticulturists / environmentalists identify potential areas for this purpose
 - * Identifiseer grond, maak water beskikbaar
 - * Identify land and earmark land for specific use.
5. Plans to be submitted to the National land reform programme.
5. Allocate low cost / free land (5.3%).
- * Allocate low cost land/free land on the condition that goals of productivity is reached. Water and back-up personnel to assist.
 - * Some reduction in rent (say half) from full economic cost.
 - * Make use of land free of charge, but designate it to a responsible person to manage and not to local government.
 - * Gratis / goedkoop beskikbaarstelling
 - * Handout of land to prospective farmers. If they are successful, long term leases / ownership can be given.
 - * Allow people access to land without any payment, land not used utilized correctly should be allocated to other.
 - * Low interest loans, community agricultural development
 - * Easy terms to acquire land and guiding principles on utilization of land.
 - * Provide serviced sites at low cost (long term loans), provide a minimum of basic services at a affordable rate.
 - * Make council land available – free of charge or small rental
 - * Grond teen 'n redelike prys, lenings teen 'n lae rentekoers moet aan mense gegee word
 - * Rent land at a low tariff
- Land can either be bought or a lease contract can be signed with the local authority (12.0%).
- * Stel oop onbenutte grond beskikbaar teen 'n minimale huur (nie vermiet nie).
 - * Lease land out – not a hand-out but a partnership
 - * Not at zero cost – maybe extended payment plan
 - * Ground can be made available in suitable areas and possible be leased to the public.
 - * No hand-outs, low cost loans, train entrepreneurs
 - * Indiscriminate hand-outs should be avoided
 - * Leasing – not sale or donation
 - * Tree regverdig op – mense moet vir grond betaal om 'n gevoel van verantwoordelikheid te verseker.
 - * Lease of land at nominal rent provide it is farmed correctly
 - * Local Government should be the landowner on a permanent basis. These pieces of land should be rented out to interested individuals at a very low price in order to encourage people. (The Local Government should own the land).
 - * Identification and lease of open space on favourable terms for individuals or groups
 - * Make land available for rent
 - * Allow lease system
 - * Land distribution and redistribution should be controlled by the local government. Rent, payments on land should also be controlled. A sense of owing the land give people pride and contribute to sustainable use of land.
 - * Sell land at an affordable price
 - * Non-residential land could be leased, each homeowners right to conduct urban agriculture.
- Deregulation of land
- * We deregulate land. Make provision for urban agriculture in plans.

9. **Financial assistance / funding / loans (4.9%).**
 - * Land and financial assistance
 - * Funding for this proposed course
 - * Subsidy
 - * Encourage financial institution to lend money to entrepreneurs for this issue
 - * Loans for people to buy land but they must control land.
 - * Subsidise land
 - * Low interest loans
 - * Encourage banks to give loans so that people will have access to land.
 - * Financial support service within local government structures, less rigid rules.
10. **Gelyke toegang ongeag ras, kleur of geslag**
11. **Land not in immediate use can so long be used for urban agriculture to produce goods for the communities.**
12. **Korrekte sonering, ontwikkelingsprogram, verskaf grond goedkoop, kontrole.**
13. **Townplanning (6.7%).**
 - * Real Estate Dept. should be consulted, town planning, facilitate use of edge areas.
 - * Townplanning (open spaces), provide trianing places, land close to homes should be used, buy available land and sell it.
 - * Townplanning
 - * Fertility is near homestead, so yards should be planned for residential.
 - * Proper planning of townships, with areas for recreation, market garden available
 - * Design township to provide for adequate space
 - * Through town planning schemes zones can be allocated for some special uses like urban agriculture
 - * With townplanning surplus land can be provided.
 - * Physical planning by means of policies in town planning
 - * Guidance and instruction in creative townplanning
 - * To do the establishment of townships
 - * Land and access through the planning process for new urban areas.
 - * Better land outlay, provide initially for urbam agriculture in urban design.
14. **Provide jobs do that people can buy land.**
15. **Extension**
 - * Extension officers
 - * Provide proper,y trained extension staff and a basic infrastructure
16. **Legislation:**
 - * Legal help, include urban agriculturists
 - * Local legislation / regulations
17. **Revise bylaws**
 - * Change bylaws, infrastructural development, assist in using open space in a productive manner
18. **Awareness of available land:**
 - * Land that is available should be known to communities, so that they are aware of it.
 - * Speedy recognition and acting with growth of informal sttlements, with community consultation
19. **Voorstelle vir land wat moontlik gebruik kan word (7.1%)**
 - * Waste land and unused areas around townships, small unuse parks made available to the people for urban agriculture.
 - * Urban agriculture should relate to self sustainablegardening in residetial home gardens. Allocation process of municipal land will be a nightmare. An awareness program of the potential of urban agriculture is a good idea.
 - * Grant permission to use land like road reserves, servitudes.
 - * Areas which are not important from a biodiverse prospective and which is zones as public open space can be used.
 - * Use temporarily vacant land for urban agriculture. Create organised access to land and water (allotments).
 - * Use planned park areas as food gardens, provide a raw water supply for irrigation.

- * Design garden spaces into housing development
 - * Make communal land available near townships (church runs it)
 - * Prevent urban agricultural activities in our parks. Kibbutz type of farms.
 - * Giving land to those that really need it and supporting the farmers with resources that they might lack.
 - * Allocation of some rescued greenbelt areas provided it is not misused.
 - * Plots
 - * Grond beskikbaar stel soos skole vir landbou
 - * Rethink developing of land set aside for open space in the developing areas. Acceptance of allotment type development.
 - * Most municipalities have at least 6% of development allocated to parks, not a single municipality can afford to develop the said percentage to parks, The undeveloped parks can be used for urban agriculture
 - * Steep areas or servitudes, central parks that is accessible
 - * Undeveloped parks
20. Education and finance
- * Knowledge and financial support
21. Education (3.1%).
- * Training and technical know-how.
 - * Make agricultural colleges available
 - * Opleiding en wetstoepassing
 - * Training for planning services .
 - * Education through using resources
 - * Training, orientation
 - * Educate people of the importance of keeping the land in good condition, mobilize radio, TV to create an awareness. Abolish traditional claims on land.
22. Make land, fencing, services like water for irrigation (basic services) available.
- 23 Fencing and security
- 24 Clear vacant land and control allotment of this land.
- 25 Advertise, legislation, resources.
- 26 Local government should get more involved with the land reform pilot projects.
- 27 Financial support, extension
- 28 Advertisement and marketing (posters, working with businesses, CBO's, schools).
- 29 If this is feasible – legislation, zoning, allocation, negotiation criteria.
- 30 Better usage of land with regards to requirements of the population
- 31 Minimal interference / nothing – land per se does not necessarily belong to local government
- 32 Assess land-use patterns, then assign priorities according to nature of communities, e.g. sport, passive recreation, woodlots. Feedback from communities essential.
- 33 Local government must use the expertise of organizations that are fully involved in uplifting the community. (Food Garden Foundation)
- 34 Nothing
- * Nothing – should be commodity driven, maybe they could facilitate initial meetings but thereafter the community must take over
 - * At this present moment none
35. Set land aside for community where jobless people can work under supervision and get the best guidance
- 36 Public participation in the planning process, the design and management of parks as safe environments, creating an open space plan., planning of rezonation of land.
- 37 Kibbutz type of farms could be a solution
- 38 Open spaces must be community driven (maintenance under supervision of local government). Formulate legislation to ensure productivity, formulate zonings (like mosjavi system), Water affairs must also participate
- 39 Identification, water, basic infrastructure, training, financing, preparation of soils, marketing, self governance
- 40 Land use policies should allow for the minimum and maximum uses of land. Identify land (analyses), zone suitable land.

