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Technology and Agrarian Development

The Urban Agriculture Classroom

Urban Agriculture as a Learning Mechanism for Environmental Learning and Community Development

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July 2011
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Preface

It was during a course on Agricultural and Rural Development that I first heard the term ‘urban agriculture’. It was mentioned in a lecture on Cuban agricultural transformations. I thought I had misheard my lecturer, since ‘urban agriculture’ seemed a contradiction. Agriculture for me was undoubtedly connected with rural areas. Naturally, I had seen that there are also gardens, parks and other green areas in cities all over the world, but had never occurred to me to view such sites as possible space for ‘agriculture’. My interest in urban agriculture was raised…

I would like to thank Todd Crane, my thesis supervisor, for pointing out critical information to me and for steering me back in the right direction when needed. I would also like to thank Percy Cicilia, Femke Hoekstra, Svenja Nette and Camilo Lozano Torres for sharing their information on urban agriculture. They were reminders that any analysis of urban agriculture should first and foremost look at the people behind the practices, at the urban farmers; and that technical and agro-economical issues come second.

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Summary

Considering the extent of debate between opponents and supporters of urban and peri-urban agriculture (UPA) in developing countries, this thesis was written with two research objectives in mind. The first objective was to offer a critical analysis of the claims on UPA made by scientists, policy makers and development organisations at either side of the debate. These claims were compared with empirical evidence to see whether they hold true. This analysis leads up to the second objective, which was to explore if UPA acts as an effective learning mechanism for environmental learning and community development. The thesis research was done mainly through a literature review of different sources on UPA.

Chapter 2 presents a conceptual framework to introduce certain important terms. The chapter explains how the terms urban agriculture, developing countries, environmental learning and community development are defined in this thesis. This chapter also presents the two educational approaches that serve as an analytical framework for analysing UPA's use as a learning mechanism. These approaches are Education for Sustainable Development (ESD) and action learning. The most important features of these approaches are translated into five criteria for ESD and four focuses of action learning.

In Chapter 3 the claims on UPA are evaluated at the level of the individual UPA farmer or his household. With regard to the health claims made about UPA, it is shown that UPA does not have a conclusive effect on household food security and nutritional status. UPA does have a negative effect on household health with regard to the contamination of produce with pathogens, heavy metals and toxins. The claim that UPA generates extra income for urban households was difficult to analyse, because of the difference in the practice of UPA among households. Literature review does show a significant contribution of UPA to household income for poor households. UPA also has effects on the culture and identity of urban farmers and their households. It helps to build their identity and contributes to cultural rituals and traditions. Although there has been no specific research into the claim that UPA contributes to integrating migrants into city life, this claim seems unlikely to be true.

Chapter 4 looks at the claims made about UPA at the system level, which is taken as the level of the city and the region around the city. It is shown that UPA contributes positively to the mental health of the city by providing an opportunity of visual contact with greenery or nature. The risks regarding the contamination of produce with pathogens are also present at the system level when produce is sold to urban consumers. The claim that UPA increases the occurrence of malaria, dengue and filariasis could not be proven. Research found a correlation between UPA and malaria, but no causal relationship has yet been proven. The claim that urban livestock proves a danger to urban citizens could also not be proven due to lack of research. An analysis of the economic effect of UPA on the regional economy showed no evidence of an absolute contribution of UPA on the economy. Chapter 4 also evaluates the environmental aspects of UPA. Claims that UPA sites act as buffer zones against natural disasters and that UPA provides a way to recycle urban waste proved to be true. There was not enough evidence found to support the claims that UPA is a way to combat climate change or that it would lead to water scarcity and pollution.

After this evaluation of claims on UPA, Chapter 5 presents a number of opportunities and constraints to UPA in developing countries. The recent food crises and the global environmental crisis are proving important opportunities for UPA development. There are also a number of new technologies in the field that will help UPA grow. On the other hand,

there are still some very serious factors constraining further development of UPA. In many countries UPA is illegal or its legal status is uncertain. Water shortages also pose a limitation to UPA farmers, as do the occurrence of theft and vandalism of crops and animals. Finally, culture and identity can also prevent people from engaging in UPA.

Chapter 6 answers the question whether UPA is an effective learning mechanism for environmental learning. It does so by looking whether the five criteria of the ESD approach are present current UPA projects and activities. The criteria are: social learning, leading to change, acquiring new skills, inclusion of local knowledge and participation, and systems thinking. The four focus points of action learning are integrated into these criteria. The analysis of literature available on UPA activities and practices showed that UPA scores on all five accounts. The criterion of systems thinking was slightly difficult to apply, although we do see some systems thinking in UPA. The chapter also shows how each of the criteria applied to UPA leads to increased environmental learning among UPA practitioners. UPA leads to increased environmental understanding and also provides practitioners with new skills and ways of thinking that enable to make the change towards a more sustainable way of production. There are still several points of improvement though. The current farmer-to-farmer interaction present in many UPA activities is not sufficient. Farmers have to interact with people from different backgrounds. There is uncertainty about the willingness and opportunity of urban farmers to learn. Such issues need to be addressed. At the moment it is unknown whether farmers have the opportunity for reflection on their learning process and whether they take this opportunity. Since reflection is vital for the learning process, this issue needs careful consideration.

Chapter 7 analyses if UPA is an effective learning mechanism for community development. This analysis was again done using the five criteria as an analytical framework. The chapter establishes for all five criteria how they contribute to the learning process for community development through UPA activities and projects. Community UPA projects bring their communities together and provide communal opportunities for learning, which generally contributes to the overall community development. Social cohesion among community members strengthens and they acquire new skills and networks that empower the community. As with environmental learning, there are some points of improvement. Community participation needs to be ensured and UPA projects need an active policy to stimulate such participation. Similarly to the issues with environmental learning, the willingness of community members to engage in a learning process and the uncertainty of reflection are other main points of improvement.

The final chapter gives a discussion and conclusion on the main themes in the thesis. The discussion reflects on several difficulties with the research and with the use of the ESD and action learning approaches. The chapter's final conclusion is that UPA is indeed a learning mechanism for environmental learning and community development. Despite its potential to be used as such a learning mechanism, UPA still has some issues of concern to overcome if it really is to act as an *effective* learning mechanism.

List of Acronyms

APA	American Planning Association
CCME	Canadian Council of Ministers for the Environment
CGIAR	Consultative Group on International Agricultural Research
FAO	Food and Agriculture Organisation of the United Nations
FFS	Farmer Field School
IDRC	International Development Research Centre
IWMI	International Water Management Institute
NGO	Non-Governmental Organisation
RUAF	Resource Centre on Urban Agriculture and Food Security
UNDP	United Nations Development Programme
UNFPA	United Nations Population Fund
UNHCR	United Nations Refugee Agency
UPA	Urban and Peri-urban Agriculture
UPH	Urban and Peri-urban Horticulture
WFP	World Food Programme

Chapter 1

Introduction

1.1 Problem Definition

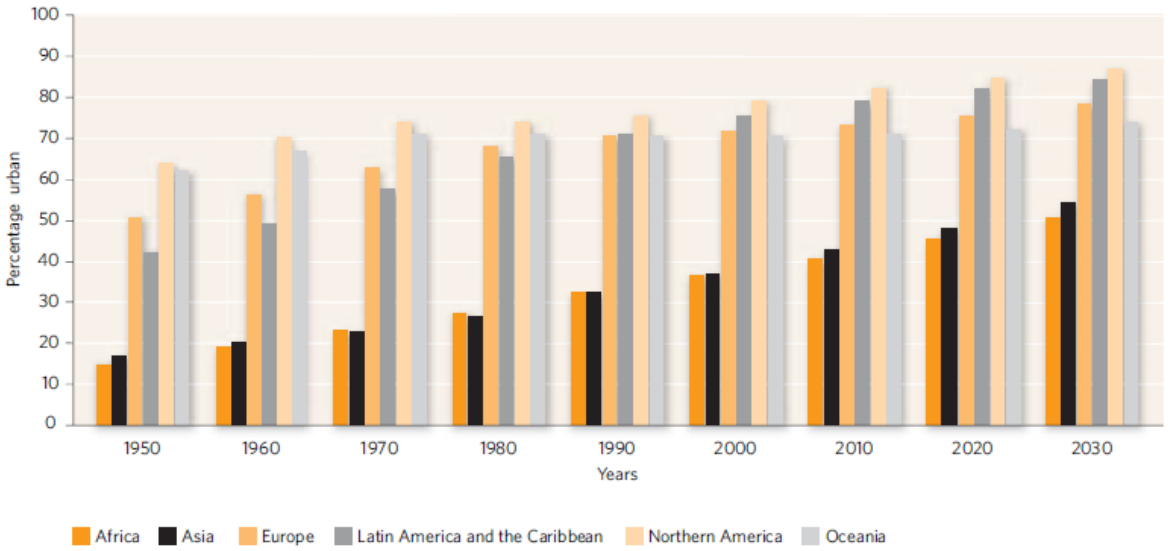
Over the years I have had several encounters with 'urban agriculture'. The subject has come forward in several courses that I followed for my Bachelor International Development Studies, in a range of courses differing from rural sociology to environmental management. The different disciplines each dealt with urban agriculture in their own specific ways, yet each time there was one common feature. Those involved in urban agriculture seemed either fervent supporters or vehement opponents; there did not seem to be any middle way. There exists a wide schism on the merit of urban agriculture for today's urban areas among scientists, practitioners of urban agriculture and policy makers. The aim of this thesis is partly to analyse and explain this divide. What are the arguments that both sides use to support their position? The preliminary review showed that there are few authors who have tried to make an objective analysis that weighs both benefits and problems of urban agriculture. Nigel Webb is one scientist who tried to do so in earlier years, before deciding that his analysis led him to join the critics of urban agriculture (see e.g. Webb, 1998; Webb, 2011).

To be able to make any judgements on the potential contribution of urban agriculture to either solving or creating the cities' problems, we must first try to answer the question: 'What is the current state of affairs regarding urban agriculture?' This question is not easy to answer, in part because urban agriculture has long been discouraged by policy makers in cities in both the developing and developed world. Many policy makers shared the opinion that agriculture is a phenomenon belonging only to distinct rural areas. What is more, agriculture did not fit in the picture of modernised high-tech cities. Therefore official policy in many developing and developed countries for a long time was to either make urban agriculture illegal, actively discourage urban agriculture or to ignore its existence (see for example Bryld, 2003; Zezza & Tasciotti, 2010). Policy usually was a combination of these three practices. Probably because of this political unpopularity of urban agriculture the subject has also not been a popular research topic among scientists. Most literature to be found on the matter is published by non-governmental organisations or research foundations that have their own urban agriculture projects, such as RUAF or the Urban Harvest program by the CGIAR.

The tide is slowly changing however. Governments and (international) development agencies have started to acknowledge that agriculture can be integrated into urban areas throughout the world (Van Veenhuizen, 2006). This is largely spurred by worries about the sustainability of our cities. This is why it is important to critically review the benefits and problems, opportunities and constraints that urban agriculture brings with it. Only when we have a balanced view can we evaluate its contribution to the sustainability of cities and design proper policies and projects.

Urban agriculture is practiced in many countries all over the world, formally and informally, communally or individually. There are no precise data available on the size of urban agriculture, but the UNDP has estimated that in 1996 about 800 million people were engaged with urban agriculture around the world (Armar-Klemesu, 2001; Mougeot, 2000; Nelson in Zezza & Tasciotti, 2010). This figure is problematic for two reasons however. First, it is based

on estimate from 1996, which is already a long time ago. The population, especially population in cities has increased gigantically in the last decades (UNFPA, 2007), and this is likely to have affected the number of people involved in urban agriculture. Graph 1 shows the growth of urban populations as estimated by the UNFPA.



Graph 1
Percentage of population at mid-year residing in urban areas, by region, 1950-2030
© UNFPA 2007

Secondly and more importantly, the often quoted number of 800 million in the original publication of the UNDP comes with a warning. The authors admit that the estimation is only a "thumbnail sketch" and based on their own experiences and extrapolation of data (Zezza & Tasciotti, 2010, p. 266). Therefore any quantification of urban agriculture is difficult, since the only available quantitative data available on urban agriculture comes from singular case studies.

Despite these problems with quantification, interest in urban agriculture is rising among scientists, policy makers and urban dwellers themselves. After years of ridicule and neglect, the potential of urban agriculture is now being seriously reconsidered. A major FAO publication was written with the intention to "enhance the awareness regarding the potential role and opportunities of UPA" among employees of the World Bank, the FAO and other development organisations (Baudoin & Drescher, 2008, p. 5). The various reasons for this increasing interest will be explained in further chapters but one key reason is worth mentioning here. At the beginning of the millennium the UN rang the alarm bells on urban growth and its associated negative effects on the urban environment. National policy makers increasingly worry about the sustainability of urban areas and the welfare of the citizens as well. The thought that urban agriculture can improve the situation is the reason for the reinstalled official interest. The FAO and other development organisations are exploring the possibility for urban agriculture to contribute to urban sustainability by improving environmental learning and community development (see Blewitt, 2006; Helten et al., 2009; Tàbara et al., 2009).

For this reason I have decided to write my thesis on urban agriculture and its role as a learning mechanism for environmental learning and community development. This role can only be properly evaluated with a critical analysis of benefits and problems associated with urban

agriculture. It also seems that only advocates of urban agriculture see it as an effective learning mechanism. The time is right for an evaluation that tries to establish if urban agriculture really proves such an effective learning mechanism as its supporters try to make us believe. The recent surge in scientific publications on urban agriculture, especially from the disciplines of health and environmental studies, has made it possible to carry out these critical analyses.

The focus of urban agriculture research differs depending on the country in which the activiti1es take place (Bailkey et al., 2007). Urban agriculture projects and research in Western countries (most notably the USA and Canada) focus mainly on community development, social empowerment of disadvantaged groups and environmental learning. In as far as they are about environmental sustainability, the projects and research usually deal primarily with reduction of food miles. Enhancement of food security is usually seen as a by-product and not as main objective. Urban agriculture in the form of allotments forms does have a bigger emphasis on growing food in a more environmentally friendly way and on contributing to household nutrition (Harrison, 2004-2011). Research on urban agriculture in developing countries emphasises very different aspects of urban agriculture. It analyses the potential contribution of urban agriculture towards income generation, food security, nutrition and increasingly, towards environmental sustainability.

In my opinion the focus in developing countries on urban agriculture as a solution only for poverty alleviation and environmental sustainability is limited. Issues such as community development and environmental learning are of equal importance. The second aim of this thesis is therefore to discover if urban agriculture also has potential as an effective learning mechanism for environmental learning and community development in developing countries.

1.2 Research Objective

The main objective of this research is to explore whether urban agriculture is a learning mechanism for environmental learning and community development for people in developing countries. It has been recognised that there is a real need to look at this potential of urban agriculture (FAO, 2010a; Mougeot, 2001). To be able to effectively assess urban agriculture's merit as a learning mechanism, the second objective of this thesis is to critically review literature on urban agriculture. This critical evaluation will try to weigh the positive and negative sides to urban agriculture. I will look at aspects such as: health, environmental sustainability, legal issues and income generation. This evaluation is necessary to gauge the potential of urban agriculture as a learning mechanism.