- 41 Implements
- * Implements / equipment through municipalities, provide water for free
- 42 Put correct infrastructures in place
- 43 Size of plots
- * Increasing building plots sizes
 - * Make plots larger so that rest of it can be used as a garden.
- 44 Consultation with communities, policy influence around town planning
- 45 Prepare the land, provide an extension services, markets, erect simple market centres, strict credit facility
- 46 Provide manpower and finance
- 47 Depends on quality and suitability of land. Land can be leased at a nominal rate, land should be within walking distance from home, pedestrian access to individual plots is adequate.
- 48 Use undeveloped open spaces, not parks / recreational facilities. Rent implements out, basic preparing of sites, allotment systems, organise land-use systems, supervise land users.
- 49 Land must stay with local government but can be used by the people.
- 50 Land identification, infrastructure, services, access to open spaces.
- 51 Participative decisions, tax incentives, service tariff structures, land-use planning, appropriate bylaws.
- 52 Allocation, awareness, planned excursions.



**ANNEXURE E: VERBATIM RESPONSES ON ASSISTANCE THAT
LOCAL GOVERNMENT CAN PROVIDE REGARDING URBAN
AGRICULTURE.**

VERBATIM RESPONSES ON ASSISTANCE LOCAL GOVERNMENT CAN PROVIDE REGARDING URBAN AGRICULTURE.

Education (19.5%)

- * Gereelde plaaslike kursusse, opleiding. Provide training, advise and technical know-how.
- * Provide training
- * Advise and technical know-how.
- * Community workshops, user-friendly central information points.
- * Having zone officers to help and educate.
- * Education, information services, technical support (information and demonstration projects). Support facilities. Community awareness.
- * Give education on how to use the right equipment.
- * Education such as this course you propose.
- * Guidance and advice.
- * Knowledge, know-how, awareness, training, advice.
- * Consultants, Horticultural advice, assistance with projects.
- * Progressive advice to the community.
- * Training.
- * Educational programmes, demonstration projects, literature on edible plants, workshops, providing seed and compost.
- * Education and empowerment of relevant officers.
- * Manpower and education
- * Training and workshops
- * Advice

Funding (4.8%).

- * Bursaries for this course. Offer jobs to the pupils who have completed the course. Technikon should link student up with local government to ensure jobs after training.
- * Omheining van geïdentifiseerde areas, daarstelling van fondse.
- * Subsidie
- * Financial assistance for those who need it.
- * Assist in obtaining sponsors, provide loans for fencing and food stalls.
- * Subsidize those who are interested in developing people in that line.
- * Financial assistance (water, fertilizers)
- * Financial expertise and empowerment
- * Subsidising production inputs
- * Financing

Education and finance (2.2%).

- * Training, education, tax incentives.
- * Education (get private sector more involved) and finance
- * Financial support and training
- * Training and finance
- * Provide affordable loans or grants to the poor. Facilitate relevant and cost effective training.

Extension (7.8%).

Well trained urban agricultural / extension officers should be made available by Local Government. They should go around almost daily to inspect, educate and render help to urban agriculturists.

Technical extension

Extension officers to sort out problems, act as contacts with formal agriculture

Praktiese besoeke

Supply suitably trained extension officers

Extension officers and horticulturists assist farmers

Extension / training

5. Access to land (2.6%).
- * Stel grond beskikbaar, fondse vir lewensvatbaarheidsstudie
 - * Allocate land in the townships and buffer land.
 - * Provide land free or take small % of earnings.
 - * Make land available
6. Water (9.1%).
- * Water supply and water management (Water supply from irrigation settlement, waste water can be used more productively.
 - * Support, free water, fertilization and seeds.
 - * Reduce food crisis so that waste water can be used more productively in urban agriculture
 - * Assist in information on environmental aspects, make water points available (the use of water should be paid for).
 - * Provision of / help with an irrigation point, water should be paid for, provision of refuse, green waste for composting.
 - * Stel water en ander hulpbronne beskikbaar
 - * Make water available to tenants
 - * Waste water
 - * Access to land and make water available to these identified areas.
 - * Access to water
 - * Helping with expertise regarding usage of water.
 - * Water supply, waste removals
 - * Supply water for irrigation purposes, boreholes, supply implements.
 - * Water can be supplied as well as tools needed.
7. Make provision for urban agriculture in plans.
8. Training, loans, seeds, fertilizers
9. Voorsien water, stel onbenutte grond beskikbaar teen 'n minimale huur.
10. Die behoud van landboustreke en dit moet stedelike landbou insluit.
1. Security (2.2%).
- * Fencing
 - * Security as theft is a real problem
 - * Safeguarding the allocated place
2. Local government could coordinate projects, information could be forwarded to the community.
3. They should concentrate on urban agriculture in rural areas and not in urban areas – the latter may only be suitable for small scale gardening which is not agriculture.
4. Opvoedingsprogramme, beheerbeamptes, ontwikkelingsassistentie, gesubsidieerde toerusting (kompos, saad, kunsmis).
5. Infrastructure (2.6%).
- * They can provide the necessary infrastructure.
 - * Help with starting up of infrastructure
6. Access to equipment for rent.
7. Set up markets
8. Support facilitation
9. Advice, extension, information, financial support, seedlings, coordination, demonstrations.
10. Safety measures, training facilities, water supply (2.2%)..
1. Lower tax rates, establishing facilities at market place.
2. Maintenance of implements and pumps
3. Water, land and bylaws
4. Marketing: Continuous advertisement on the importance of urban agriculture
5. Promote community-supported development, involve outside developers and private sectors, support.
6. New initiative, mobilize necessary labour, promote and enhance local expertise.
7. Urban type of farm could be a solution

28. Provide water, land, education (skills, encouragement, guidance)
29. Plan residential sites sufficiently large, provide ways of saving water (water tanks, sponsor easy to read/ understand publications on urban agriculture.
30. Advisory personnel, build an open market at a central place for more than one community garden, provide training – no hand – outs.
31. Local government should be part of the process and be part of compiling this course
32. Zoning more open – space.
33. Research, extension, information, facilitation.
34. Water supply, proper control, education.,land
35. Extension, financial and engineering services.
36. Make land available, fencing, services (irrigation systems)
37. Make process materials available.
38. Lease of land
- Recycle water, sewage, organic waste. Provide training centres in partnership with CBO's and NGO's.
39. Provide the money to build the capacity.
40. Support must be research and development related. Finance administration of land, taxes.
41. Security, training and tools for the work.
42. Provision of land, education and training facilities, waste collection and recycling, marketing of produce.
43. Aanle van water, hulp met grondwerke, hersirkulering van afvalmateriaal.
44. Training, extension, finance, land.
45. Waste water, compost, refuse dumping, training (extension officers), waste land (under powerlines, traffic islands).
46. Appoint agriculturists to drive process, supply centre for implement hiring, provide markets, provide advertising.
47. Review land use plans, select appropriate sites, provide the know-how.
48. Financial assistance as well as extension, training, marketing facilities.
49. Extension / advisory services, seedlings, organic manure, hand-tools.
50. Extension advice, fencing, water irrigation, vegetable seedlings (at a low cost)
51. Training, extension, security, marketing services
52. Fertilizers and pesticides at a low cost.
53. Credits for inputs, funds for implements, water availability
54. Education, finance, irrigation, transport of products to markets
55. Research, extension.
56. Preperation of land, machinery (tractors, ploughs)
57. Infrastructure, composing material (services), making land available, education
58. Local government should enforce payments of high fines if anybody dare to litter our city streets.
- 59= Training programmes, tool-hire, equipment sheds, transport and markets, water-supply, fencing.
10. Onderhoud van persele t.o.v. watervoorsiening en instandhouding, demonstrasies (opleiding)
61. Reduced rent, resources
62. Technical advice, organic fertilizers, compost
63. How can local government assist in leveling ground, removing rubble, storage of water in dams?
64. Water and extension services
- Access to resources, develop farms for advancing decision making bodies, develop a land use plan for a specific areas.
65. Nothing (should be a private initiative)
66. Get it going
67. Education and infrastructure (monitoring, marketing)
68. Would have to be formulated together with local governmnet.
69. Management, public training, communication with communities
70. Supervising development, maintenace, make zoning areas available, develop the system, Workshops.
71. Free of charge to local inhabitants. Provide water free of charge, but under supervision to prevent wastage.