1.3 Research Questions

The main question of this thesis is:
Is urban agriculture an effective learning mechanism for environmental learning and community development for practitioners of urban agriculture in developing countries?

To answer this question, and in accordance with the two research objectives, I will answer several sub questions:

1. What are the benefits and problems of urban agriculture for people practising urban agriculture?
   This question analyses the empirical evidence of benefits and problems of urban agriculture on an individual or household level.

2. What are the benefits and problems of urban agriculture for people living in cities in which urban agriculture is practised?
   This question analyses the empirical evidence of benefits and problems on a more systemic level.
3. What are some of the opportunities for urban agriculture in cities in developing countries?
4. What are some of the constraints that urban agriculture is facing in cities in developing countries?
5. What makes an activity a successful learning mechanism for environmental learning?
6. What makes an activity a successful learning mechanism for community development?

Both sub questions 1 and 2 are analysed by comparing alleged benefits and problems claimed by scientists from different disciplines and other urban agriculture experts with empirical evidence based mostly on case studies. Sub questions 3 and 4 again are questions that in general are discussed on a systemic level, although constraints and opportunities at the individual level are not ignored. The last two sub questions are mostly theoretic. They are answered by analysing literature on two educational approaches: Education for Sustainable Development (ESD) and action learning. However, I apply elements of this literature to existing urban agriculture activities to see if current activities already prove effective learning mechanism and learning through urban agriculture could be improved.

1.4 Scope and Limitations

Since the role of urban agriculture in environmental learning and community development has been researched somewhat more extensive for developed countries (though the quantity and quality of academic research in this matter is still lacking), I aim to answer the main question only with regard to developing countries. There is not enough information available on urban agriculture in one specific continent. Therefore my research combines data from South America, Asia and Africa.

The research looks at both intra-urban and peri-urban agriculture, since the distinction is hard to make and often overlooked in many reports. It is therefore often unclear which categories scientists define or in which category their research falls, which is why it easier to include both in this research. I also think an analysis of both categories is necessary to be able to make a proper evaluation of urban agriculture activities. The widely used acronym for intra-urban and peri-urban agriculture is UPA.

One further limitation of the research is that it will look only at UPA projects aimed at adults or UPA activities conducted by adults. There are many urban agriculture and communal garden projects which aim specifically at children, both in developed and developing countries. Such projects will not be analysed in this thesis. Instead I want to focus on the potential of UPA projects and activities for adult environmental learning and community development. First because most projects around urban agriculture in developing countries involve mainly adults and are also only aimed at adults. The second reason for the focus on adults is that, according to McKenzie (2009, p. 178), adult environmental learning and adult education on sustainability are “marginalised”. Indeed it seems many educators involved in environmental learning projects do not recognise the potential of educating adults and instead focus only on children. I think this is a missed opportunity, which is why this research will focus on adult education.

1.5 Methods

The analyses in this report are mostly based on literature study. The literature comes from many different sources and includes articles from academic journals, policy documents of cities and development organisations, strategic reports by policy makers, newspaper articles and some blogs by urban agriculture enthusiasts.

My research strategies are not only confined to literature study. I also visited the Urban Agriculture Festival in Rotterdam on May 14th, 2011. This visit gave me the opportunity to explore urban agriculture in the Netherlands and to talk to some urban farmers. At the festival I combined 'normal' observation with participatory observation and conducted open interviews with the people present. Another source of information was an open interview with Femke Hoekstra, an expert on urban agriculture, who worked for the RUAF for four years and now works at Wageningen University.

1.6 Audience

I wrote this report this report for anyone interested in urban agriculture, be they students, policy makers or urban agriculture enthusiasts. Reports on urban agriculture usually take a particular stand in the debate and are either pro- or contra-urban agriculture. It may therefore be hard for those looking to analyse urban agriculture to find literature that critically evaluates both sides of the debate. This research aims to fill that void and to provide some clues as to the effectiveness of urban agriculture as a learning mechanism.

1.7 Outline of report

The structure of this report largely follows the outline of the six sub questions. Chapter 2 contains a conceptual framework that elaborates on the most important concepts and approaches used. Chapter 3 then deals with the problems and benefits of urban agriculture for its practitioners. On a systemic level, the problems and benefits for those living in cities in which urban agriculture is practiced (the non-practitioners or non-producers) are discussed in Chapter 4. Chapter 5 analyses first the opportunities of urban agriculture in developing countries, and subsequently the constraints to urban agriculture in these countries. The sixth chapter explores what whether the structure of current UPA activities and projects make them successful learning mechanisms for environmental learning. The chapter also looks at which points need improvement to make UPA a better learning mechanism. The same, but then applied to community development is be done in Chapter 8. The last chapter includes a conclusion that tries to answer the question whether or not urban agriculture can be a successful learning mechanism. It also includes some general points of discussion following the analyses of the previous chapters.

Chapter 2

Conceptual Framework

There are a number of concepts of particular importance in this report. This chapter is reserved to elaborate on these to provide the reader with some notion of the concepts will be used in the report. The following concepts are discussed: urban agriculture, developing countries, environmental learning, community development, Education for Sustainable Development and action learning.

2.1 Urban Agriculture

Mougeot (2001) defines urban agriculture as "industry located within (intra-urban) or on the fringe (peri-urban) of a town, a city or a metropolis, which **grows or raises, processes and distributes** a diversity of food and non-food products, (re-)using largely human and material resources, products and services found in and around that urban area, and in turn supplying human and material resources, products and services largely to that urban area (Mougeot, 2001, p. 10, emphasis added)." This definition is slightly more refined than the common used definition of urban agriculture as "the production of crop and livestock goods within cities and towns", as Zezza and Tasciotti (2010, p. 265) phrase it.

I use Mougeot's definition throughout this report for three reasons. First of all, the definition includes both intra- and peri-urban agriculture. The authors of most texts on urban agriculture actually do not differentiate between these two categories. When they do the criteria on which they base their categorisation are often not clear and also differ for each author (Mougeot, 2001). It remains difficult to specify when agriculture takes place 'in' the city and when it takes place 'around' the city. An added difficulty of defining peri-urban areas is that these areas tend to be very fluid (Mougeot, 2001), especially in developing countries. City edges change daily with the influx of new migrants. Land zoning plans also change or are not abided by. As of yet no solution has been found to provide definite categorisation of intra- and peri-urban agriculture. Some authors have even gone as far as to suggest a third category: suburban agriculture. For reasons of simplicity I did not include this category in my report.

Because I refer to both forms of urban agriculture I use the acronym UPA, which stands for Urban and Peri-urban Agriculture. This acronym is more inclusive than the also used UA (Urban Agriculture), which may lead to confusion over the role of peri-urban agriculture. Including peri-urban agriculture in the definition of urban agriculture is important, not only because the difference between what is urban and what is peri-urban is often difficult to assess. Peri-urban agriculture also seems worth including because of its large share in urban agriculture. If we define peri-urban agriculture as agriculture on the fringes of the cities or as agriculture in areas near the city and performed by city dwellers (based on Zezza & Tasciotti, 2010), you can imagine that these forms of agriculture include large numbers of practitioners.

A second reason for using Mougeot's definition is that it has been accepted by many other scientists doing research in the field as a solid definition. The FAO uses Mougeot's definition for example (Baudoin & Drescher, 2008). The Resource Centres on Urban Agriculture and Food Security (RUAF), the most important international organisation working on urban agriculture, uses a simplified version of the definition (De Zeeuw, 2004).

Lastly, Mougeot's definition does not exclude any production activities beforehand. He leaves room for all kinds of activities that can be seen as agriculture. The most common activities common in urban agriculture are horticulture (refers to growing vegetables and fruits), livestock production and dairy farming. The benefit of Mougeot's definition is that it can also include activities that are disputed amongst scientists as whether or not they are 'agriculture'. These activities include: urban forestry, floral horticulture (e.g. for ritual use), medicinal horticulture and bee-keeping. It is often unclear whether or not these activities are seen as urban agriculture in research or even in formal policy. Some authors do and some authors do not. Therefore I think it is best to use a definition that specifically includes all activities. Figure 1 gives an impression of possible UPA activities. Furthermore, Mougeot's definition does not only include the production stage of UPA. The so-called "post-production processes of processing, packaging, distributing, marketing and recycling" are also included (Baumgartner & Alevi, 2001, p. 6). It is important to include these processes, because they are often connected to the various benefits and problems associated with UPA.

Although the difference between intra-urban and peri-urban agriculture is debated, the line between urban and rural agriculture is found more easily. To differentiate between urban and rural agriculture, Richter et al. have identified one critical defining characteristic of urban agriculture. This characteristic has been widely recognised and was later copied by other authors in their reports on urban agriculture (see e.g. De Zeeuw, 2004; Howorth et al., 2001).

Figure 1
Several possible activities for urban agriculture
© Photos (clockwise, starting from horticulture): IDRC: Monica Rucki, Asian Development Bank, ADHENO, Bill and Melinda Gates Foundation, Treehugger: Sami Grover, City Parks Blog: Ben Welle

According to Richter et al. (in Mougeot, 2001, p. 9) urban agriculture differs from rural agriculture because it is "embedded and integrated into the urban economic and ecological system". This sets it apart from rural agricultural production, because such production is either produced and consumed outside the city (thus having only scant relationships with urban dynamics) or is imported into the city at a later stage.

Urban agriculture also goes under the names of 'metropolitan agriculture' or 'civic agriculture'. I however do not use these terms in this report as I find them limited. Metropolitan agriculture suggest that urban agriculture can only take place in cities the size of Beijing or New York, whereas urban agriculture activities can take place in any urban area. What is an urban area differs per country and per population size. The term 'civic agriculture' downgrades rural populations, because it suggests that rural agricultural producers are not seen as civilians.

2.2 Developing Countries

The term 'developing countries' refers to a number of countries. Although the term is contested and has been called old-fashioned I have not yet found a better term to indicate countries that are struggling in their development and their general performance in upholding basic human welfare needs. The United Nations has coined several concepts to refer to such countries, but each concept is exclusive and therefore does not include all the countries I would like to talk about. There is the term Least Developed Countries (LDCs) for example, which refers to currently 48 countries that fulfil three criteria of being least developed (UNCTAD, 2002a). Admittedly a list of 48 is quite a long list, but it does not include many South American of Asian countries, such as Peru or India. These countries would be described as 'emerging countries' or 'structurally weak, vulnerable, and small economies' (SWVSEs) (UNCTAD, 2002b).

I use the term 'developing countries' primarily to set these countries apart from Western, 'developed' countries. I think that any geographical names given to these countries (such as the often used term 'the South') are misleading and confusing. Perhaps the best categorisation of countries in the case of UPA can be made on the basis of the difference in the focus and aim of urban agriculture projects that was described in Section 1.1 on the problem definition. Developing countries will be all countries in which UPA projects so far have been primarily focused on income generation and food security. Developed countries will be all countries in which UPA projects mainly aim at reducing food miles and encouraging environmental learning and community development.

2.3 Environmental Learning

The process of environmental learning, or the outcome of this process, are sometimes also referred to as 'ecological literacy', as for example John Blewitt (2006) does. This research will focus on environmental learning among adults, because this group has been neglected in environmental learning projects so far. A major website for urban agriculture, cityfarmer.org, has information on many UPA projects aimed at stimulating environmental learning among children (see e.g. Figure 2), but in their whole list only two projects specifically aim at adults (Levenston, 2011a).

In this research I will use the term 'environmental learning' to refer to the processes of adults gaining an understanding of one or more of the following issues:

- the interaction between humans and their physical environment. This includes insights in the effects of humans on the physical environment and vice versa. It also means that people understand how and why they react to changing environments.
- the dynamic interaction within the biophysical processes of growing crops or raising animals. This means that a person understand the biological pathways involved in these processes, such as the interaction between soil, water, organic matter and seeds.
- the causes and effects environmental problems on a local scale. This includes issues such as water pollution, solid waste management, erosion, air pollution and soil pollution.
- climate change and the possible direct effects of climate change on a local scale.

In recent years, with the urgency of global environmental problems increasing, it has been carefully suggested that UPA could also enhance people's environmental learning by helping them to gain insight in environmental problems beyond their own local scale. Helten et al. (2009) describe that this has become a side-objective in a UPA project in Casablanca, for example. However, the potential of UPA to contribute to learning about the global dynamics of environmental problems is often only proclaimed in a theoretical way by advocates of UPA. These advocates do not give any indication as to how such learning would translate into everyday practice. One of the aims of this report is to find out whether UPA really could enhance the understanding of the dynamics of environmental problems among its practitioners, or whether this is simply a theoretical benefit of UPA that its advocates use to promote urban agriculture.

Some UPA projects have been designed in reaction to issues related to climate change. Examples are CERES in Melbourne (Larsen & Barker-Reid, 2009) and the earlier mentioned project in Casablanca (Martin Han & Pieschel, 2009). Usually however these projects are advocated with the argument that locally grown food reduces transport emissions and thus helps to counter climate change. The emphasis of these projects is not on *learning* about climate change through the practice of UPA. This report will have this emphasis on 'climate learning'[1] through practice. Environmental learning on climate change here refers to processes of personal and social learning among UPA practitioners that take place through their agricultural activities. It does not refer to learning processes in which practitioners only learn through directed learning, meaning that an expert or organisation lectures the urban farmers on climate change.

Figure 2
'Truck farm' in Portland, Oregon: example of an UPA project aimed to stimulate environmental learning among children
© Neighborhood Notes 2011

[1] This term was coined by Tàbara et al. (2009) and is used by them to refer to processes of social learning that contribute to a greater awareness and willingness to act and deal with global warming and climate change problems.

I think the term 'ecological literacy' is better used to refer only to the outcome of the above process. While I like the idea that we should not only be literate in the conventional sense but also in this new sense, the concept has a big problem. When can we consider someone to be 'ecologically literate'? Is it when this person knows that trees need water and sunlight to grow or when he or she can explain the whole dynamic process of climate change? Therefore I will only use the term 'environmental learning' throughout this research, which refers more to a continuous process of learning and allows for several stages of understanding.

2.4 Community Development

Community development is taken in a broad sense here, because it is also used in a broad sense in many UPA projects and research. In general UPA projects and research use the concept to refer to all processes that strengthen local communities and the sense of community among participants. Important aims in community development through UPA is to integrate disadvantaged groups (such as HIV patients, migrants, ethnic minorities or jobless people) into the community and into the wider urban network (Bailkey et al., 2007). The American Community Gardening Association has nicely summarised some of the issues of community development for which UPA can have a positive contribution. These issues include: fostering social and environmental justice, empowering communities, breaking down racial and ethnic barriers, reduce crime and promoting and enhancing the education level in communities (ASLA in Bailkey et al., 2007). Furthermore, several authors claim that UPA can have positive influence on practitioners' political and organisational skills, e.g. promoting democracy (Bailkey et al., 2007; DeLind, 2002; Levkoe, 2006). In more general terms the contribution of UPA to community development is that it leads to the creation of new networks and to the "bonding and bridging of networks" (Bailkey et al., 2007, p. 2). Bailkey et al. claim that the strengthening of the community's network leads to increased trust among community members

2.5 Perspective 1: Education for Sustainable Development

When analysing the potential of UPA as a learning mechanism I use an Education for Sustainable Development (ESD) perspective. ESD is not a theory, but represents a general line of thought today's educators and policy makers wish to incorporate into all forms of education. The main question of this thesis involves two facets of sustainability, which is why the ESD perspective is an appropriate way to find an answer. The main question deals both with environmental sustainability (implied in environmental learning) and social sustainability (implied in community development).