- 72 Encourage recycling, education, provide water, make agricultural advisors available.
- 73 Make knowledgeable people available:
- * Hulp van landboukundiges, bystand van boere.
 - * Horticulturists can assist on a part-time basis.
 - * Make available qualified horticulturists to train the people.
 - * Expertise from council officials
- 74 Leadership, networking
- 75 Empower the community to participate
- 76 Facilitate access to markets, financial assistance, provide sites and service, demonstrations, training facilities, gardening clubs.
- 77 Production of compost.
- 78 Town planning
- * City planners must incorporate it in the holistic planning of urban areas
 - * Better urban planning regarding use of treated sewerage effluent and urban runoff.
- 79 Creative thought and leadership, detailed local information.
- 80 Assuring technical support for community, finance
- 81 Training, access to information, technology, water, incentives, child care, markets.
- 82 Overhead resource management
- 83 Unused water resources should be made available, marketing services
- 84 Financial, extension workers, training centres.
- 85 Can assist in access and services: roads; water, market facilities
- 86 Create awareness such as free land of commonly certain set standards
- 87 Permanent demonstration plots and places to sell produce.
- 88 Start the project initially but must be handed over to the community which must ensure that is self-sustaining – provide technical back-up thereafter
- 89 Hands-on assistance, land allocation, outlets for end product – market site.
- 90 Policy formulation, make land accessible, liaison with communities, environmental education
- 91 Rate, levy, tax incentives, education and extension services, land access, water access, energy access, participative decision making.
- 92 Training of persons for technical support, monitor development of urban agriculture, make land available.



**ANNEXURE F: VERBATIM RESPONSES ON MAJOR PROBLEMS
THAT COULD BE ENCOUNTERED IN URBAN AGRICULTURE**

VERBATIM RESPONSE ON THE MAIN PROBLEMS THAT CAN BE ENCOUNTERED IN URBAN AGRICULTURE.

1. Money and a lack of knowledge.
2. Pollution (4.4%)
 - * To teach the people not to throw waste around will be a tough one. However if this is taken as community development where the community is involved in project form, this might work.
 - * Land being soil eroded, rubbish picking up, deterioration if no goals are set.
 - * Environmental – animal waste (pest control) – these could not be dumped into sewerage systems or normal drainage without problems. Water quality (soaps, etc.) will not be acceptable for agricultural production.
 - * Onoordeelkundige gebruik van grond, plaas, waterbesoedeling, grondverlies, transport.
 - * Re-cycled water can be a health hazard, livestock in the city should be discouraged (health risk). Doing agriculture at the expense of retaining indigenous vegetation and natural areas. Green spaces are required for recreation.
 - * Erosion, underutilization, uncontrolled clearing of wetlands
 - * Soil erosion, squatting, theft
 - * Noise, odours, erosion, drainage, and various other health hazards
 - * Kontrole is noodsaaklik – anders sal dit ontaard in ongewenste toestande (kompohope wat nie reg bedryf word nie, hoenderhokke – swak onderhoud)
 - * Pollution especially in the livestock section.
3. Availability of land, water (availability), theft, lack of money, assistance by local government, knowledge.
4. Water (4.0%)
 - * Lack of water – more water will be used by the urban environment. Bad water management (who pay for water) : Suggestions contaminated water, recycled water, proper education.
 - * Bad water management (who pay for water). Suggestions: contaminated water, recycled water, proper education.
 - * Die gebruik van hoogs geduiwerde water vir groentes en plante. Die "vervoer" van besoedelde water na gebruikspunte. Beheer kostes van plaas en plantsiektes. Grootmaakproses vir die plante.
 - * Water availability and plant disease control
 - * Use waste water to assist
 - * Lack of water.
 - * Waste of resources, financial losses due to current unwillingness to pay for water.
 - * Water shortage
 - * Bad water management, water shortages
 - * Moet waterrekening betaal, te min grond beskikbaar
 - * Cheap water and enough land
5. Theft and vandalism (5.9%)
 - * Theft, security
 - * Security and finance
 - * Theft of produce. Resistance from conservative people preferring decorative gardens to sustainable agriculture.
 - * Theft and land invasion
 - * Theft, vandalism, friction. Identification of interested people.
 - * Theft – land must not be accessible for people from outside the involved communities.
6. Pollution, markets, transport, pests, diseases
7. Security of product being produced, availability of infrastructure. Payment of services rendered. Who is going to pay for water or electricity?

- 0. Theft / vandalism and drought
- * Marketing, water, theft
- * Theft – water available (who will pay), use of open land for housing or sport.
- * Theft, misuse of water.
- * Theft of all produce, provision of water
- 0. Theft (lack of security), lack of management (correct use of land), corruption
- 1. Lack of sustainable social structures as it must be planned with the people by the people for the people.
- 2. Cost to local government and general apathy of poorer people.
- 3. Pressure to develop urban agriculture to raise taxes.
- 4. That the economics have not been properly examined. Security issues.
- 5. Lack of knowledge, funds, interest, the will to do.
- 6. Uneven distribution of available land. Disputes over land
- 7. Lack of information, money, resources
- 8. The distribution of benefits, management required, unavailability of land.
- 9. Insufficient land, inadequate tools
- 0. Access to appropriate land, dealing with security and vandalism.
- 1. Too many NGO's, Government must really be committed, it must create wealth.
- 2. Ownership:
 - * Lack of ownership, must be community driven, theft.
 - * If on private land – no problems. If local authority land: land allocation, service provision, security, resistance from local authority to make land available for agriculture.
 - Competition for land for industrial, residential, other uses.
 - * Open space zoning and ownership of land.
 - * Landownership. Arguments over ownership of land.
 - * Basis on which land is allocated
 - * Competition for land – use.
- 0. Too high expectations, a very small part of the population can take part, water shortages, lack of business skills.
- Lack of knowledge:
 - * Lack of knowledge and understanding of agricultural process.
 - * Lack of skills
 - * Ignorance
 - * Lack of understanding
 - * Training and education
 - * Lack of knowledge. top down involvement of authorities.
 - * The fact that people do not understand the advantages themselves.
- It can create the perception that a family can live of a small piece of land.
- Markets
- Community housing and people always on the move.
- Lack of knowledge, skills, lack of water / irrigation, capital, distribution network, motivation. Clash of interest / competition between land users.
- Organising van 'n ekonomiese eenheid, kreatiwiteit ontbreek, identifisering van entrepreneurs, gemeenskapsbetrokkenheid ontbreek, tekort aan inligting, kennis.
- Lack of interest. / apathy
 - * Lack of public participation.
 - * Lack of interest in agriculture, lack of inputs, monopoly, theft
 - * Community involvement (getting them involved)
 - * Lack of interest and willingness to co-operate by the community
- Die kaping van projekte deur politieke en ander organisasies vir eie gewin asook burokrasie in stadsrade.
- Theft, water shortage and costs, soil erosion.
- Provision for water, plundering/stealing, conflict of land usage (1st and 3rd world users).