The term ESD was coined by the United Nations in the Agenda 21 report of 1996. The Agenda 21 report recognised that education was a vital part of achieving a sustainable world. Further thought on the matter by several UN commissions concluded that ESD should be seen as a life-long process (Blewitt, 2006; Fien & Tilbury, 2002). Hence, adult education is also important. The supporters of ESD also think that opportunities to learn about sustainability (both in the environmental and social sense) are to be found in formal ('official' education programs) and informal (everyday practices) spaces. Urban agriculture could be said to fall in both spaces (Fien & Tilbury, 2002).

ESD is not a clear step-wise method. It also does not have any specific design. We should see it as an approach that wishes to create space for social learning, social learning that can lead to a transformation of an unsustainable to a sustainable society. It seeks to find "new ways of

thinking, valuing and doing" (Lijmbach et al. in Wals, 2006, p. 47), and in doing so looks mostly at the potential of local opportunities to find these new ways (Fien & Tilbury, 2002).

In this thesis I use Marton and Booth's definition of learning, in which learning is seen as "the process leading to a changed way of understanding the surroundings (Marton and Booth in Axelsson, 2004, 2nd page)." In the case of UPA this could mean two things. It could refer to a changed understanding of the biophysical surroundings and human interrelationships with these surroundings (i.e. environmental learning). It could also refer to a changed understanding of our social surroundings, which would be related to community development. An essential element of the ESD approach however is that promotes seeing the social and biophysical systems as being strongly connected. In this view, changed understanding of one system should go together with changed understanding of the other.

Taking the ESD perspective means that you look at learning and education as processes that give participants motivation to change. Change could mean either changing their behaviour or trying to facilitate a change in their community or city. The emphasis on change means that the ESD perspective usually prefers action learning. ESD educators believe that to achieve change, active participation is necessary. Dialogue with other participants and with the facilitators of a project is also crucial for the learning process. Through dialogue participants can share thoughts and feelings, and without such confrontation the individual learning would not be meaningful (Wals, 2006).

Although ESD is not a rigid method, based on the above paragraphs I think that the perspective does come with certain prescriptive criteria. For the analysis of ESD in UPA activities and projects I have chosen five criteria that I feel are most important for the research questions.

Criterion 1: Social learning

Social learning is a very important element to ESD. Social learning means that the learning processes of those involved should not merely be the result of individual learning, but also of sharing knowledge and interacting with others. Social learning means that the actors involved go through processes of framing and reframing issues together. This interaction results in new and shared understandings of certain problems and in collective goals. Social learning can only take place if there are opportunities for dialogue and negotiation among actors (Tàbara et al., 2009). Therefore, to operationalize social learning in UPA activities and projects I will analyse whether projects provide space for shared learning, dialogue and negotiation.

Criterion 2: Change

The learning process should lead to an awareness that change in students' current behaviour and practices is necessary and also to a willingness to change these. However, willingness to change is not enough in ESD. The approach specifically aims to go from awareness to action (Hopkins & McKeown, 2002; Mogensen, 1997). The action element of ESD is strongly related to the action learning approach, which is explained in the next Section. The action criterion of ESD is operationalized by change in practitioners' practices or behaviour because of the learning process, or the expression of a willingness to change by practitioners.

Criterion 3: Acquiring new skills

In ESD it is important that students do not acquire new knowledge in the cognitive sense only, but also that they acquire new skills that empower them and that enable them to carry out their motivation for change (Axelsson, 2004). UPA projects have the potential to deliver a range of

different skills. These can include agricultural skills (e.g. new weeding or fertilising techniques), but also social skills (e.g. making contact with new people) or organisational, commercial and personal (e.g. cooking new dishes) skills. I will analyse to what extent existing UPA activities stimulate the development of such skills.

Criterion 4: Involving local knowledge

Local knowledge needs to be valued and incorporated in the learning process. The learning process should not only be based on Western education perspectives (which are characterised by "technocratic discipline-focused learning" (Blewitt, 2006, p. 26)), but should value local knowledge and practices (Blewitt, 2006; Hopkins & McKeown, 2002). In my assessment of UPA activities and projects I will analyse whether or not the projects allow for the integration of local perspectives and knowledge.

Criterion 5: Systems thinking

Important in relation to the issue of environmental learning is that ESD aims to develop the ability to *think 'in systems'* among its students (Hopkins & McKeown, 2002). Systems thinking means that the student is aware of and understands the dynamic interactions in different (biophysical, but also social) systems. The student can understand that different facets of his or her environment are interrelated in complicated ways and that the interrelationships create feedback loops (Van Koppen, 2011). This last criterion is perhaps the most difficult to operationalize. To analyse the empirical evidence for traces of systems thinking I will look mainly if participants of the projects are aware of the larger dynamics of social and biophysical cycles. This strategy could only be applied with great care however, since it involves much interpretation and speculation.

I use these five criteria to analyse if current UPA activities and projects can already be said to have an ESD perspective for environmental learning and community development. By using these five criteria to see at which points current UPA activities do not comply, I hope to find out if the ESD approach can be a meaningful contribution to make UPA an instrument for environmental learning and community development.

2.6 Perspective 2: Action Learning

Doing research into UPA, especially when you combine this with an ESD perspective, seems to be almost synonymous to taking an action learning or action research approach. Most UPA projects are also done in an action learning or research mode. The difference between action learning and research is not always clear and many researchers themselves use the terms interchangeably. Both are circular approaches that generally follow continuous cycles of action, reflection of the action, incorporating lessons learnt into new actions and then reflection again (Milgroom, 2011). As I understand it, action learning refers to education programs or projects in which this circular approach is taken, whereas action research is an approach taken by scientific researchers to not only analyse their topic but also the influence of their own opinion, values and actions on their topic.

Action learning has several characteristics in common with action research that make it an appropriate theory to be using in this report. The main similarity is that action learning like action research sees, not surprisingly, action as the base of learning. Reginald Revans, the 'father' of both action learning and research, designed a formula for learning on which the whole action learning approach is based. He saw Learning as the outcome of Programmed knowledge and Questioning, which results in the formula L = P + Q. With 'Programmed

knowledge' Revans meant the knowledge already present among students and teachers or knowledge available in books or through expert consultation (Jennings, 1996). 'Questioning' refers to the capacity of students and teachers "to identify useful and fresh lines of inquiry" (Jennings, 1996, p. 10). According to Revans, and many action learning scholars after him, learning cannot take place without both P and Q: you cannot learn without action and you cannot do an action without learning from it (Jennings, 1996; Pedler in Passfield, 1996).

Action learning sees participation as a crucial element of education. The students are not supposed to be passive receivers of information, but instead can only learn through active collaboration and discussion with fellow students and with their 'teachers' (Riding et al., 1995). This is one way in which we can see that the ESD perspective is very much based on action learning. There is however some discussion on the presence of teachers in action learning processes. The fact that both students and teachers are required to learn can be seen to remove the barriers separating these roles. Action learning means that everyone involved becomes a student. Some authors, like Passfield (1996), do speak of the need for a teacher or instructor to guide or coach the process. Revans himself also saw the need for such a person. This could be explained by the fact that action learning originally developed as a strategy for improving the management in organisations and industries, which are traditionally more hierarchical (based on Jennings, 1996).

The importance of participation for education also means that the learning that individual learning is nigh impossible. Action learning should involve a group of people (also called the 'learning team' or 'learning set'), so that there is a change for exchange of thoughts and practices (Jennings, 1996; Passfield, 1996). So, as with the ESD approach, the action learning approach also focuses on social learning as a very important component within the learning process (Zuber-Skerritt in Jennings, 1996).

A fourth feature of action learning is that it is specifically problem-based. It is focused on a specific issue and tries to find solutions for this issue through cycles of action learning (Passfield, 1996). In the case of UPA the problem could for example be an unsustainable way of waste management and the action could be trying UPA to see if this proves as solution.

A last but critical feature of action learning is that it takes a circular perspective on learning. Action learning does not see learning as a linear process going from ignorance to understanding through information transfer by a teacher. Instead, like action research, it encourages both the students and teachers in involved in the process to adopt the circular learning strategy that is illustrated by Figure 3. In the Action phase, students and teachers perform a certain action (a UPA activity). In the Reflection phase they evaluate both product and process of their actions. Their reflection will lead them to draw certain lessons and conclusions in the third phase, the Learning phase. The students and teachers then think how to apply their new understandings to future actions in the Planning phase. And then the whole cycle starts over again. Although the above explanation may make it seem as if action learning is a method that prescribes a fixed set of steps or phases, one feature of action learning is actually the acknowledgement that during the learning process all these phases happen simultaneously or in different orders. Action learning embraces this instead of trying to push the process into a fixed pattern (Milgroom, 2011).

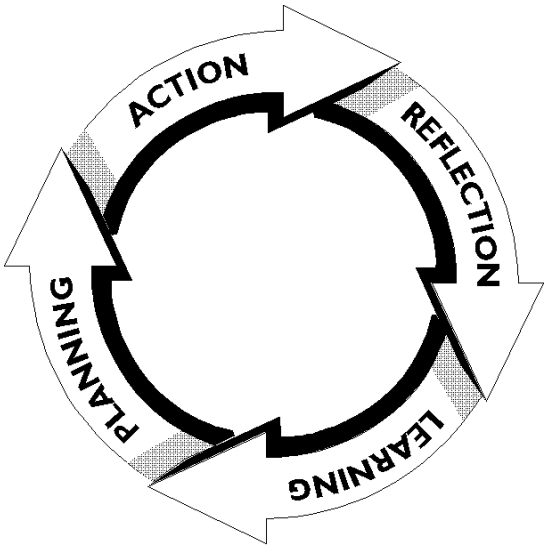


Figure 3
The Action Learning Cycle
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According to Wals (2006), there are three reasons for the focus on action in the learning. I think these three reasons apply also to the UPA context. First, the issues on which learning is required, in this case environmental problems and development of the community, can be a little overwhelming. Through taking action, the practitioners of UPA do not only come to understand about such issues (the learning element), but also get an opportunity to try to change the issue (the action element). Practitioners can take charge and thus develop a sense of power (Wals, 2006, p. 54). A second argument is that UPA is in itself an activity. It is nearly impossible to learn about or through UPA without actually doing some agriculture yourself. Finally, environmental learning and sustainability are often connected with some degree of political participation or democracy. This is also visible in my research question, which looks at both environmental learning and community development. Wals argues that without taking action it is also impossible to participate to democracy. While it is not my intention here to start a discussion on the conditions for democracy, I do agree with Wals that just talking about making a contribution to your community is not enough to come to change. Some form of physical action is usually required to make a change.

To assess the occurrence and effect of action learning in UPA activities, I look at the following points:

- Do the practitioners of UPA follow cycles of action, reflection and new actions? Are there opportunities to incorporate lessons learnt into new stages of urban agriculture? In other words, is learning based on hands-on experience?
- Is the UPA project or activity based on participatory education, meaning that learning processes are the result of a two-way interaction process between teacher and participants? Do participants get the opportunity to integrate their values, opinions and experiences in the learning process?
- Does the UPA project or activity aim at achieving change at a micro-level or at the level of the participant? The overall objective can be a wider structural change, but the goals should be presented 'small' enough for an individual participant to achieve them (Almekinders et al., 2009).
- Does the activity try to develop several strategies to overcome constraints or solve problems? In action learning there is not supposed to be single predetermined direction of the learning process. Instead there should be space for diversity. In later stages, after

enough action and reflection, a single strategy that works best can be chosen based on experience of participants and project leaders (Almekinders et al., 2009).

Figure 4 summarises the key ingredients of action learning.

Figure 4
Key components of Action Learning
Based on: HRO Consulting (Shanghai) Co., Ltd. 2002-2008

Chapter 3

Benefits and Problems of UPA at the Household Level

This chapter discusses the benefits and problems derived from UPA for its practitioners. The analysis looks only at the existence of such benefits and problems at the household or individual level of those practising UPA. This analysis is done by comparing purported benefits and problems, mostly based on claims by scientists of different disciplines or UPA enthusiasts, with empirical evidence that either supports or counters these claims. I discuss claims related to the fields of health, income generation and culture and identity. In this chapter, and in the next, I only discuss benefits and problems specific to UPA. I do not analyse general benefits and/or problems that can be associated with any kind of agriculture, such as health risks of pesticide use. To discuss such issues is beyond the scope of this thesis.

3.1 Health Benefits and Problems

This section discusses several claims on UPA's effects on household health. These claims can be about positive or negative effects. The alleged health benefits of UPA are discussed first.

3.1.1 Food Security and Nutrition

The main benefit of UPA claimed by development organisations such as RUAF is its contribution to food security and nutritional status of low-income urban households (Armar-Klemesu, 2001; Egal et al., 2001; Zezza & Tasciotti, 2010). Armar-Klemesu (2001) states that UPA activities can help improve the quantity and quality of food consumed in urban households in two ways. First of all, the activities can result in extra income when the urban farmers sell their produce, thus enabling the household to buy more or better food. UPA can also help by enhancing the access to food for urban households, since households engaged in UPA can grow their own food.

An analysis of empirical studies into the effect of UPA on food security and household nutritional status shows however that this effect is less certain than initially claimed by Armar-Klemesu. Case studies have very different results. There are no studies that can give a conclusive result on the contribution of UPA to either food security or nutritional status, as Ruel et al. in Yeudall (2006) have also noted. In an attempt to draw a final conclusion on the matter Zezza and Tasciotti (2010) performed a meta-analysis of 15 different case studies using dietary diversity as a proxy of food security. Zezza and Tasciotti indeed found a positive correlation between urban agriculture and an increase in calorie intake and dietary diversity. This correlation was present in ten of the countries that were included in the meta-analysis. Despite this correlation the actual impact of UPA in absolute terms was found to be small. It is not clear in Zezza and Tasciotti's research whether increase in household food security and nutrition was the result of extra income obtained by UPA or by direct household consumption of the UPA produce.

A case study of UPA in Hanoi, Vietnam presents a totally different picture. Combining several different research methods the study found that 38% of the food consumed in urban farming households was produced on their own farm (Ali et al., 2005). This is a significant share and the results contrast with those of Zezza and Tasciotti. One explanation is that Zezza and Tasciotti compared 15 different case studies, whereas Ali et al. present only one. The fact

that Hanoi is a very fertile city in which UPA activities are very much supported by the local government could be a second explaining factor (Ali et al., 2005).

The real contribution of UPA to household food security and nutritional status remains inconclusive, although it is certain that not all studies support enthusiast claims on the matter. Webb points out that many of the case studies reporting beneficial effects on food security and nutritional level are based on a methodology that is lacking or at least questionable (Webb, 2011). What is more, as Armar-Klemesu (2001) reminds us, UPA is often only possible for a limited scope of products: some vegetables, small livestock etc. It is almost impossible for UPA to satisfy the household demand for large staple crops such as rice or potatoes through self-sufficiency alone. Armar-Klemesu further states that the effect of UPA on nutritional status of households differs per income group and other conditions in which the household is living. Evidence from Malawi and the Philippines supports that statement (Mkwambisi et al., 2011; PUVeP in Potutan et al., 2001).

3.1.2 Indirect Health Benefits of UPA

UPA activities are associated with a number of indirect health benefits. When UPA provides a sufficient income or level of food, there will be less need for the practitioners to be employed in industrial jobs that are potentially more dangerous. Any cash income derived from UPA could also help to increase the level of general health and welfare in a household, e.g. by enabling the household to buy medicine (D. Cole et al., 2008; FAO, 2010a). Such benefits are too indirect to be able to prove through empirical studies however, which is why they still exist only in the domain of speculation on potential UPA benefits.

3.1.3 Contamination by Microbes, Pathogens and Parasites

Because of the lack of precipitation or clean irrigation water, urban and peri-urban farmers often end up irrigating their crops with urban waste water (Amoah et al., 2007; Anh et al., 2007b). This waste water is often full of faecal matter and other types of sewage. It therefore contains many microbes and pathogens that could be a danger to human health (Anh et al., 2007a). In some countries it is also customary for urban farmers to use poultry or human manure as a fertilizer (Keraita et al., 2007b), which is acts as another source of contamination by pathogens. Outbreaks of diseases associated with untreated waste water use in agriculture had the World Health Organisation worried in 2006 (Anh et al., 2007a). This worry manifested itself into many researches into the health risks of waste water use in UPA. The health risks can be divided into risks for consumers of produce irrigated with contaminated water (which are discussed in the next chapter) and risks for the producers, which are discussed here.

Anh et al. (2007a) looked at the faecal contamination in water spinach production in a lake near Cambodia's capital Phnom Penh. Most of the city's sewage flows to this lake. Consequently, Anh et al. found high levels of contamination of the water spinach with pathogens and parasites that cause food poisoning and diarrhoea (e.g. Figure 5). Studies in Ghana, Mexico and Eritrea found similar results for other crops (Amoah et al., Rosas et al. and Shrikanth & Naik in Anh et al., 2007a; Keraita et al., 2007b). Since water spinach is usually fried or cooked, the main risk of the high levels of contamination in Cambodia is to the health of the farmers who handle their crops and to their families, because parasites usually spread through human contact (Anh et al., 2007a).

In another study in 2005 Anh and another team of researchers looked at the prevalence of skin disease (eczema) among practitioners of peri-urban aquaculture in Hanoi, Vietnam (Anh et al., 2007b).. The results showed that the prevalence of skin problems was much higher (about

five times higher) among practitioners that used waste water. Although Anh et al. state that they do not know the exact cause of the skin disease, they speculate that the pathogens and other pollutants in the waste water could be responsible. A second research in Hanoi looked at helminth infections among practitioners of peri-urban agriculture and aquaculture (Trang et al., 2007). The research found that it was not the use of untreated wastewater for irrigation that led to increased helminth infections, which opposes the study by Anh et al. (2007a). Trang et al. showed that the use of human excreta as an organic fertilizer proved a far larger source of infection. Nonetheless all studies show that transmission of microbes, pathogens and parasites through wastewater and faecal matter is indeed a main problem with UPA.

3.1.4 Contamination by Heavy Metals and Chemicals

Agro-ecologists and health workers worry that urban or peri-urban soils are contaminated with high ratios of heavy metals and chemicals that come from various urban activities, such as tanneries, plastic factories or textile industries and vehicle emissions (Abdu et al., 2011; Binns et al., 2003; D. C. Cole et al., 2006). Scientists are especially worried about the presence of Cadmium and Zinc, since these metals are considered extremely mobile. What is more, practitioners of urban and peri-urban horticulture (UPH) often also irrigate their crops with wastewater or precipitation that is contaminated with heavy metals (Diogo et al. and Predotova et al. in Abdu et al., 2011). The claim by agro-ecologists is that these metals will come into the food chain through plant uptake. Once in the food chain they can damage human health when the members of the households eat their produce (Abdu et al., 2011).

Abdu et al. (2011) have assessed these claims on the presence of heavy metals in urban horticulture by sampling seven sites in three different West-African cities. By taking soil and water samples the researchers found that currently the concentrations of some main pollutants (Chromium, Lead, Nickel and Copper) are below the threshold level set by EU and CCME. The concentrations of Cadmium and Zinc, which are more dangerous to human health, are already above the threshold levels, even though they were lower than some other studies reported (Abdu et al., 2011, p. 391). The authors implore authorities to remain wary. The concentration of heavy metals varies per season (being higher in the raining season when more contaminated precipitation irrigates the crops) and accumulation of heavy metals can on the long run cause environmental and human health problems. Another case study by Binns et al. (2003) done in Kano, Nigeria shows much the same results for this city. Here too the crops produced by urban farmers were grown on heavily contaminated soil and with polluted water from adjacent industrial sites. Research into the presence of Zinc, Copper, Lead, Cadmium and Nickel in the crops of peri-urban farmers near Kampala also concluded that the levels of these metals were worrisome. Like Abdu et al. the researchers in Kampala concluded that especially the accumulation of such metals in the soil is a primary concern for healthy urban agriculture produce (Nabulo et al., 2008).

These results are indeed worrying, yet it is important to remember that the data found only represent African countries. I was unable to find similar research conducted in non-African countries. It should therefore be taken into account that the data presented above might not be representative of all UPA activities in developing countries. What is more, the pollution of heavy metals is likely to vary with the industrial activities carried out in a particular area or with the amount and enforcement of environmental regulation.

3.2 Cash Income Benefits

UPA enthusiasts and supporters claim that UPA generates enormous potential for cash income generation among poor urban households in developing countries (Nette, 2011; Zezza

& Tasciotti, 2010). Surveys among UPA practitioners showed that respondents indicated income enhancement was their second most important reason to start UPA activities[2] (Nugent, 2001).

Any empirical analysis of the contribution of UPA activities to a household's income is difficult (Webb, 2011). As Nugent says (2001, p. 75), the conditions for farming vary per season and per city, which makes it difficult to generalise data. Any income derived from UPA will depend on factors as the amount of time a farmer spends on UPA, the availability of inputs, access to the market and of course, local prices (Nugent, 2001). Nonetheless Zezza and Tasciotti (2010) have tried to analyse the share of income derived from UPA for total household income by comparing a cross-section of 15 different case studies in their data-set. Their most important conclusion is that UPA does have a significant share in the income of the poorest households in these countries. For these households the income derived from UPA is essential for their livelihood strategies. Other households produce mainly for their own consumption and derive less direct income from their activities (Zezza & Tasciotti, 2010). Looking at the literature, the only certainty about the income effect of UPA on household level is that the effect differs per household and per country. Reports that generalise UPA's income effects therefore seem incorrect.

3.3 Benefits and Problems Related to Culture and Identity

When agricultural activities take in an important share in your daily activities, they become, almost by default, part of your identity. Ali et al. (2005) suggest that UPA activities can be especially important to migrants who have come to the city from the rural areas. Since many of these migrants used to farmers or at least engaged in farming activities at their place of origin, UPA might provide a link to the past (see also Sachs and Silk in Burger et al., 2009). A migrant woman quoted by Guénette in a case study on UPA in Quito, Ecuador illustrates the importance of farming to some people's identity and says: "I love gardening, it's part of my life (Guénette, 2006, p. 5). "

By engaging in UPA the migrants can earn a living in a way they are already familiar with, claim Ali et al. (2005) and several other authors (Mayer, Bundy, Potter & Unwin, Tacoli and Gogwana in Burger et al., 2009). That assumption is too simplistic. Many of the farming techniques used in UPA are quite similar to rural farming, yet the urban context does presents some need to adapt farming techniques and practices. The availability of land, water, fertiliser and other inputs have proven constraints to many UPA farmers (Baudoin & Drescher, 2008). Because of these constraints UPA has developed technologies that are most likely completely unfamiliar to the migrant, such as organoponics[3] or hydroponics[4] (Tixier & De Bon, 2006). The need for migrants to adapt their farming practices to the urban context might make them anxious or reluctant to start UPA.

UPA is also important to a household's identity and social position because it offers opportunities to exchange gifts. This aspect of UPA is especially relevant when it concerns the rearing of livestock. When urban families rear livestock, they can choose to give away

[2] Food production for home consumption was the most important reason (Nugent, 2001).

[3] Organoponics refers to an agricultural system in which crops are grown on different organic levels, which reduces the amount of soil and other inputs necessary (Tixier & De Bon, 2006).

[4] Hydroponics refers to a horticultural system in which the roots of plants are submerged in flowing water instead of in soil. This reduces the amount of soil needed to grow plants and prevents pollution of the produce through soil contamination (Tixier & De Bon, 2006).

some of their animals as presents or perhaps dowry (Nasinyama et al., 2006). The act of gift-giving can enhance a household's social status and can help secure their identity within the community (D. Cole et al., 2008). Focus groups on urban livestock rearing in Kampala, Uganda, indicated for example that apart from the production of milk, the possibility to sell cows for bridal payments was seen as the most important benefit of having cows as an urban farmer (Prain, 2006b). In South Africa respondents of two UPA surveys answered that they used their livestock and vegetables to perform necessary marriage, funeral or circumcision rituals (Dunn, 2008; Thornton, 2008).

3.4 Summary

Table 1 provides a summary of the most important claims regarding UPA that were analysed in this chapter; and the results of this analysis per claim.

Table 1
Summary table of Chapter 3

	Claim	**Empirical evidence**
Health: **food security and nutrition**	UPA has positive contribution to household food security and nutrition level	No conclusive evidence; relative contribution depends per case study, but appears insignificant
Health: **Indirect benefits**	UPA contributes to general health of household	Too indirect to be able to prove
Health: **Contamination by microbes, pathogens and parasites**	Use of waste water for irrigation and excreta for manure contaminate produce with pathogens	Evidence supports claim; pathogens and parasites found in produce
Health: **Contamination with heavy metals and chemicals**	Urban location causes UPA produce to be contaminated with heavy metals, chemicals and other toxics	Evidence supports claim, but evidence was only available from African countries
Income: **Cash income**	UPA generates extra income for poor urban households	Difficult to analyse due to variable nature of UPA activities; UPA does contribute significantly to income of poor households
Culture: **UPA is important for identity**	UPA has important value for practitioners' identity	Evidence supports claim; practitioners express love of farming
Culture: **UPA is important for migrants**	UPA helps to integrate migrants into the city by providing familiar livelihood activities	No specific research done on this subject; difficulties of UPA farmers are likely to make things harder for migrant farmers
Culture: **UPA contributes to cultural festivities**	UPA produces necessary items for cultural rituals	Anecdotal evidence supports claim; agricultural products are used for marriages, funerals and religious rituals

Chapter 4

Benefits and Problems at the System Level

Most benefits and problems associated with UPA take place on larger level than the household level. They affect the people living in cities in which UPA takes place (the non-producers) or affect the urban system itself. This chapter analyses these benefits and problems at the system level. The approach taken for this analysis is similar to the one in the previous chapter. Alleged benefits and problems are compared with empirical evidence to see whether or not the claims prove to be true. Within this analysis the following fields are considered: health, regional economy and biophysical environment. UPA's potential to enhance community development is an often cited benefit of UPA at the system level. This aspect will not be dealt with in this chapter however, but will be elaborately discussed in Chapter 7.

4.1 Health Benefits and Problems

Many of the health benefits and problems that were discussed in Chapter 3 also apply to this chapter, since they also occur on the wider urban level. Like the practitioners, the non-producers also benefit nutrition-wise when more food is available and suffer when produce is polluted by microbes or heavy metals. This section first discusses any health benefits of UPA to the urban population. The health risks of UPA are dealt with afterwards.

4.1.1 Mental Health

Authors on UPA in developed countries often claim a beneficial effect of having green and 'natural' environments in the urban area on the mental health of urban dwellers (see e.g. Kansas City Center for Urban Agriculture, 2011; Largo-Wight, 2011). For a critical evaluation of UPA however, the effect of 'nature' on people's mental health is just as important to study in developing countries as in developed countries.

The Biophilia theory states that a lack of plants and greenery in people's environment causes stress, tension and attention loss. Studies on environmental psychology have shown that the Biophilia theory is real and that experiences in and of nature are beneficial to mental health (Grinde & Patil, 2009; Largo-Wight, 2011; Taylor et al., 2002). UPA activities, especially horticultural activities, would mean an increase in the amount of 'nature' present in areas generally devoid of greenery, plants and animals. According to Grinde and Patil (2009) and Largo-Wright (Largo-Wight, 2011), the visual contact of urban dwellers with the sites of UPA would improve the mental health of these dwellers. A survey among UPA farmers and their neighbours in South Africa shows that this claim is true (Dunn, 2008). Physical engagement of communal gardening in urban context has also been recognised as being beneficial for people's mental health, especially that of the elderly (Milligan et al. in Dixon et al., 2009). The beneficial effect of these forms of contact with nature has likewise been proven for children. City children who had regular contact with nature performed better on matters such as self-discipline and concentration (Taylor et al., 2002).

4.1.2 Contamination of Produce Sold to the Urban Market

UPA has long been opposed by government officials because of the health risks it could pose to the urban population as a result of unsanitary production methods. The health risks of UPA spread to the system level when urban farmers produce not for their own consumption but for

market demand. To see if these worries are justified, medical scientists are increasingly doing research into the matter.

Research has shown that much of the produce of urban and peri-urban horticulture in Ghana's capital Accra ends up as salads and side dishes for the fast food sold by street vendors (Amoah et al., 2007). Unfortunately for the customers their salads are often contaminated with helminth eggs and microbes, due to the use of untreated waste water and organic manure by farmers (Amoah et al., 2007; Keraita et al., 2007b). In Uganda, milk from urban dairy farmers proved to be dangerous for consumers. It contained zoonotic pathogens and drug residues from drugs administered to the cows (Prain, 2006b).

Some authors present another side to this story. They claim that certain UPA projects give urban consumers a chance to buy chemical- and pesticide-free produce, because the projects stimulate participants to produce using organic methods (Guénette, 2006; Yokohari et al., 2000). Guénette (2006) reports that an organic UPA project in Ecuador's capital Quito indeed fulfils a demand in organic products. Similar reports can be found for other countries and projects, but usually these reports discuss UPA activities in developed countries. An exception are reports on the growing demand for pesticide-free vegetables in several Asian countries (Midmore & Jansen, 2003; Ng, 2011). Authors of such reports present UPA as if it is equal to organic agriculture. It most definitely is not. Use of pesticides and insecticides is rampant among urban farmers in developing countries. For example, in the Philippines 86 per cent of the urban farmers surveyed used pesticides (Potutan et al., 2001). A study in Ethiopia showed that there 76.9 per cent of the farmers mixed organic and chemical fertilizer. Around 70 per cent used chemical pesticides (Ashebir et al., 2007, p. 224). Contamination of food with pesticides is not particular to UPA. It becomes a special concern however when UPA produce is presented as organic, when in fact it is often not.