Theft and lazyness

Availability and access to markets, lack of expertise, funds and management thereof, ethnic differences, lack of organisation, need for ownership, drought, poor soils.

Overproduction of a specific crop at a certain time of the year.

Theft, vandalism, resistance to change current exploitation of land.

Proper control

Theft, vandalism, poor access to extension officers, lack of suitable soil, pests.

No interest, theft, competition between agriculture and housing, flooding with market of the same crop.

Opposition from real estate.

Scarcity of water, restrictive legislation, municipal bylaws

Unrealistic expectations. (conflict between local authorities and community)

Water shortage, land being allocated to people with no interest in agriculture, poor production in produce

Economic factors with regard to trade, people must be shown what to do with byproducts, otherwise our cities will become dumping ground.

Negative attitude by council, finance

Management of infrastructure, community development and training.

Theft, acquiring suitable land, lack of water, marketing of products, transport to markets

Squatters, illegal plants being planted, green grocers may have to close their businesses, more pests and insects may invade land due to a lack of insectidal management.

Unrealistic expectations, vandalism, theft, resistance from other parties, pollution, estetic loss of open areas.

Viability to compete in current market, resistance to change from local authorities, the water act needs to change.

Changing peoples attitudes to use urban agriculture as a source of income, shortage of land in urban areas, making land available.

Security, training, attitudes, lack of willpower (community) to pull through.

Lack of understanding from local governments (shortsightedness, resistance to new ideas), conflicting demands on land, lack of capacity, lack of knowledge.

Health hazard, look untidy, lack of transport and equipment to cultivate the land.

Insufficient management, poor planning, lack of finance.

Lack of land, knowledge, security, facilities

Lack of knowledge, space, high expectations, living standards could drop.

Interference by local authorities

Gebrek aan bekwame bestuur, leiding, kundigheid, basiese vaardighede, oordrag van inligting aan ongeletterdes, hulpbronne, persoonlike motivering.

Household plots too small, squatters too poor to afford inputs, getting owners for unused land, lack of communal spirit.

Drought, dispute, finance, theft, disease

Government rigidity, bylaws, create acceptance in community, theft and vandalism

Theft, lack of knowledge

Attitude of stake holders, land availability, lack of funds and motivated trained staff.

Lack of extension services and funds

Security (physical presence of entrepreneurs is necessary), animal production will only be possible on a limited scale.

Over using of small pieces of land, underproductivity (food for family only), lack of knowledge

Attitudes of the people, suitable land, irrigation, crop production techniques, marketing, economic forces working against agriculture.

Lack of marketing bureaus, market studies, production of the wrong products, lack of knowledge, not enough trained trainers available.

Derde wêreld standaarde, invloed van nie-burgers, beskikbaarheid van water.

No funds, no infrastructure, no available land, political point scoring

Apathy, misunderstanding of usefulness, implement farming techniques in the urban content. Political

understanding as to the value of urban open space.

74. Water supply, allocation of plots.
 75. Resistance by many people, not enough land for everybody
 76. Theft of produce, sabotage, lack of water
 77. Versoenbaarheid van produk met die area waar dit geplant word.
 78. Lack of knowledge, lack of land (2.0%).
 79. Community support and involvement (lack of interest), lack of water
 80. Toiletgeriewe, diefstal, sekuriteit, keurin van kandidate, invordering van huurgeld, bemarking van groot hoeveelhede produkte.
 81. Lack of qualified people, lack of interest (only old people wilol be interested)
 82. Hygiene, lack of interest, poorly developed marketing outlets
 83. Lack of planning with regard to appropriate crops and their management. Shortage of suitable land in areas where urban agriculture could be most useful. Lack of education, few resources for equipment
 84. Land ownership, legislation on the responsibility when servitudes are used, water resources, lack of knowledge, standards of water affairs and other government organisations.
 85. Lack of necessary services (water and sewerage), ignorance of residence, pollution
 86. Possible for land-use planning between different uses, current authority mind-set.
 87. Public land should be large enough, access to land should be freely available.
 88. The proximity of available land to where people live, so that they can look after it and make it secure. Access to adequate skills, community development can be a major issue.
 89. Access to water, fertilizers, seeds, lack of capacity.
 90. Water! Control of numerous participants, education that works on grass root level.
 91. Number of participants: Sex, age, household size, income, sustainability, water.
 92. Ignorance, water, theft
 93. Onkunde, geen talent, onbekombaarheid van lenings, grond wat nie geskik is vir landboudoeleindes nie.
 94. Finances, equipment, land
 95. Access to land, water, markets, finance, popular support for concepts.
 96. Lack of land for diverse use (3.2%).
 - * Availability of enough land (currently used for housing)
 - * Shortage of land and lack of experience
 - * Land unsuitable for agricultural purposes, no proper training.
 - * Lack of fertilized soil, lack of space, water rates.
 - * The big demand for urban land for housing, lack of priority on urban agriculture.
 - * Over-use of land, no open space or natural land left
- Other:
- * Allocation of land, water, equipment, public outcry against it, theft.
 - * Insufficient support, mentoring.
 - * Lack of training, lack of adequate land, lack of support systems, lack of facilities / market outlets, lack of collective efforts.
 - * Invasion of property, competition, apathy, friction between rae payer and urban agriculturists, water (payment), squatters, removal of indogenous vegetation .
 - * Equipment, water, land, trees availability
 - * Access to land, ensuring sustainability, political instability, costs of herbicides and pesticides, loss of interest.
 - * Lack of land, methods to use, transport, market oppertunities
 - * Lack of water and motivation
 - * Water, lack of seeds, lack of land, boreholes
 - * Markets, tools, available land
 - * Lack of ownership, tenure, theft, lack of adequate health controls or pest management
 - * Erosion, have a better infrastructure, support, facilitate with credit, health matters, pest control
- Soil preparation / erosion

- * Spaces available and productive ways to utilize them.
- * Supply information, theft, time constraints (effective cheap tools, excellent design), supplying seeds, seed-lins, suitable livestock.
- * Population growth – conversion of open spaces for residential purposes.
- * Inadequately trained staff, theft, land zoning.
- * Availability, cost of water, sustainable management system at grassroots level, economics, social structures.
- * Theft of material, sites for houses, status, politics, human behaviour.
- * Young people may not be interested, small farmers may only stay for one season and then decide to make a living elsewhere, traditional city councils may be reluctant to make land available, agriculturists may be sceptic.
- * Lack of sufficient training, bad planning, insufficient consultation, lack of support systems.
- * Where land must be shared among a large group of people disputes may arise, theft, vandalism, funding, lack of motivation and / or interest.
- * Water, finance, reticulation systems, poor rainfall, lazy labourers.
- * Management and control (administrative, financial, environmental)
- * Maintenance and staff available
- * To motivate urban people, to acquire the right extension personnel, to find the necessary funds to develop infrastructure.
- * Unhealthy circumstances, application thereof problematic, management policies will be complicated, setting of standards problematic.
- * Supervision to make development and improve the environment.
- * Population growth will invade the plots for settlement of communities. Theft, violence, scarcity of land, resources for purchase of land is limited.
- * To identify suitable land
- * Soil erosion, groundwater pollution, lack of affordable water, absence of facilities for livestock.
- * Erosion, apathy
- * Individualism – not coordinated, politics interference, funding, enough space for demands.
- * Theft, access to land, lack of funds, shortage of water, lack of training, no organisation.
- * Sustainability of programme, control to be provided, tools could be provided, should be well controlled.
- * Mistreatment of animals by the people.
- * Use of land for other or unwanted purposes, services made available not paid for, land invasion, pressure from rate payers.
- * Pressure by competing land uses, theft, vandalism, damage due to pests, informal unplanned settlements, lack of leadership, economic situation, lack of resources (compost, education).
- * Land use conflict, water availability / supply / cost, land allocation, infrastructure provision, marketing problems, unwillingness to commit.
- * Conflict of interest between residents, environmentalists and urban farmers.
- * Availability of land and water as the demand is received to be big, the possibility of having "chancers".
- * Competition for land, competition for water, the poor image given to agriculture.
- * Acceptance by community, security of crops
- * Squatting on vacant land
- * Suitable training, lack of interest



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**ANNEXURE G: VERBATIM RESPONSES ON THOUGHTS
REGARDING THE PROVISION OF WATER, RECYCLED WATER
OR WASTE WATER FOR URBAN AGRICULTURE.**

VERBATIM RESPONSES ON THOUGHTS REGARDING THE PROVISION OF WATER, RECYCLED WATER, WASTE WATER FOR URBAN AGRICULTURE.

1. Positief (31.2%)

- * Voel positief hieroor. (Can only improve agriculture. Costs should be fair. Especially where there's drought.)
- * Money well spent.
- * Waste water would be ideal if it could be collected, treated and transported inexpensively and effectively only. The project must be cheap and productive.
- * Waste water – positive; tap water is too expensive.
- * Fairly clean recycled water could be used. local government should subsidise water.
- * Encourage recycled water as it is cheaper
- * Sewerage water is currently suitably treated and released into rivers where it is utilized downstream.
- * Important to use recycled water if possible.
- * All sewerage farms should be replanned to provide sewerage water for plants, all new sewerage farms should be capable by law to produce recycled water for plant purposes.
- * Know it can be done / used from grass roots up.
- * Incentives should be created for residents to recycle solid wastes and waste water.
- * Good idea for watering
- * For small time farming
- * Yes, if it is possible
- * A very good idea – but the necessary knowledge and systems are needed.
- * The only affordable water for urban agriculture is recycled water and possibly available river water, there should be no waste water.
- * Water is scarce – must be used maximally.
- * Waste water systems can be developed to serve a larger area.
- * Municipal water is quite expensive but is the only available water source, except rivers/dongas can be dammed. Recycled water could be used where possible.

Negative:

- * Recycled and waste water – too dangerous especially when there is a sudden breakdown of equipment used. Rather clean water must be provided.
 - * Water is a restrictive commodity and therefore limits what can be done with it.
 - * Not a good idea, depends on education programmes. Use other methods of conserving water.
- Gebruik veral ander metodes van water besparing (15.4%)
- * Water kan goedkoop gesuiwer word deur dit deur rietbeddings te laat sypel.
 - * Use "grey water", i.e. water from sink, showers, taps; also rain water that run off gutters.
 - * Bore holes, streams, fountains, caught storm water in dams, caught water on roof tops.
 - * Stormwater should be channeled to water crops.
 - * Conserve rain water from roof tops for dry seasons, conserve storm water, use water storage tanks, feel positive towards use of recycled water (health inspection required).
 - * Konsentreer daarop om afloopwater te kanaliseer, beklemtoon skaarsheid van water, effektiewe hergebruik van water is noodsaaklik.
 - * Conserve water in other ways (rooftops, tanks, straw, household waste water, storage dams, install more boreholes, bewaar grondwater), recycled water is too expensive
 - * Use green water – can be used in irrigation
 - * Water should be supplied by means of irrigator heads in each plot, with a standard fee charged or included in the allotment rental. This water can be timed to go off, and can be varied according to the rainfall/season.
 - * Use stormwater or water catchment from roofs, waste-water to be re-used.
 - * Stormwater, reservoirs.
 - * Catch water from roofs.
 - * Land close to sewerage purification could be put to good use. Boreholes – the only answer in certain AREA!
 - * Construction of dams down the slope.
 - * Only rainwater should be used

5. Be careful – provide information and ensure proper understanding.
 6. Too expensive (12.7%)
 - * Who is going to pay for services (electricity, etc.)
 - * Recycling water is expensive. (Partially purified water is good for plant growth.)
 - * Too expensive (teach people to use current water sparingly)
 - * Do not use hi-tech irrigation systems, use systems that will fulfill the purpose, Do not use municipal water for agricultural use – too expensive, provide storage tanks, recycle water.
 - * Very expensive to use recycled water. Possible health hazards.
 - * A most complex and difficult problem due to cost of infrastructure
 - * Only recycled or waste water must be used as purified water is too expensive. (As long as there are no health risks).
 - * Most urban environments do not have the great existing structures to provide recycled or waste water. Water provision in urban environments is expensive, must determine a way of reducing the costs of such schemes.
 - * Can use recycled water even though it is too expensive.
 - * The infrastructure to provide to certain areas may be very costly.
 7. It should be government and urban authorities policy.
 8. Conservation education is very important
 9. 2 Watervoorsieningsstelsels: Nie gesuiwerde water vir plante en gesuiwerde water vir menslike gebruik.
 10. Make use of professional organisations like the ARC or Dept. Engineering, people do not like growing food in waste water, pay for water.
 1. Treated waste water can be used where high quality water is united. If treated waste water is recycled to the urban environment it helps to conserve drinking water, it reduces the cost of treating the waste water, reduce fertilizer inputs, the sludge from the treatment can improve soil structure.
 2. People should be trained or taught on how water should be saved or recycled and used time and again in urban agriculture.
 3. Fine – provided it is at full cost and it is paid for.
 4. Be aware of health dangers:
 - * Bacterial, chemical wastes, chlorine, soap residues are unacceptable for plant growth. Recycling -- too expensive.
 - * Recycled water is a health risk. Health danger.
 - * It should be used provided the minimum treatment to remove dangerous pathogens has been done. Users should pay for it.
 - * Excellent, however – routine health inspection is required. Catch up roof water in storage tanks.
 - * Quality control is vital (hepatitis B, salmonella) Must be controlled in respect to health.
 - * Use recycled / waste water where safe. it can not be used on certain vegetable segments. (Sodium level too high – it will damage the soil).
 - * Purify to an acceptable standard and then use it.
 - * Precaution should be taken to prevent water wastage, recycled water must be hygienic at all times.
 - * Waste water is too dangerous
 - * Recycled water and waste water can be used for gardens, provided the water is uncontaminated with dangerous chemicals.
 - * Should be done if environmentally feasible, but beware of potential health hazard.
- All people must start paying for their water – then there will be less water wastage, waste rain water should rather be used for more effective rural agricultural facilities where proper irrigation can be instituted. Water should be paid for, purified or recycled water can be used but waste water should not be used in residential areas.
- Leibeurte by strome, beheerde pomp van water, gebruiker moet vir water betaal, beheerde hergebruik program.