4.1.3 Malaria

Policy makers that oppose UPA activities within their perimeters often come with the argument that UPA will lead to an increase in the occurrence of malaria among city dwellers (Burger et al., 2009; Howorth et al., 2001). Puddles of water used to irrigate crops, drinking water in troughs for livestock and the ponds needed for aquaculture are usually all filled with stagnant water that could prove a breeding ground for mosquitos that transmit malaria, dengue and filariasis (Egal et al., 2001; Lock & de Zeeuw, 2005).

There has been much research into this matter, especially with regard to the relationship between UPA and malaria. The results are mixed and can be somewhat difficult to interpret. While some studies did find an elevated occurrence of malaria mosquito larvae near UPA sites, other studies did not find this correlation (Klinkenberg et al., 2008). Even when a correlation was found, the studies not always concluded that this also led to an increased occurrence of malaria among the population. Epidemiological surveys done in Ghana showed that malaria was more prevalent in children living near UPA sites than in children who were living further away from UPA sites (Klinkenberg et al., 2008, p. 152). Not all communities showed a significant inverse relationship between distance to agriculture and malaria prevalence however. For example, a study on the relationship between UPA and malaria in Kumasi, a city in Ghana, reported more malaria mosquitos in communities with urban agriculture (Afrane et al., 2004). In these communities more respondents reported having suffered from malaria as well. These findings seem to indicate a causal relationship between UPA and malaria. However, in Kumasi UPA is usually practised in the inland valleys, which might naturally produce more mosquitos than the exclusively urban areas on higher grounds. Therefore, although the researchers found a correlation, a causal relationship between UPA

and malaria was not proven. A study in Côte d'Ivoire had similar results (Matthys et al., 2006).

Klinkenberg et al. (2008) did an entomological survey for Accra, Ghana. Their survey concluded that people living in UPA communities were bitten by malaria mosquitos more often than people living in urban areas without UPA. Based on the biting pattern, the researchers suggest that this relationship could mean that UPA sites do not only provide breeding ground but also a resting place for the mosquitos. To add to the worries Klinkenberg et al. (2008) found that mosquitos near UPA sites were more resistant to insecticides. That could mean that the heavy insecticide use by UPA farmers is making the mosquitos resistant.

4.1.4 Health Risks Associated with Keeping and Rearing Livestock

The range of animals kept by urban farmers in different countries varies from chickens to guinea pigs to cows. Not everyone is enthusiastic about the presence of animals in urban and peri-urban areas. There are several health risks associated with their presence. The most important risk claimed by policy makers is the risk of transmission of diseases through contact with animals, animal produce or with animal manure (Armar-Klemesu, 2001; Lock & de Zeeuw, 2005). This risk is exacerbated when animal manure is used as a fertilizer for urban horticulture or aquaculture (Armar-Klemesu, 2001). A second risk of rearing livestock in the city is that the animals might escape from their pens or are set loose to roam for themselves. Authorities often fear that free-roaming animals will lead to more road accidents (Lock & de Zeeuw, 2005).

City authorities seem most concerned with the risk of disease transmittance by urban livestock. Nonetheless, there has not been much empirical research on the subject that is specific to its urban context and most evidence remains anecdotal. It also remains unclear whether this problem occurs only at the household level or if the system level can be seriously affected as well.

Some findings are worth mentioning. Focus group discussions in Kampala, Uganda showed that, in the perception of urban farmers, theft of animals is a major worry. As a result, farming households tend to guard their animals in their living quarters at night. These practices increase the risk of exposure to zoonoses (diseases transmitted by animals) for the households (Mwiine in Nasinyama et al., 2006). A study by Dimoulas et al. concluded however that there was no significant increase in the prevalence of zoonoses among chicken rearing households and their surrounding communities in Kampala, Uganda (Dimoulas et al., 2008).

The problem of free-roaming animals is quite serious, especially when it involves relatively large animals as cows and pigs (see Figure 5). There is no small number of animals involved, so the potential damage to the urban population can be substantial. A 1990 research found that at that time about 5700 dairy cattle, 5700 goats and about 800,000 chicken were kept within the city limits of Dar es Salaam in Tanzania (Materu in Howorth et al., 2001). Seeing the nature of these animals it seems unlikely that all of them stayed safely in their pens, if they even had these to begin with. With these numbers of animals roaming free in the city it does not seem unlikely road accidents will happen because of them. The project coordinator of an urban sanitation project in Kampala reports that free-roaming animals have led to injuries in some neighbourhoods because they caused accidents or were aggressive. He also reports that there has been some psychosocial health risks, since conflict and stress erupt among the population over stray pigs wandering into courtyards (Twebaze, 2006). Unfortunately I was unable to find any data that could quantify the occurrence of road accidents as a result of a

collision with free-roaming livestock. In fact data on injuries as a consequence of road accidents in developing countries is almost non-existent (WHO, 2009).

Figure 5
Cows being herded through Sana'a, the capital of Yemen
© RUAF

4.2 Enhancing the Regional Economy

UPA development organisations claim UPA contributes to a city's overall economy (see e.g. De Zeeuw et al., 2011 for RUAF). Mougeot's definition of UPA (in Section 2.1) encompasses not only the production phase of UPA, but also the buying of inputs beforehand and the packaging, marketing and distributing of UPA products after production. The claim that UPA can contribute significantly to the regional economy of the urban area seems logical when we include all the upstream and downstream processes. Is this claim true? Does UPA enhance the regional economy?

Nugent (2001) has made a valiant attempt to measure the exact impact of UPA activities on a city's economy. She compared several case studies presented in the book *Growing Cities, Growing Food* by Bakker et al. (Eds.). Nugent warns that making any estimate on the aggregate impact of UPA is difficult, since most of the produce of UPA is sold via informal markets and street vendors. What makes it even more difficult to analyse Nugent's estimation is that she has found some data expressed in percentages and some in absolute numbers. A case study on Lima in 1995 found that UPA contributed 4% of the GDP of this city, yet a case study on Dar es Salaam in 1999 found that UPA contributed to the city GDP with $25 million (Nugent, 2001, p. 82). It impossible to compare or analyse these data properly. The same problem applies when trying to assess the effect of UPA on city employment and wage labour opportunities. Most labour in UPA is informal and case studies are fragmented in methods and date, so it is impossible to come up with a good estimation of UPA's contribution to city employment (Nugent, 2001).

The inclusion of the pre- and post-production phase in the definition of UPA allows to also look at the upstream and downstream effects of UPA on the regional economy. Empirical data on these effects is missing however. Still Nugent has tried, through deduction, to assess the effects and has come up with some careful expectations. Although it has been claimed that UPA can boost local economy as a purchaser of inputs, UPA farmers actually use minimal inputs of little value (e.g. waste water and human excreta) (Ali & Porciuncula, 2001). This fact has led Nugent to conclude that is unlikely that UPA acts as a major boost to upstream industries. With regard to the possibility of UPA to add value to downstream processes, Nugent reports that there certainly is potential for UPA to contribute to the urban economy by

processing, packaging and distribution activities. There is one important constraint however (Nugent, 2001). Many case studies on UPA report that the agricultural production is highly seasonable (see e.g. Ali & Porciuncula, 2001), which means that UPA production is too uneven and unpredictable to establish effective downstream industries.

4.3 Benefits and Problems to the Biophysical Environment

The relationship between UPA and the biophysical environment is perhaps the most contested aspect of UPA. This section explores the positive and negative effects of UPA on the environment.

4.3.1 Creating Buffer Zones

In an effort to promote UPA as a strategy towards creating resilient cities, the RUAF stresses UPA's potential to create buffer zones against floods, flash floods and landslides (Dubbeling et al., 2009). Information from several case studies shows that in some cases UPA indeed plays an important role in protecting urban areas. Many urban farmers plant their crops on river banks or other low laying terrain near water sources or use steep slopes for their activities. When they do so they prevent urban expansion into this areas and make it more difficult for squatters to start living there (Howorth et al., 2001; Yokohari et al., 2000). UPA on steep slopes has the added advantage of preventing erosion. Soil conservation and erosion prevention are two main objectives in the AGRUPAR development project on UPA in Quito, Ecuador (Anguelovski, 2009).

UPA zones can also protect the city by acting as reservoirs during floods. In Hanoi for example, flood water is redirected towards agricultural lands or aquaculture ponds to protect the urban population (Ali et al., 2005). Yokohari et al. (2000) demonstrate that UPA zones have been acting as flood reservoirs for a long time. Figure 6 shows a 19th century map of an urban neighbourhood in Tokyo. City planners included rice paddies in between the houses to act as flood reservoirs. In Accra, Ghana, urban agriculture along river banks helps to prevent flooding in another way. The dumping of solid waste in and around Accra's water ways by the urban population clogs up these water ways (Lydecker & Drechsel, 2010). Research has found out that the combined effect of the dumped waste has actually worsened recent floods in Accra (Sam, and Duodu in Lydecker & Drechsel, 2010). UPA sites enclosing the water ways and river banks prevent solid waste dumping however, since the population respects the farmers' activities (Lydecker & Drechsel, 2010).

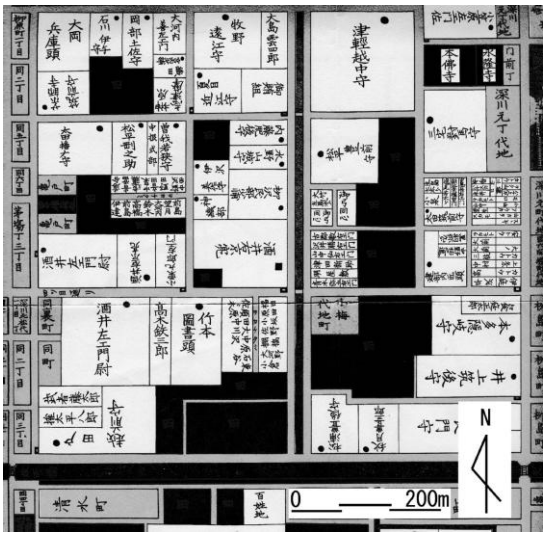


Figure 6
Map of a 19th-century Tokyo neighbourhood with planned rice fields (in black) to act as reservoirs during floods.
Source: Yokohari et al. 2000

4.3.2 Recycling Urban Waste

One often speculated benefit of urban agriculture is that it could go a long way towards recycling urban waste, both solid and organic or in the form of waste water (Baudoin &

Drescher, 2008; Cofie et al., 2003). An analysis of the existing evidence on recycling urban waste shows that there are indeed positive environmental effects on the system level.

Lydecker and Drechsel have looked at the potential of UPA to act as a sanitation service in Accra. They estimate that by using waste water and human excreta for irrigation and fertiliser urban farmers recycle up to 14 per cent of the total waste water produced by Accra's population. Since most of Accra's sewage now ends up untreated in a nearby lagoon, the 14 per cent means an important contribution towards limiting water pollution (Lydecker & Drechsel, 2010).

In Bélem, a city in Brazil, urban farmers have found another way to recycle their communities' waste. They use waste from construction sites, tyres and plastics, metals and woods found elsewhere to make containers for their fruit trees and vegetables (Madaleno, 2000), as Figure 7 illustrates.

Figure 7
Urban farmers reuse tyres
© M. González Novo 2009

4.3.3 Combatting Climate Change

A recent FAO publication on 'climate-smart agriculture' mentions UPA as a new policy to combat some of the effects of climate change in urban areas. The FAO maintains that UPA is 'climate-smart' for a couple of reasons. First, and most important, it can make cities more self-sufficient in their food supply, which would make the urban households less vulnerable for food supply variability due to climate change in the rural areas (FAO, 2010a). Whether or not UPA can indeed significantly improve urban food security has been discussed in Chapter 3, so I will not discuss this again. Suffice is to say that the previous discussion did not give a conclusive answer that allows me to support the FAO on this matter.

The FAO report describes other ways in which UPA can be climate-smart. By increasing the amount of 'green' areas in a city, UPA can help improve air quality and lower temperatures (FAO, 2010a). This positive effect of UPA has also been claimed by Howorth et al. (2001). A Japanese study proved the claim right, showing that peri-urban paddy fields helped to lower summer heat in the nearby urban areas (Yokohari et al. 1997 in Yokohari et al., 2000). It could be though that current air pollution levels are already too high for UPA to be able to reduce them. A study into the effect of air pollution on urban agricultural yields in Varanasi, India, showed that high levels of air pollution significantly reduced the yields of urban farmers. The amount of air pollutants already present prevented crops from growing properly (Agrawal et al., 2003). And when Ono et al. investigated the carbon sequestration by urban greenery in Manila in the Philippines, they concluded the role of urban green areas was negligible in the city's carbon sequestration (Ono et al., 2002).

The FAO and other organisations claim there is a third way in which UPA can mitigate climate change: by reducing food miles. When a food item has to be transported, its transportation produces CO_2 emissions. Because UPA reduces the distances between producer and consumer, CO_2 production would go down (see De Zeeuw et al., 2011; Deelstra &

Girardet, 2001). Although food miles are often perceived by the general public as a phenomenon typical to developed countries, food items in developing countries are also often transported from faraway places. A scientist from the International Water Management Institute (IWMI) in Accra calculated that the "average food item found in a supermarket or food shop in (…) Accra travels by air 3700 km before it is on the shelf (Drechsel in Baudoin & Drescher, 2008, p. 37)." How effectively UPA can really reduce a city's food miles depends on the share of UPA products in the total amount of food items consumed in the city. It thus depends on the overall size of UPA in each area. It is very difficult to gauge the total potential of UPA to reduce food miles, since the size of UPA varies per city and per season.

4.3.4 Water Pollution and Scarcity

In cities (clean) water sources are often more limited than in rural areas and have to be shared by larger numbers of people. Therefore policy makers and scientists worry that urban and peri-urban agriculture could prove to be a polluter and user of scarce water (Deelstra & Girardet, 2001). Accounts on the use of pesticides by urban farmers differ. Some authors claim that UPA farmers do not use chemical pesticides and insecticides because these are too expensive. Other studies, e.g. the one by Potutan et al. (2001), report intensive use of pesticides. A comparison of different case studies and reports on the matter shows that pesticide use by urban farmers depends on the country and on the income level of the farmer.

All farmers need water though, so at least we can try to analyse the effect of UPA on the water levels of a city. Not much research has been done into this effect. In fact I could only find one research, albeit a very thorough and intensive one. This research by Wolf et al. (2003) looks at the effects of peri-urban agriculture on the water supply of Beijing municipality. Their study has shown that as an effect of intensified peri-urban agriculture in and around Beijing, Beijing's ground water level has gone down. The water supply is also being polluted by pesticides of vegetable producers and fluid manure from pig farms.

4.4 Summary Table

Table 2 provides a summary of the most important claims analysed in this chapter and a final evaluation of the merits of these claims.

Table 2
Summary table of Chapter 4

	Claim	**Empirical evidence**
Health: **UPA is beneficial for mental health**	Urban greenery improves mental health of community	Evidence supports claim; contact with nature makes community and farmers feel better
Health: **Contamination with pathogens, parasites etc.**	UPA produced food is risk to health of consumer	Evidence supports claim; food items contaminated with pathogens; pesticide use can also pose risk
Health: **Risk of increasing malaria, dengue and filariasis**	UPA sites are breeding grounds for disease-transmitting insects	Evidence is inconclusive; correlation between UPA and malaria was found, but no

		causal relationship
Health: **Dangers of urban livestock**	Keeping livestock increases risks of disease transmission and road accidents	Not enough scientific evidence to support either claim; only evidence is anecdotal
Income: **Enhancement of regional economy**	UPA provides opportunities to improve city-wide economy	No evidence on absolute contribution of UPA to regional economy; emergence of up- and downstream industries is unlikely
Environment: **Buffer zones**	UPA sites act as buffer zones against natural disasters	Evidence supports claim; UPA sites protect against floods and landslides
Environment: **Recycling urban waste**	UPA is a way to recycle urban waste water and solid waste	Evidence supports claim; UPA could help to reduce waste water; UPA farmers recycle solid waste
Environment: **Climate change**	UPA provides ways to combat climate change	Not enough evidence yet; urban greenery can lower city temperatures; effects on CO_2 emissions are uncertain
Environment: **Water scarcity and pollution**	UPA pollutes urban water source and makes water scarce	Evidence inconclusive; evidence on pesticide pollution differs; only 1 research into water scarcity

Chapter 5

Opportunities and Constraints for UPA

This chapter discusses several opportunities and constraints for UPA in developing countries that emerged from the literature review. Most of the opportunities and constraints are found on the system level. With 'constraints' I refer to factors that have been consistently recognised as limiting the further development of UPA in developing countries. The first section on 'opportunities' mainly discusses recent trends and developments in the world that could act as potential stimulants to UPA.

5.1 Opportunities for UPA

5.1.1 Food Crises and Trends

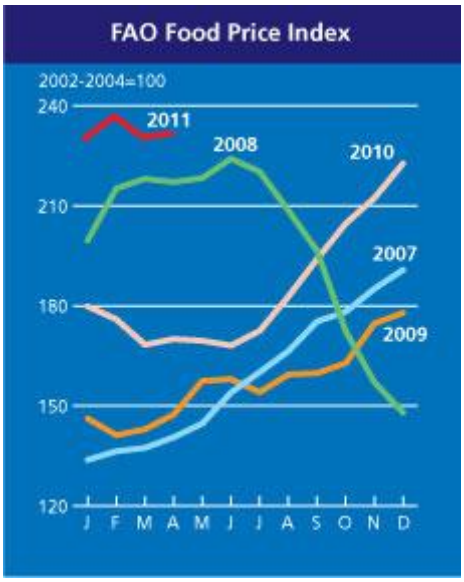
Recent food trends and crises have kick-started a major boost in UPA activities, both in developed and developing countries. In the past years several food scandals involving toxic or pathogenic foods have caused a renewed interest in urban farming (e.g. Figure 8), especially among the middle-class populations of urban areas (see e.g. Larsen & Barker-Reid, 2009; Midmore & Jansen, 2003). The Jakarta Globe reports a growing UPA trend in China. Young Chinese urbanites, concerned for their health, are increasingly renting small farm plots to grow their own organic foods (Ng, 2011). Localised or private production of food is seen by many people around the world as a chance to regain control over food production (Dixon et al., 2009).

Figure 8
Especially the melamine milk scandal caused much concern among the Chinese population when contaminated milk powder sickened about 300.000 people.
© China Daily, Xinhua, 2008

The demand for fresh produce in urban areas is increasing even without the food scandals. Since cities are growing, more and more urban citizens need to see their daily needs met. UPA is especially suitable for the production of perishable vegetables, flowers, milk and meat that cannot be transported over long distances to the city (Amoah et al., 2007; Midmore & Jansen, 2003).

Several authors have also identified the rises in food prices of the past years as a potential stimulant for UPA. Graph 2 shows the most recent FOA food price index, which clearly shows food prices are rising sharply. When food prices keep increasing, producing your own

food becomes more attractive and lucrative for urban households. Development experts expect that especially among poor urban households the prevalence of UPA activities will increase (Baudoin & Drescher, 2008; Burger et al., 2009). In Chapter 3, I concluded that UPA at present does not represent a significant contribution to household income and food security. This conclusion was largely based on older data. The current high food prices might mean that UPA has become or will be a significant source of income and food security for urban households.



Graph 2
FAO Food Price Index of 05/05/2011. Average prices of 5 main commodity groups indices are set off against the index of 100 for the period of 2002-2004.
© FAO 2011

5.1.2 Global Environmental Crisis

With rampant worries about the state of the planet's resources and global climate change, people are starting to look for alternative ways of living and of food production. As more and more people start living in urban areas it is important that the alternative ways can be integrated into an urban context.

Development organisations that are involved with urban agriculture, such as the FAO, RUAF or IDRC, have seized the global environmental crisis to promote UPA as a strategy to improve the sustainability of cities. UPA has also been hailed as a strategy to build 'resilient cities', especially by RUAF. Examples are publications by Van Veenhuizen (2006), Anguelovski (2009), Helten et al. (2009), Martin Han and Pieschel (2009), De Zeeuw (2004) and De Zeeuw et al. (2011). These kinds of publications focus on the contribution of UPA to urban sustainability. They are proving to be an impetus for more research into UPA and a change in official policy regarding UPA. For example, in recent years the potential of UPA's contribution to urban waste management has been extensively studied. The earlier mentioned change in FAO policy regarding UPA is an example of changing policies. For decades UPA was largely ignored by the FAO, but the latest FAO policies on UPA are carefully enthusiastic (see Baudoin & Drescher, 2008; FAO, 2007, 2010a).

5.1.3 New Technologies

Several new technologies and UPA methods are being developed to initiate new forms of UPA and overcome some of the problems and constraints associated with UPA. It is beyond

the scope of this thesis to discuss all these technologies and their merits. I will mention some of them, just to give the reader an idea of the developments in UPA.

Perhaps the most controversial form of UPA is the so-called 'vertical farm', a high-tech sky-scraper farm combining all sorts of UPA activities: horticulture, aquaculture, pig breeding etc. (De Zeeuw et al., 2011). Designers of vertical farms aim to bring farming back into the city and to reduce the waste produced by agriculture by reusing this waste internally. The plans are still mostly in the design phase, although the Netherlands and China have each started with the build of a vertical farm. It seems this technology is a long way off from being a realistic option for most UPA farmers in developing countries however, since they require high levels of funding and (academic) education.

On the other end of the UPA spectre there are some small-scale and low-cost technologies available to farmers in developing worlds. Experiments with organoponics and hydroponics are one example. The UNHCR and WFP have started experiments in refugee camps with organoponic 'farms' made out of grain sacks, for example (Corbett, 2009). See Figure 9 for an illustration of the 'sack garden'.

Other low-cost technologies include irrigation methods that reduce microbial contamination of plants through irrigation water. The IWMI in Accra is engaged in an extensive research into which irrigation methods are most likely to reduce microbial contamination through contaminated waste water and are also likely to be adopted by the Ghanaian farmers. Methods include drip irrigation, sand filters and different ways of applying the water to the plants (Keraita et al., 2007a).

Figure 9
Multi-storey garden in sack
© FAO 2008

These new technologies come with constraints of their own.
The IWMI has also started a project to promote the use of human urine as a new type of fertiliser. The use of urine encounters cultural constraints however, since farmers are reluctant to handle 'dirty' urine (Cofie et al., 2010). It would be wise not to underestimate such cultural issues.

5.2 Constraints to UPA

5.2.1 Legality of UPA

The biggest barrier for the development and expansion of UPA today is its legal status (Vélez-Guerra, 2004). In many cities UPA is seen as an illegal activity within the urban zones. This is the result of opposition by municipal authorities to UPA because of the problems with UPA discussed in previous chapters. Consequently, UPA activities in many countries are either ignored at best or restricted and banned at worst (Ashebir et al., 2007; Bryld, 2003). At other times, UPA is seen as neither legal nor illegal, simply because authorities cannot decide whose responsibility it is to manage UPA. Urban authorities claim agriculture should be managed by rural authorities; and the rural authorities claim UPA's urban context makes it the responsibility of urban authorities. As a result, the official policy towards UPA is unclear and UPA gets a semi-legal status (Bryld, 2003).

The ambiguous legal status of UPA has two important consequences for its practitioners. It means that practitioners usually are not entitled to any formal support services by government or development authorities that rural farmers could make use of. Such support facilities include extension services, credit opportunities or union representation (Mwalukasa, 2001; Vélez-Guerra, 2004). A second consequence is that land and tenure insecurity becomes a main problem to UPA farmers, because they cannot acquire land in a legal way for their illegal activities. In fact, in most literature on UPA land and tenure insecurity are seen as the most important barrier to UPA in developing countries. The problem is worsened by the continuous growth of the urban population. The population growth will only increase the competition for arable land (Ashebir et al., 2007; Masiya & Mazuruse, 2008). The lack of a legal contract of land ownership or tenure makes farmers who did find some 'illegal' land for their activities vulnerable to bribing demands or destruction of crops by the municipal authorities (Lynch et al., 2001). The problems and opportunities of UPA described earlier require UPA farmers to make investments, e.g. buying filters to clean waste water for irrigation. The land and tenure insecurity, and the associated problems, are generally understood to lower the incentive for farmers to make such investments (Vélez-Guerra, 2004).

Masiya and Mazuruse (2008) describe how farmers in Harare, Zimbabwe, have numerous ways of accessing land. Most of them (around 60 per cent) just appropriate a piece of land, although Masiya and Mazuruse use the euphemism 'self allocation'. Consequently, there are many land conflicts in Harare. These land conflicts may cause the farmer to eventually lose access to the land. This example relates the story of Zimbabwe, but similar stories are also found in Dar es Salaam in Tanzania (Mwalukasa, 2001), Bamako in Mali and several Latin American cities (both found in Vélez-Guerra, 2004).

There are signs that the situation is changing. Government authorities have started to realise that they can no longer ignore the occurrence of UPA in their cities. What is more, the authorities increasingly acknowledge the potential of UPA to make cities more sustainable regarding waste recycling and waste water sanitation (De Zeeuw et al., 2011). Thus cities and countries around the world are revising their regulation regarding UPA. They have also started to include UPA in their official urban planning designs. So far, Doala, Dodoma, Dar es Salaam, Kinshasa, Maputo, Kampala, Kumasi, Dakar, Harare[5] and Pretoria are all cities that have officially incorporated UPA in their government plans (De Zeeuw in Ashebir et al., 2007; Masiya & Mazuruse, 2008; Mougeot, 2001). The Brazilian, Chinese and Cuban governments have even embraced UPA as a national strategy to eradicate hunger and poverty in their countries (Helten et al., 2009; Mougeot, 2001).

5.2.2 Water Shortages

Water shortages are another important constraint to UPA. Various surveys among UPA farmers show that the farmers often indicate water supply (and lack thereof) as one of their main worries. In an Ethopian study, at two out of three sites around 20 per cent of the farmers identified water shortages as a major constraint for their production (Ashebir et al., 2007, p. 225). Farmers in Tanzania and Nigeria have similar problems (Mvena et al. in Binns et al., 2003; Lynch et al., 2001). These problems are highly dependent on location and season however. On the other hand, increasing population in cities, and thus increasing competition for water, means that water supply is a worry to additional farmers despite the local climate (Midmore & Jansen, 2003).

[5] For a critical review of Harare's UPA policy, see Masiya and Mazuruse (2008).

5.2.3 Theft and Vandalism

Theft and vandalism of crops and livestock are issues that urban and peri-urban farmers face on a regular basis. In a city in Mozambique farmers indicated that theft happened at least once a week in some neighbourhoods (Mulenga in Egal et al., 2001). Findings by Smith conclude that 60 per cent of Harare's urban farmers have experienced theft (in Bryld, 2003).

Theft and vandalism of produce does not only occur on the hands of naughty children or non-producers that steal food items to feed themselves or their families. It is also a method of retaliation by urban authorities to make clear to farmers that their UPA activities are unwanted in the city (Bryld, 2003). This refers back to the problems explained in Section 5.2.1.

The implications of the problem of theft and vandalism go deep. When crops and livestock get stolen or destroyed, the yield or income of a farmer will go down. The fear of theft may also prevent farmers from making any but the basic investments in their activities, as Bryld (2003) describes. A third and deeper consequence is that the fear of theft leads farmers to keep their animals safely inside the family home at night. While this would indeed be an effective way of preventing theft of animals, it also means that the farmers' households run a higher risk of getting infected with zoonotic diseases (Nasinyama et al., 2006).

5.2.4 Culture and Identity

Culture and identity can serve as a constraint to UPA when they prevent individuals from wanting to engage in UPA. Urban dwellers might feel they do not want to engage in any 'rural' activity. South African migrants, who had just 'escaped' the countryside to come to the city, indicated that it was precisely because they did not want to become farmers that they came to the city. Not surprisingly they proved reluctant to pick up UPA (pers. com. with S. Nette, 2011). Research among a Bengali community in the UK showed similar remonstrations among that community (Holland, 2004). In some cultures farming is seen as a denigrating activity. UPA is a sensitive subjects among African Americans for example, as Guthman (2008) shows. Guthman argues that African Americans see farming as a 'white' activity. In addition research subjects indicated that they do not want to work on urban farms since they feel they are labouring under white farmer or to produce white people's food. Personal communication with an African American resulted in a similar answer when he said that farming in his community was unpopular because it was felt to be a resonance of slavery (pers. com. with P. Cicilia).

5.3 Summary

This section presents a short summary of the most important identified opportunities and constraints to the further development of UPA.

Opportunities:

- *Recent food crises and the trend for organic food stimulate an increase in UPA activities worldwide:* UPA is seen as a way to produce locally grown and uncontaminated vegetables, eggs and milk. The continuing increases in world food prices are expected to turn even more people to UPA, since poor urban households will need to find ways to uphold their food security.
- *The global environmental crisis and the threat of climate change shift official support towards UPA:* policy makers and researchers increasingly see UPA as a strategy to help cities be more sustainable.

- *New technologies provide improved opportunities to engage in UPA:* apart from high-tech vertical farms, low-cost hydroponic techniques or irrigation methods also help UPA farmers to improve production.

Constraints:

- *In many countries UPA has an uncertain legal status:* the unsure status of UPA in many developing countries leads to land and tenure insecurity and to a lack of official support services for UPA farmers. In some countries official UPA policy is changing though.
- *Water shortages create problems for UPA farmers:* growing urban populations decrease urban water supply available for farmers.
- *Theft and vandalism of crops and animals reduce farmers' yields, reduce the incentive for investment and can increase health risks for farming households.*
- *Culture and identity can prevent people from engaging in UPA:* particular cultural values can make that people look down on UPA and do not want to do it themselves.

Chapter 6

UPA as a Mechanism for Environmental Learning

"Like maths, ecological literacy is a skill we all need to acquire."
Andy Goldring, CEO Permaculture Association in The Urbal Fix
(Bliss, 2010)

This chapter aims to explore whether UPA could prove an effective learning mechanism for environmental learning among its practitioners in developing countries. In Chapter 2 environmental learning was defined as gaining an (better) understanding of human-environment interaction; dynamics within biophysical processes of agriculture; causes and effects of local environmental problems; and climate change and its local effects.

A better understanding of these issues among UPA farmers would improve the further development of UPA. Insight into the complexities of the biophysical improvement will enable farmers to make better use of the opportunities and benefits UPA presents or counter its negative aspects. At the system level, increased environmental learning among the urban population could help citizens to recognise and deal with environmental problems that arise in their cities.