The principles of permaculture are particularly relevant to urban agriculture. Purified water should only be made available for drinking and domestic washing unpurified water should be cheaper and should be accessible for urban agriculture

Water must be provided cheaply if the town and its people can benefit.

Agriculturists should be involved in the planning and supply of water to ensure a feeling of control and to create understanding of where water comes from.

Initial cost is high – long term benefits should be considered.

Water from treatment works should be made available.

Besproeiing m.b.v. tuinslange sal prakties moontlik wees mits munisipaliteit groot genoeg wateraansluitings kan voorsien.

Recycled water should be used for damping the decomposed material.

Indien boerdery naby suiweringwerke geplaas word kan pyplyding aangelê word.

Cost of recycled water in case of communal gardens. Soil contamination (soaps)

Provision of water should not be detrimental to domestic supplies.

Such water can be of much use to irrigation purposes.

Water: provision from pipes carrying raw water to treatment works; recycled water: from treatment sewerage works and other industrial areas.

Minimum use of water – plant appropriate crops.

Start with waste and/or recycled water and expand only to other water source if project is proved viable.

Must be better controlled.

Methods should be developed that require a minimum use of water.

Need more research and development. Involve all role players.

Creating sites near sewerage works, providing catchpits in roadsides.

Proper policy should be set up regarding this matter. Land surrounding sewerage works should be better utilized.

At the UOFS present research projects exist that is directed at the problem to recycle and purify water by means of algae production.

Need to change water act, need to recycle more waste water, need to use treated sewerage as organic fertilizer.

Low-cost water should be provided, re-use waste water, no sewerage water should be used for irrigation.

Tuismaakpraktyke behoort by die beskikbare water aangepas te word. Die goedkoopste water behoort gebruik te word sonder dat dit 'n gesonheidsrisiko inhou.

Availability, sustainability

Too difficult

Least costly if planners plan and site recycled water plants so that there will be no major infrastructure and pumping costs. Consider health implications.

Boreholes, lower rates for municipality water could be used for efficient gardens, recycled water could be used only with special care and tight control.

The usage of water should be controlled strictly, in order to prevent the wastage thereof. the usage of recycled water should be encouraged as long as it doesn't affect cultivation, people and surrounding areas.

Connection points can be made available by Councils.

Education (2.3%)

It is very important to have information about what is suitable water for urban agriculture so it is safe and beneficial (education).

Education is needed in this respect

Need to be recycled, teach people

Water – scarce, people should be trained to use water correctly


A major educational process need to be undertaken and waste water need to be saved in tanks and collected for use of urban agriculture.

Enhance agricultural conditions through the planning of drainage, local authorities could provide water taps, waste water could be used for irrigation purposes.

49. It all depends on the amount of water at a given place with regard to pipes, finances.
50. Supply water tanks until such time as Health authorities have looked at ways of recycling water.
51. Use water from households and from cooling systems or "clean water" from factories (non-toxic).
52. Be careful with sewerage water, assist with boreholes (subsidise), recycled water is a good idea, but is it practically proven right? More research need to be done on chemistry effect on waste water.
53. Recycled water – yes; waste water – no
54. Water pumped in from outside the community provide the opportunity for small scale utilization of local water resources. Unsure about waste water due to lack of knowledge and health consideration.
55. Recycled and waste water should be put to use, provided run-off water would not be negatively invested. Urban agricultural land must not exceed the amount of water available.
56. Everyone must pay the same price for water.
57. Municipal water should be made available for gardening.
58. Control authorities that control the re-use of recycled water need to re-think their present policies.
Help by local authorities
59. Must be addressed by all parties concerned – water is a scarce resource
60. Municipal water: could be supplied from standpipe centrally situated; cost of water could be included in rental. Recycled water available at the Waste Water Treatment Works but would have to be pumped to point for use; Untreated waste water cannot be used because of risk to public health and to underground water sources.
61. Retain local sewerage water within municipal boundaries.
62. Cost of infrastructure and supply, health issues in the case of misuse, misuse of supply, practical problems of availability and demand.



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**ANNEXURE H: VERBATIM RESPONSES:
HOW CAN OTHER URBAN WASTES
BE UTILIZED FOR URBAN
AGRICULTURE?**

VERBATIM RESPONSES: HOW CAN OTHER URBAN WASTES BE UTILIZED FOR URBAN AGRICULTURE.

- * Maklik afbreekbare organiese stowwe kan gebruik word vir kompos (56.8%)
crushed bottles, groen afval (blare, gras), kombuisafval, mis van diere, sewerage sludge), make mulches from e.g. newspapers, manure, bone-meal, crushed eggs. Maak eie kompos, leer mense wat alles op so 'n hoop kan kom.
- * It is too expensive and dangerous.
- * After a confirmed proper treatment of proper wastes they can be used as natural manure for urban agriculture.
- * Municipal composting to be extended.
- * Recycled compost – as overseas.
- * Deep trench gardening, donga reclamation, terracing.
- * Training for open space utilization, business enterprises in urban agriculture.
- * Rubble could be used for trenching method.
- * Uitroei en beheer van indringer plante, rehabilitasie van grond, gebruik van grond sal rommelstrooi verhoed.
- * Stimulate and reward waste sorting and recycling.
- * Old vehicle tyres can be used to plant vegetables in small spaces.
- * Make people aware of recycling, pay for bottles and paper
- * Local authorities can have compost produced from the solids from sewerage water and sell these at reasonable prices. Get people to use separate bags for recyclable waste.
- * Permaculture principles (Bill Mollison theories), Organic substances for fertilizers, Food from restaurants etc. for livestock.
- * Kitchen waste for pigs / livestock., feeding livestock (2.0%)
- * Only vegetables peels for composting – other wastes have a severe health hazard e.g. cholera.
- * Impossible at this stage.
- * Paper composting
- * Suitable mining grounds can be used to build farmstalls.
- * Too expensive for municipalities to make compost
- * Composting of municipal waste at various sites.
- * Improve drainage – general waste, organic wastes can be used as compost
- * Riioolslik by rioolwerke, plantreste kan omskep word in kompos.
- * Separate organic and inorganic waste into two streams.
- * Only suited waste materials can be used, mixed urban wastes could do more damage than chemical fertilizers.
- * Keep it simple, waste recycling (high tech) should be done by experienced small holders.
- * Use organic material, permaculture, tyres for potato growing
- * Plastic and Coke bottles for seedlings.
- * Further research needed in this regard, available methods must be exploited to the fullest.
- * Use money of recycling product to buy fertilizers
- * Composting of organic materials, production in pipes (transportable as well), waste plastic can be converted as well.
- * Sewerage fall out
- * Garden refuse is the most suitable (herfsafval, blare, gras) (3.9%)
- * Compost always a plus although not always economical
- * Mulching, soil improvement
- * Dividing different recycling materials in different groups for recycling elsewhere. Provide central location for bio-degradable products use as a filling material for peace gardens / trenches.
- * All perishables can be used in fertility trenches
- * Utilization of land fill sites, solid waste usage.
- * Solid waste, wet waste, sewerage for compost
- * Fertilizer, irrigation water