Currently, it seems knowledge of the four aspects of environmental learning described above is lacking among UPA farmers. In South Africa for instance, farmers lack "basic knowledge" on soil fertility and on how to recycle nutrients in an environmentally safe way (Baumgartner & Alevi, 2001, p. 21). Through integrating an ESD and an action learning approach the current chapter tries to analyse if UPA farmers gain any meaningful understanding in the issues of environmental learning through their UPA activities.

There is one important difference between the ESD and the action learning approach. In ESD the general objective is to stimulate a change towards more sustainable behaviour in all number of aspects. With regard to UPA this could mean a change towards more sustainable forms of UPA. Or it could mean a change in awareness: a better understanding among farmers of the different elements of environmental learning described above. Action learning on the other hand is specifically problem-oriented. It defines a specific problem and focuses its efforts towards finding a solution for this problem. That would require a reframing of the environmental issues UPA touches upon by reframing these issues as specific problems. Examples could be the water pollution experienced by urban dwellers or soil erosion in the urban area. Despite their different ways of formulating objectives, by integrating ESD and action learning I will have a proper framework for analysis.

The analysis follows the five criteria of the ESD approach discussed in Section 2.5. The action learning component is weaved through each of these criteria. This chapter aims to find out to what extent current UPA activities meet the criteria. It also looks at which requirements ESD and action learning pose to UPA. At some points it was necessary to compare UPA activities and projects in developing countries with activities and projects in developed countries, since in the latter the process of UPA as a learning mechanism seems more common.

6.1 UPA and Social Learning

Learning in social learning processes is the result of interaction among the participants in the learning processes. The participants share knowledge and experiences to come to 'reframing' (Leeuwis, 2004). When participants reframe their perspectives it means that they learn to look at a situation and their role in it in new ways (Gray in Leeuwis, 2004, p. 3). As a result participants develop new and shared understandings of the situation. Social learning can also mean that those involved develop new perceptions of and solutions to problems that they experience (Van Mierlo et al., 2009). In the ESD approach social learning takes an important role. To uphold individual change, you need the society or community in which people are submerged to change with them (Mogensen, 1997).

The action learning approach has a less clear emphasis on social learning. Nevertheless social learning is also important in the action learning model. Action learning intends that farmers learn through "recognised ignorance": through acknowledging that they miss certain knowledge and then finding the answers together (Revans, 1997, p. 5). The action learning approach furthermore states that diversity of perceptions and ideas is key to arriving at good solutions for problematic situations. Through plenty of action-reflection cycles participants will be able to find a solution that can be shared by all of them (Almekinders et al., 2009).

Social learning can only take place if there are opportunities for dialogue and negotiation among actors (Tàbara et al., 2009). Therefore, to consider UPA's potential for social learning I evaluate whether current activities and projects provide space for shared learning, dialogue and negotiation.

6.1.1 Current Social Learning in UPA

There is much evidence of social learning in UPA. Similarly to most development projects, official UPA projects often offer farmers the chance to exchange information and learn from each other by organising farmer meetings or workshops. Yet social learning in UPA is different from the normal development context on two accounts. First, because UPA often lacks government support or is new to the people, the support and knowledge of other UPA farmers can be more crucial than in social learning around established development objectives. Second, social learning in UPA is often self-initiated. In many countries, although especially in developed ones, farmers become so involved that they develop websites or organise meetings to share their information.

A large UPA project in the Moroccan city Casablanca illustrates social learning in UPA. In this project, social learning between farmers and the whole community was necessary to deal with some of the social problems that UPA farmers faced, such as vandalism and theft. Through social learning, the whole community came to realise the value of UPA (Helten et al., 2009). UPA activities that are not coordinated through government or development organisations also lead to social learning. Livestock farmers in a research community in Kampala, Uganda, indicated that they learned from each other how to best raise livestock (Nasinyama et al., 2006). In Manila too, research among UPA farmers showed that friends and family were an important source for agricultural information (Ali & Porciuncula, 2001).

The examples of social learning above indicate social learning through interaction with people that are familiar to the UPA farmers, such as their friends or neighbours. A second way of social learning that applies to UPA is social learning through an introduction with new people in new situations. Field trips to relevant sits for farmers' environmental learning could be one

example of this strategy for social learning. Such visits allow farmers to interact with previously unknown problems and solutions. This method of learning is already being used in regular agricultural education, for example by Farmer Field Schools. It is also common in children's environmental education, but I have found no accounts that make use of this approach for adult environmental education (except when parents are guardians on children's field trips).

6.1.2 Requirements for Social Learning among UPA Farmers

Social learning is not an automatic result of bringing farmers together. If social learning is to take place, farmers must first be aware that there is a common problem, interest or opportunity that needs their collective action (Tàbara et al., 2009, p. 125). In the context of this thesis, farmers need to be aware that they lack a certain environmental understanding or that there exist some environmental problems in their community. Environmental learning projects will therefore first have to create a certain level of awareness. Many current UPA projects aim to create environmental awareness, but only up to a certain extent. Projects often only deal with issues that directly touch the individual farmer, such as farmers' pesticide use. They promote individual solutions that do not require much collective action, nor do they deal with larger environmental issues such as biodiversity.

Tàbara et al. (2009) found two other factors besides awareness that influence social learning on climate change. I think these factors also apply to social learning on the other aspects of environmental learning. Tàbara et al. found that social learning increased when participants had opportunities for multi-level and cross-sector interaction. The degree of freedom participants had to change their practices also influenced their social learning. When participants had more freedom, they could adapt to their newly learned lessons more easily. If the changes resulted in personal benefits, social learning proved even stronger.

6.1.3 Constraints to Social Learning among UPA Farmers

It will not always be easy to facilitate the social learning process that ESD requires. Often social learning happens spontaneously. Sometimes, however, it needs to be actively stimulated, especially when the situation puts constraints to social learning. Many UPA farmers in developing countries are not part of official UPA projects. They are 'undocumented' farmers and their activities are not part of a development program. They are neither united nor organised, which reduces their opportunities for social learning through regular meetings or workshops. In some cities however, individual farmers are united in associations. For example in Manila, where 74 per cent of the UPA farmers interviewed in the study was part of their local Farmers' Associations (Ali & Porciuncula, 2001). The main purpose of these associations seems to be to ensure members' access to land, but it does mean there is a possible platform for social learning. The increase in individuals engaging in UPA might also present an added opportunity for environmental learning. Many new UPA farmers do not have a background in agriculture (pers. com. with C. Lozano Torres, 2011;(Tinker, 1994). Therefore these farmers could be more interested in learning about agriculture and the environment.

The urban context also proves a constraint to social learning. A UPA project in Lima, Peru organised an urban Farmer Field School (FFS) for local farmers. The FFS approach aims at action learning with lots of participation and community involvement. The urban context of this project however meant that initially the social bonds among the participants were lower. They did not participate much in community associations or felt a need for collective action. The diverging interests of the urban population, combined with their lack of agricultural background and their involvement in non-agricultural jobs, meant that participants found it

difficult to reach agreement on what they needed and wanted to learn (Arce et al., 2006). Other organisations have found similar problems while trying to organise urban farmers (Van Veenhuizen, 2007).

6.2 Leading to Change

According to the ESD approach, any learning process should lead to a change in awareness of a problem situation and to a change in behaviour with regard to the problem situation. Learning, in other words, should lead to action (Hopkins & McKeown, 2002; Mogensen, 1997). Connecting learning with everyday livelihood activities is the only way to make new knowledge really hit home (McKenzie, 2009). Thus it is in this criterion of ESD that the action learning approach is integrated the strongest. It turned out to be quite difficult to analyse whether current environmental education among UPA farmers actually leads to a change in their behaviour. Most documents on the issue are written by representatives of organisation that have environmental education elements in their UPA programs. These reports are not very objective on the success of the programs, nor do they include follow-up research to see if the farmers actually showed continued changes in their practices.

In connection to the action learning approach, this section could also be connected to the vision that all meaningful learning is based on cycles of action and reflection. In order to really change the behaviour or understanding of UPA farmers, the action learning approach states that the farmers' learning should be based on practical experience. It is therefore necessary to analyse whether UPA activities give farmers the opportunity to engage with the subject of environmental learning: the biophysical environment. And do UPA activities allow the farmers to incorporate their new understandings into new behaviour?

6.2.1 Action Learning in Current UPA Activities and Programs

UPA activities are a good action learning strategy for environmental learning, because they offer practitioners the opportunity to face "considerable ecological dilemmas, ambiguities and opportunities in terms of how they engage … with a particular form of nature" (Bhatti & Church, 2001, p. 370). The point of action learning is that when you are faced with these dilemmas, ambiguities and opportunities in the real world during your everyday activities, understanding and retention of environmental learning is better.

Many training programs around UPA recognise the benefits of learning through experience and often try to include some sort of hands-on experience. The FFS approach is one approach that works with the concept of action learning with UPA farmers (Prain, 2006a). Yet the action part of action learning can be problematic in areas where land is scarce or access to land is variable. For example in Ethiopia, where a long-running and extensive training program on UPA teaches those people willing to start UPA how they can make use of organic waste to fertilise their gardens. The lack of a permanent demonstration plot however seriously inhibits hands-on practice, and thus participants' learning process (Getachew, 2006).

Actual behaviour change as a result of environmental learning proved best documented in information on teaching organic production to UPA farmers, though this kind of education often came forth out of economic and not environmental concerns. Convincing UPA farmers to switch to organic production seems successful (see e.g. Oelofse et al., 2007). Gonzales et al. report that in Lima farmers that that have learned how to produce organically go on to teach this to other farmers. They are also so enthusiastic that they now go to demonstration and commercial fairs to sell their produce and talk about their new way of production

(Gonzales et al., 2008). Clearly this presents new opportunities for social learning between farmers and urban consumers.

The earlier-mentioned Casablancan UPA project is a very fine example of how UPA can be used as a learning mechanism through action learning. The project first aimed to create awareness of the possibilities of UPA to increase Casablanca's sustainability. It did so by communication and capacity building with government officials and practitioners. The project then went on to develop an action plan and instruments that ensured the diffusion of sustainable UPA practices among the population. The whole process was evaluated with scientists and with local UPA farmers in order to adjust shortcomings and improve UPA in Casablanca (Helten et al., 2009).

6.2.2 Requirements for Change

To get UPA farmers willing to change their awareness of local-global problems and their behaviour and attitude towards these problems, it is important to give the farmers a reason and capacity to change. The trainers trying to enhance farmers' environmental understanding, whether they are peer-farmers or extension workers, need to involve the farmers in such a way that the farmers understand the personal benefit of environmental learning (Hoekstra, 2011). Any program focused on environmental learning should try to answer the question: why would I bother (Thomas, 2009)? UPA farmers are starting to experience the negative environmental effects of the current lifestyles and production methods in cities (Binns et al., 2003). In many cases this has led to farmers already seeing the need for better environmental learning.

Research among farmer adaptation to climate change and environmental problems in Canada showed that farmers with access to multiple and diverse sources of information were more likely to exhibit long-term environmental learning. As a result, they were more likely to change their farming practices and this change was also more durable. The best information sources for the farmers were those that were based on either experiments or interaction with others (Tarnoczi, 2011).

Action learning evaluations show that the message is even better retained when the lessons are kept visible to participants after their reflection phase. This could mean holding a farming demonstration for the whole village for example (Ramaru et al., 2009), or making a poster illustrating the most important lessons (Ornelas, 1997).

6.2.3 Constraints to Action Learning

Hands-on experience alone is not enough. There need to be moments of reflection in order for experience to become knowledge. Only when a person examines, analyses and evaluates his experiences are they stored as knowledge for future use (Boud et al., 1993). This might be one of the key challenges with using UPA as an action learning mechanism for environmental learning. When will the moments of reflection be? It is true that every UPA farmer will probably take some moments to reflect on how this season's or year's production went and will try to see lessons were learnt. My concern is that it is uncertain whether the farmers will want to reflect on the bigger environmental understanding the year has brought them. And if they want to, will they also find an opportunity to do so in their busy lives? Research into agricultural and environmental learning among farmers in different countries shows that they do reflect on their learning process, which leads them to change their practices. The research also shows however that if farmers were not stimulated to reflect during the learning process, their daily concerns prevented reflection (Loevinsohn et al., 2002). Farmers participating in

training workshops in the USA indicated that one of their favourite elements of the workshops was the time given for reflection and evaluation (Francis & Carter, 2001).

Learning through action learning means that you can incorporate old lessons into new cycles of activities. It seems that when learning processes are part of official academic experiments with UPA farmers it becomes harder to incorporate lessons learned into next stages. Since experimental guidelines are set beforehand, farmers cannot adapt immediately when they see something is not working. Consequently, the true value of reflection is lost. Farmers will have to wait till the end of the experimentation cycle (based on Ramaru et al., 2009).

6.3 Acquiring New Skills

With ESD, 'learning' does not only mean acquiring more cognitive knowledge. It also means that participants acquire new skills. These skills are necessary to make the effective change in behaviour the previous section deals with (Axelsson, 2004). The range of skills that UPA activities can teach to practitioners varies widely. The most obvious option are agricultural skills, ranging from 'how to raise a chicken' to new ways of fertilisation. With regard to environmental learning new agricultural skills could focus on sustainable methods of agriculture. Perhaps less obvious are the social and organisational skills that UPA could stimulate, such as meeting new people are creating networks. These skills are explained in more detail in Chapter 7. In this chapter, I focus on the 'environmental skills', skills that enable participants to better deal with the mounting environmental problem urban areas in developing countries are facing.

6.3.1 New Skills

UPA literature is rather lacking when it comes to documenting which environmental skills it actually promotes among its practitioners. The literature is full of UPA proponents claiming that UPA has enormous potential for teaching people how to deal with the biophysical environment in a better way. Any practical description of what environmental skills people actually receive from UPA is missing, though. The underlying assumption is that any UPA activity will automatically skill the practitioner in every necessary way. In a certain respect, practising UPA does give the farmer some new skills. The state of the plants or animals changes all the time; and this requires UPA farmers to keep making new decisions and evaluate past decisions. By working with conflicting and ever-changing situations, people develop the skills to think critically and to question what is happening in the world around them. This process is reflexive (past decisions will need to be reconsidered) and leads to deeper understanding (Mogensen, 1997). Such critical thinking skills are essential for further environmental learning to take place, e.g. because they allow a farmer to explore the dynamics of his local environment.

ESD and action learning might consider creative and critical thinking very important skills, but it is impossible to analyse whether current UPA projects actually teach these skills to their participants. None of the research on UPA dealt with increased critical thinking among UPA practitioners. Hence the nature of literature review simply does not allow me to analyse this in the correct way. The rest of this section therefore focuses on those skills that have been recorded in the literature, of which there are also plenty of examples.

The *Growing Jobs for Living* project for instance teaches participants educational skills. Armed with these new skills participants can later share their knowledge on the environment with other members of their community (Clover, 2002). This project takes place in Canada, but a similar model could easily be adopted in a developing country. The *Red Hook*

Community Farm project is another example from North America that could be copied to developing countries. In a poor, multi-ethnic neighbourhood in New York City the Red Hook Community Farm teaches children and adults in the neighbourhood about gardening and farming. Red Hook Farm also teaches adults and children about the different cycles of life and the seasons (Marvy, 2009). In Peru a project was launched to help farmers get 'organic skills'. These included technical skills (such as organic pest or soil management), but equally important were the social and organisational skills. Farmers learned how to apply for organic certification and learned negotiation skills (Gonzales et al., 2008).