- * Composting for mulch
- * Waste paper, plastic bags, containers, tins – collected by jobless people – can be sold to waste collecting companies who can deal with these materials more appropriately
- * Vegetable peels and other organic waste – compost, paper and tins used in trench gardening
- * Builders rubble – be used in the construction of pathways and roads/prevent erosion. Paper and vegetable matter into compost at specific sites,
Plastic, glass can be placed into skips to generate income for the local community.
- * Irrigation
- * Compost and treatment by central authorities before making it available
- * Use different coloured bags (special bags) for household wastes (i.e. blue for plastic; green for organic waste – compost).
- * Utilized to upgrade soil
- * Composting techniques are important. General control of urban waste is essential.
- * All rubbish dumps should be able to make compost out of urban wastes and force to do so. It will reduce rubbish dumps and compost will be made.
- * Recycling of solid waste can be sold for money. Organic waste like grass can be used to manufacture manure.
- * The mixed farming will help the use of urban wastes. Fertilizer droppings from chickens for vegetables.
- * Treated "night soil" works excellent. Others: newspapers, egg boxes.
- * By recycling
- * Crop residues
- * Waste for compost, tins used for seed trays and irrigation.
- * Fertilization, fencing
- * Permaculture and the establishment of waste separation plants
- * Compost making: ABAKOR will give advice on converting wastes into nitrogen rich fertilizers. Have at supermarkets separate containers ready for paper, glass, plastic
- * Branches chopped on site mechanically. Treated sewerage. Already cut grass.
- * Previously white areas produces an incredibly large amount of unwanted garden refuse. Municipality collection points should collect and make compost.
- * People should be educated that by weight, at least 60% of household waste can be domestically composted at no risk with many benefits.
- * Dungs from zoos as animal feeds or fertilizer. Plant material recovered from pruning of street trees as fertilizer or animal feed.
- * Sewerage sludge
- * Need investigation
- * Biological waste for compost
- * Each household should make compost out of waste vegetable matter for use in garden or allotment. Local authorities should have composting plants for composting plants for composting of household refuse and should sell compost to public at cost price as Paarl Municipalities does.
- * Saw dust – in poultry units, waste food, egg shells
- * Compost, food for animals, generation of power
- * Provision of growth medium, fertilizer, materials for infrastructure
- * Organisations like ACAT could teach communities on turning waste vegetable product and paper into compost / mulch



**ANNEXURE I: VERBATIM RESPONSES:
MULTIPLE RESPONSES ON
OPEN URBAN SPACES.**

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VERBATIM RESPONSES: USE OF URBAN OPEN SPACES.

Multiple answers:

- * Planting trees for wood, For planting vegetables, For planting trees for fruit
- * Vegetables, community farms, sport facilities, parks
- * Vegetables, for planting trees for fruit, sport facilities, parks
- * Medicinal plants, trees for wood, vegetables, trees for fruit, sport facilities, herbs, flowers, kiosks
- * Medicinal plants, trees for wood, vegetables, community farms, parks, indigenous trees
- * Trees for wood, vegetables, community farms, trees for fruit, sport facilities, herbs
- * Vegetables, community farms, trees for fruit (x2)
- * Medicinal plants, vegetables, community farms, sport facilities, parks
- * Vegetables, sport facilities, parks, recreation
- * Sport facilities, planting flowers, parks
- * Vegetables, community farms, trees for fruit
- * Trees for wood, vegetables, trees for fruit, flowers
- * Vegetables, sport facilities, parks
- * Planting medicinal plants, planting vegetables, planting herbs, planting flowers, parks
- * Medicinal plants, trees for wood, vegetables
- * Trees for wood, vegetables, community gardens, trees for fruit, flowers, parks
- * Medicinal plants, vegetables, trees for fruit
- * Medicinal plants, vegetables, trees for fruit, herbs
- * Trees for wood, vegetables, community farms, trees for fruit, parks
- * Medicinal plants, vegetables, fruit, sport facilities, herbs, flowers, parks
- * Vegetables, fruit, sport facilities, kiosks, parks.
- * Hiking trails, parks, sport facilities
- * Medicinal plants, vegetables, fruit, herbs
- * Vegetables, community farms, fruit, sport facilities, herbs, flowers, spaza shops.
- * Medicinal plants, wood, vegetables.
- * Medicinal plants, vegetables, sport facilities, spaza shops, parks
- * Medicinal plants, wood, vegetables, community farms, fruit trees, parks
- * Trees for wood, vegetables, community farms, sport facilities
- * Medicinal plants, vegetables, fruit trees, sport facilities, herbs, parks
- * Medicinal plants, vegetables, fruit trees, herbs, flowers, parks
- * Wood, vegetables, fruit, herbs, flowers, spaza shops
- * Wood, vegetables, community farms, fruit, flowers, parks.
- * Medicinal plants, vegetables, fruit trees, flowers
- * Vegetables, flowers, parks,
- * Wood, vegetables, fruit, sport facilities, parks
- * Community farms, sport facilities, parks
- * Community farms, sport facilities, flowers, parks.
- * Medicinal plants, wood, vegetables, community farms, fruit, sport facilities, flowers, parks, kiosks.
- * Medicinal plants, vegetables, fruit, herbs, flowers.
- * Wood, vegetables, community farms, parks

A faint watermark of a university logo is visible in the background, featuring a central emblem with radiating lines and the word "UNIVERSITY" in a serif font.

**ANNEXURE J: VERBATIM RESPONSES ON AREAS THAT CAN
BE USED FOR URBAN AGRICULTURE.**

VERBATIM RESPONSES: AREAS THAT CAN BE USED FOR URBAN AGRICULTURE.

- * Sommige parke en onbenutte munisipale areas.
- * Servitudes, undeveloped public open spaces
- * Any unused open space (as long as it is treated in a sustainable and environmentally friendly manner).
Sonder om die natuur te vernietig.
- * Areas on the fringe of towns / around towns
- * Railway servitudes, herbs on rooftops, flowers at graveyards, road verges, golf courses near rivers (aquaculture), mine dumpings, parks
- * Open spaces between towns where farmers has left because of drought.
- * Hoë spanning elektriese omleiding, servitude, gas – en olie pyplyn servitude. (powerline and pipeline servitudes).
- * Gedeeltes van parke wat nie gebruik word nie, asook by huise en werkplekke.
- * Beneath power line servitudes, besides waste water canals, adjacent to sewerage disposal works, around air-ports where housing / industry is undesirable, house (private) gardens, school gardens, church gardens, prison gardens (if available).
- * Electrical servitudes but use open grounds for sports and parks.
- * Large grounds in public schools, large traffic islands
- * Alle servitude, stroke ongebruikte groen langs strome, ou stortingsterreine, terrasse.
- * Power servitudes, road banks – terrace them
- * Gardens (around dwellings, schools, church, factories; old age homes, homes for children, youth homes)
- * Residential plots, size should be increased coupled with incentives for productive land use.
- * Unused parks, Eskom servitudes
- * Premises that is not suitable for Local Government Development, old dumping sites, secured old mines, quarries.
- * Back yards and other designated areas (road verges / servitudes)
- * Randwaterraad, Eskom servitude, vleigebede, waterkanale, spruitoewers, uitvalgronde
- * Roadsides, unused plots (unoccupied)
- * Kraglyn servitude, buffer sones, publieke oop ruimtes, onontwikkelde dorpsgebiede, mynhope
- * Powerline servitudes, undeveloped parks
- * Under-utilized parks, street islands, grass verges, portions of popular parks where medical and fruit gardens can be combined – will look beautiful.
- * Wasteland around townships, pipeline and electrical servitudes
- * Unused river banks / areas below river floodlines
- * Road verges (fruit trees, kiosks), between properties (vegetables, herbs), large natural areas for herbs and medicinal plants. Private property for flowers, vegetables.
- * Should be scientifically allocated on basis of town – planning.
- * Groenstrook areas
- * Home garden plots, containers, pots, window cills, tyres.
- * Road sides
- * Power line servitudes, road verges, mine dumpings, school grounds, parts of municipal parks.
- * Within the owner's property. Own gardens
- * Road reserves, Eskom servitudes
- * Eskom servitude, rioolsuiweringswerke, groen gordels (boorde of bosbou)
- * Powerline servitudes, unused privately owned land, community parks.
- * Onbenutte Staatsgronde in Munisipale gebiede, wat aan privateienaars behoort, wat aan Stadsrade behoort.
- * Areas adjacent to sewerage works, rubbish dumps.
- * Pipeline servitudes, electrical cable servitudes, areas between highways, sewerage farms, borderline areas between farms and cities, company gardens
- * Ash dam areas, mine dumpings, servitudes, ownership of land must be accepted.

- * Unused portions of road reserves, powerline, Spoomet property, undeveloped public open spaces.
- * Langs paaie en treinspore.
- * Corridors along major highways, beneath power lines, along railway tracts, SANDF, unused municipality land.
- * Powerline servitudes, unused open spaces, unused government land (i.e. land surrounding municipalities, hospitals, jails).
- * Parks, road verges
- * Only gardens (back yards), own gardens
- * Pipeline servitudes, powerline servitudes, sewerage purification farm, undeveloped parks and recreational areas.
- * Open areas should be formed between groups of houses, municipal areas waiting to be developed
- * Property designated areas identified under land uses cannot be designated as left over space
- * River banks and pipeline servitudes
- * Close to sewerage farms, certain mine dumps. Not nature reserves and other necessary open spaces.)
- * Close to sewerage farms, unused parks, polluted rivers
- * Plots
- * ESKOM powerline servitudes, sewerage farms, passive open space
- * Powerline servitudes, municipal grounds, underdeveloped land, buffer zones, institutional grounds
- * Suiweringswerke terreine
- * Vacant land in communities, church yards, scholls, clinics, community centres, service centres
- * Require surveys on each area.
- * Riolsuiweringswerke, kraglynsewritute, onontwikkelde oop ruimtes
- * Pipelines servitudes, complex gardens, school waste land, sludge disposal sites
- * Under power lines
- * Land not used for township development, river sides, wet areas, all servitudes. Must make provision for parks.
- * Pipeline and powerline areas, next to roads and railways

lots, abandoned industrial areas, schools, hospitals, libraries. What about areas that should not be used for urban agriculture?

- * Sowland – wher there are no houses, rubbish dumps
- * Alongside rialways, backyards, unused land belonging to the state.
- * Old railway reserves
- * Road islands – fruit trees
- * There are no appropriate areas for these activities in our cities, if you have to use undeveloped army ground areas around some black townships. Just keep them out of our parks.
- * Areas that are not fitting for housing because of the soil condition.
- * Schools, churces, buffer areas, all servitude areas road reserves, alongside rubbish dumps.
- * Powerline and pipeline servitudes, alongside rivers and streams, nurseries, bach yard plots
- * Land not suitable for building and upgrading
- * All servitudes, 20% of parks, firm's and school gardens, building plots not immediately used.
- * Pipe and powerline servitudes, rivers below 1 in 50 year floodline, communities themselves can decide how to utilize their public open spaces.
- * Rondon rioolwerke
- * Electricity and pipeline servitudes, open mine grounds, available agricultural soil
- * Servitudes, stream/river valleys
- * Mine properties in urban areas
- * Rocky areas for grazing, areas below flood lines, servitudes, land not suitable for residential development, back yards, community owned land earmarked for urban agriculture
- * Back yards, spaces to be developed in distant future, state and municipal land with rent contract.
- * Rubish dumps, sidewalk, parks, gardens, commonage private gardens.

- * Unmade food reserves, powerline servitudes, sections as undeveloped open spaces, school grounds.
- * Undermined areas, pipeline servitudes, stormwater drainage system, flood areas, buffer strips.
- * Servitudes, sloping land, municipal commonage lands, adjacent to rubbish sites.
- * Powerline servitudes, river courses, old mine and industrial sites.
- * Imaginative uses combining public benefit and urban agriculture, for example planting flowers and edible plants.
- * Parks, decreasing sidewalk widths.
- * All areas with a municipal area which is unsuitable for structure developing.
- * ESKOM servitudes, designated, proclaimed areas.
- * Peri-urban areas, open or vacant land
- * Servitudes, school grounds, railwaylines reserves, hospital property, hostel properties, road verges, open spaces.
- * All open spaces not too far from the urban settlements and/or market outlets.
- * Unused railway yards, powerline servitudes, selected steep areas, schools, underutilized parks.
- * Underneath electrical powerlines, steep land unsuitable for building, avoid river vegetation areas, road islands.
- * Parks, servitudes, along pipelines, school grounds, areas not used.
- * Dumping sites.
- * All servitudes.
- * Open spaces that are not parks but have to be mowed, sprayed etc. Parking lots, church grounds, road islands.
- * Sewerage farms, municipal commonage
- * Back yards, undeveloped plots, between developed houses, outskirts
- * Railway line servitudes, pavements, municipal commonage
- * Electricity servitudes, land not suitable for building purposes (poor drainage, poor soil conditions)
- * Old mine dumps, road reserves.
- * Small parks, steep areas, areas between national roads, communal area in centre of squatter areas.
- * Next to rivers
- * Small plots, pipeline servitudes
- * Open spaces, road reserves
- * Open spaces around towns, servitude areas, communal land
- * Undeveloped open spaces (temporary), land reserved for future streets (temporary), pipeline and powerline servitudes, refuse dumps, along river banks.
- * ESKOM servitudes, existing parks, sewerage farms, road islands, town commonage.
- * Pipeline servitude, sewerage works, vacant land, buffer zones
- * Eskom servitudes, storm water run off areas, road schemes, small holdings (lease), purchase farms
- * Unused industrial land, underdeveloped parks, municipal properties.
- * Mining land, mine dumps, road reserves, noise zones, flood lines, buffer zones.
- * Open spaces with access to water: buffer zones, school fields, road reserves, powerline reserves.
- * All servitudes, school gardens, individual homestead areas, urban open space
- * Specially zoned areas where no conflict of interest will exist
- * Along streambeds, around sewerage plants, within municipal dam surroundings, parks.
- * Electrical servitudes, road islands.

APPENDIX D



APPENDIX D

Protocol for conducting semi-structured focus group interviews

1. What do you understand by the concept of urban agriculture?
2. What specific outcomes would you envisage in a curriculum for Urban Agriculture?
3. What do you think should be the content of a course in Urban Agriculture?
4. What learning opportunities will be suitable for the course?
5. What learning experiences do you think should be actualised by the learner?
6. How can effective assessment be achieved?

APPENDIX D

Protocol for conducting semi-structured focus group interviews

1. What do you understand by the concept of urban agriculture?
2. What aims and objectives would you envisage in a curriculum for Urban Agriculture?
3. What do you think should be the content of a course in Urban Agriculture?
4. What learning opportunities will be suitable for the course?
5. What learning experiences do you think should be actualised by the learner?
6. How do you think the effectiveness of the curriculum should be evaluated?