A thorough environmental learning process does not only mean that the student develops a deeper environmental understanding. It also includes learning to anticipate on environmental problems and thinking about how to deal with these problems. The action learning approach provides one way of developing such planning skills. The reflective phase in action learning develops reflection skills in the student. Reflection on what went wrong leads to planning skills, because students will think about the question: "How will I prevent this from happening again?" Especially when these planning skills are the result of joint learning between scientists and farmers (see Section 6.4), they are crucial element of the learning process (Ramaru et al., 2009).

6.4 Inclusion of Local Knowledge

The ESD approach recognises the necessity to value and incorporate local knowledge within the learning processes (Blewitt, 2006; Hopkins & McKeown, 2002). In order to meet this criterion of local knowledge inclusion, UPA projects and activities have to allow their practitioners to involve the local perspectives and knowledge on problems and solutions. UPA projects that only approach UPA from a Western perspective without taking the local context into account are not considered 'right' according to the ESD approach. UPA activities that are simply based on copies of Western UPA approaches are likely to fail in developing countries. In Rotterdam for example, the UPA group *Tuin aan de Maas* has started their activities by defying the municipality and actually getting angry at the municipality (pers. com. with J. Kuipers, 2011). This may work in the Netherlands, where civil disobedience is tolerated to an extent. The initiators of Tuin aan de Maas also said that their high level of education helped them fight the municipality (pers. com. with J. Kuipers, 2011). In countries with stricter regimes, an illegal status of UPA and low education levels such an approach could see you end up in jail.

The action learning approach takes course similar to ESD with regard to local knowledge. Action learning frames the inclusion of local input as 'local participation' in the learning process. Learning can be called participative when all involved contribute equally to the learning process (Riding et al., 1995, p. 3), whether they are researcher, male farmer, female farmer or educator for example. Making the learning process participatory ensures, according to action learning theorists, that participants get an opportunity to integrate their values, knowledge, wishes and experiences in the learning process. What is more, eventually it will be the farmers that have to implement and evaluate the understandings that have come forth of the environmental learning process. They are the ones who 'own' the problem and that have to live with any strategies that would be the result of their learning processes (Garratt, 1997).

Therefore, participation by farmers and inclusion of their knowledge is important for UPA. It is needed to adapt agricultural and environmental technologies to local urban context. More importantly, it is needed to ensure longevity of any improvements made. Participatory

approaches to extension or learning require the farmers to think about the problems and the solutions. Farmers will need to think how they will pursue the solutions once the extension officers or project managers are gone. They have to think about challenges such as: "How to be cost-effective? How could other organisations help us get necessary inputs (Ramaru et al., 2009)?" Engaging farmers in these questions from the start helps to ensure the project or activities do not collapse once initial management or funding leave.

6.4.1 Local Participation in Current UPA Activities

The importance of local participation is well-recognised by many policy makers and development agents involved in UPA. In Kampala for example, female UPA farmers and the Kampala City Agricultural Office worked together to develop new horticultural systems that allow the women to intensify their production (Prain, 2006a). The Casablanca UPA project used farmers' input to come up with effective strategies to deal with some of the problems the project encountered. Farmers helped to think of cheap ways to recycle waste water and came up with strategies for the problem of salinated water (Helten et al., 2009). In Lima, Peru, local and international development organisations started a project to eliminate UPA's harmful effects on the urban environment. Together with researchers, the Peruvian farmers explored which harmful effects were caused by UPA and how the farmers could improve their agricultural practices in the future. The input of the farmers was especially needed to translate good agricultural practices to an urban context in the right way (Gonzales et al., 2008).

In Ghana too research into some harmful effects of UPA took place together with farmers. The research aimed to find safe ways of using urban waste water for irrigation. Trials were done together with farmers. The scientists also looked at which options worked best for farmers and which were most likely to be adopted. They also included farmers' suggestions for improvement (Keraita et al., 2007a). The results were translated into easily accessible and understandable instruction movies that were put on the internet, so that farmers can watch them to understand the do's and don'ts of waste water irrigation[6].

6.4.2 Constraints to Local Participation

There are some obstacles to the inclusion of local knowledge in UPA or to local participation in setting up UPA environmental learning programs. For one, UPA often still is part of the informal economy, which might make official education programs difficult (Howorth et al., 2001). The informal and illegal status of UPA explained in Section 5.2.1 may also make local participation difficult, since it could mean that people are scared to participate. At the same time this ambiguous status can result in extension workers or other trainers working on environmental education not really valuing or respecting the local practices of production. Although many cities and authorities are officially changing their mind sets with regard to UPA, conservative government officials or extension workers might still not support what UPA farmers are doing (Masiya & Mazuruse, 2008).

Devaluation of urban knowledge could also have other roots. In my opinion one of the problems is that in literature on environmental learning or farmer education, Traditional Ecological Knowledge (TEK) is repeatedly discussed as something possessed only by rural farmers. In Blewitt's book on environmental learning for instance, there is plenty of talk about valuing the knowledge of indigenous tribes living in remote places or of the elderly (Blewitt, 2006). The same is true for other books on ESD (see e.g. Pretzer, 2009). Yet the majority of urban farmers are young men and women born and bred in cities (Van Veenhuizen, 2007).

[6] See http://video.google.com/videoplay?docid=-3530336707586348166#.

They may not have specific agricultural knowledge, or knowledge of the surrounding ecosystems. Then again, they do have know-how on how things work in the city. They know what will or will not work in urban areas. This sort of knowledge is essential if we really want to make UPA sustainable. One example of local knowledge that is not traditional, yet might prove very important to promoting good practices in UPA, are internet and telecom technologies (Thomas, 2009). The videos produced in Ghana mentioned in the previous section are an example of the possibilities of such technologies.

6.5 Thinking in Systems

Out of all criteria, this last criterion is perhaps the most difficult to analyse. A strong feature in the ESD approach to learning is the emphasis on systems thinking, although this exact term is not often used (Hopkins & McKeown, 2002). ESD aims to develop an understanding of the dynamic interactions between different biophysical systems, but also between the biophysical and the social system. Accounts on ESD stress that environmental education should create an understanding of the interrelationships and feedback loops between different elements of a student's environment. The analysis in Chapters 3 and 4 have shown that such a wider view on the part of the urban farmer is necessary. UPA does not only affect the individual at the household level, but works further into the community or city level. UPA practitioners will fail to make UPA a strategy for sustainability if they create a closed vision looking only at their own plot.

Although the ESD approach and the action learning approach share many key points, the last criterion of ESD has some friction with the wishes of the action learning model. In action learning it is accepted that the objective of a learning process can be a change on the system level. Yet the goals of a project or activity should still be on an individual level, so that the participant does not feel overwhelmed with unachievable goals (Almekinders et al., 2009). Some action learning scholars, like Passfield (1996), disagree with the emphasis on the individual, which they claim prevents us from seeing the inefficiencies in our worlds (Passfield, 1996, p. 24). If action learning supports the individual outlook on learning however, this can create a bit of tension with ESD's emphasis on learning at the system level. This section aims to find out for which level UPA presents a more suitable learning mechanism.

I originally intended to analyse this criterion by looking at accounts of UPA practitioners. I wanted to reveal what their reasons for starting UPA were and how their experience with UPA is developing. Famers' accounts reveal whether practitioners think in larger 'systems' beyond their own direct micro-scale. In connection to environmental learning such systems thinking would involve an awareness of the dynamics of social and biophysical cycles. From a practical point of view however, such an analysis is extremely difficult. Firstly, it requires much interpretation and reading into of accounts of UPA farmers. Second of all, there is a lack of such accounts from developing countries. There are many blogs on UPA or interviews with UPA farmers, but these come from farmers in developed countries. I did find one account by Dunn (2008), who interviewed 17 UPA farmers in South Africa on their starting and continuing with UPA. The farmers' answers showed that their environmental concerns did not play any part in their motivation for UPA. Their main reasons were on a personal or household level, although improvement of the neighbourhood was seen as an important side-benefit.

Signs of systems thinking are present among rural farmers in developed countries, as Tarnoczi's research on farmers' adaptation to climate change in Canada illustrated. The interviewed farmers indicated that a continuous environmental learning process has led them to rethink and question the relationship between their farming practices and the environment. They also have developed a new vision on their roles and responsibilities as farmers to take care of the environment. The farmers claimed they now took take care of their lands to prevent global climate change from worsening and to preserve their lands for future generations (Tarnoczi, 2011).

6.5.1 Necessity of Systems Thinking

Before systems thinking is incorporated in ESD and action learning approaches to UPA, more research should be done to find out whether there is a necessity for encouraging systems thinking among UPA farmers. The extent to which UPA farmers currently think about the dynamics of environmental problems or climate change is unknown. We do not know whether farmers think about such issues only at the individual and agricultural level or if they already recognise that such issues have effects outside of agriculture and beyond their own community. Most literature sources seem to assume that there is a lack of systems thinking among farmers and that this needs to be addressed in order to come to better environmental understanding. Whether these assumptions are correct can only be found out by interviewing and observing urban farmers.

Systems thinking is especially important for learning about climate change and its direct effects on farmers, the fourth element of my definition of environmental learning. Understanding the bigger workings of the environment and the climate can help farmers to get their individual strategies for dealing environment and climate issues in tune with bigger systems, which would make such strategies more effective. Changes on the household or community level will work better if they do not conflict with what happens on a bigger level. This is common sense for a range of issues, not only climate change, and therefore farmers probably already apply or attempt systems thinking to their practices. Urban farmers however, may have difficulty in gaining information and knowledge on the nature of problems of the regional or national level. Awareness of the need for systems thinking is not enough to ensure actual systems thinking. UPA activities can create opportunities for farmers to gain the necessary knowledge on larger level issues, as the next paragraph shows.

6.5.2 Systems thinking in current UPA projects

Though developing systems thinking often is not a specified objective of UPA projects, some projects do show signs of encouraging their farmers to think on a bigger scale. In Cape Town the initiators of a large UPA project are expecting water shortages in Cape Town in the future. To prepare urban farmers for this event, the *Abalimi* project has begun to give trainings on how to work with drip irrigation (Small, 2007). The FFS for urban farmers in Lima realised that their participants needed a better understanding of the local agro-ecosystem, so that farmers would know how to manage their crops in accordance with this system. To make their production more sustainable, farmers had to learn about agro-ecological issues such as the relationship between water, soil and crops. The FFS also helped farmers to realise that selling their land to real estate developers will make the whole city a less green, more polluted and unhealthy place (Arce et al., 2006).

6.5.3 Starting Small

Action learning's emphasis on starting small with difficult topics could be a way to stimulate hard-pressed urban citizens to think about environmental relationships that might not directly touch them. A survey among low-class citizens in the UK revealed that the respondents did

not think about environmental problems if these problems did not have a direct connection with their personal sphere. Environmental issues of a global concern or of the long term were felt to be less important than pressing, local concerns. The researchers suggest that through local issues the low-class citizens could be engaged in the global issues (Burningham and Thrush in Blewitt, 2006). Evaluations of children's and adult environmental education in Thailand also showed that it was important to have a clear focus in the curriculum. Just saying "We will teach you something about the environment" doesn't work. Instead programs need to start with small topics that can build up to deeper understanding of certain issues (Gallagher et al., 2000).

UPA activities provide a way of 'starting small', because they begin with (usually) small plots of land and the limited timeline of one or two agricultural seasons. Once the UPA practices have been established, environmental learning could start in steps. Learning could start with individual pesticide use, for example, and build up to loss of biodiversity. Most UPA projects are done in phases. Issues such as environmental learning are only part of the last phase, when practitioners experienced some environmental problems already (Hoekstra, 2011).

6.6 Exemplary Projects: Thailand and Sri Lanka

The example projects in this section show all five criteria of the ESD and action learning approaches being applied to combine adult environmental learning with UPA. The projects show how each of the criteria contributed to the strength of the project. I think the success of these projects demonstrates the importance of addressing all criteria if ESD is to be successful.

The International Centre for Sustainable Cities (ICSC) set up three projects to involve local urban communities in urban agriculture and urban greening in Thailand and Sri Lanka. All communities were first asked to develop their own 'Green Plan', in which residents could indicate what type of greenery or agriculture they wanted. After implementation of these plans, evaluation and reflection by community members on the current state of affairs took place. A first reflection took place via Lessons Learned Workshops with community members, ICSC representatives and government officials. These workshops offered an opportunity to reflect on the results so far and to discuss next steps together. Secondly, community members were trained in the evaluation technique Outcome Mapping, to look at the change in behaviour and attitude within the community as a result of the projects. Peer-to-peer learning had a very important role in the project. Community members taught greening and agricultural skills to each other and to local children. Some female Sri Lankan urban farmers even travelled abroad to teach communities in South Africa, India and the Philippines! A Thai community went on to win the Green Community Award and in all communities the urban environment has improved because less waste is being dumped for example (Seymoar et al., 2010).

6.7 Barriers to Environmental Learning

The above sections have shown how UPA in some ways provides opportunities for environmental learning. However, even when these opportunities exist it is not simply a matter of course for UPA farmers to make use of them. Several barriers to learning emerge when you look at the literature on the nature of UPA and the socio-economic characteristics of UPA farmers.

The first problem is that urban farmers might not have the time, resources or willingness to learn about the environment (DeLind, 2002). This problem has also been discussed in Sections 6.1.2 and 6.2.3. Is it really fair to ask farmers who have started UPA out of the bare necessity to live to bother themselves with understanding complex human-environment relationships? Environmental learning in Lima proved difficult for example, because UPA farmers were more time-constrained since they also held other jobs. These farmers also proved less involved in UPA, because it was not their main livelihood activity (Arce et al., 2006). In South Africa people abandoned their urban farms whenever a new job came along (Oelofse et al., 2007). The RUAF has recognised a general difficulty to get farmers involved in training sessions that are not directly agriculturally related. In order to make the time investment, farmers need to see a direct relevance (Hoekstra, 2011).

The generally low level of education among UPA farmers is another constraint. A survey among UPA farmers in the Philippines showed that 63 per cent of the farmers only had primary education (Ali & Porciuncula, 2001). This means that the options for education methods are limited and that explaining complex relationships might prove difficult. Informal and non-directed learning have increased importance in such context. With non-directed learning it depends entirely upon the personal interest of the farmer whether environmental learning will take place (Hoekstra, 2011).

A final constraint is the lack of access to learning possibilities or to the right information. When environmental learning is done among UPA farmers, it usually is part of official UPA programs. Farmers from other areas or target groups might not have access to these projects. For higher-educated UPA farmers with access to internet the lack of information could possibly be solved Urban Agriculture Libraries, such as the one in Toronto. The library wants to go digital, which makes their information better accessible (Levenston, 2011b).

6.8 Summary

Although some UPA projects or activities by farmers already exhibit one or more of the five criteria necessary for environmental learning, there still are some barriers to the use of UPA as a learning mechanism. This section provides a summary per criterion of the main points of improvement that need to be addressed if UPA is to become an effective learning mechanism for adult environmental learning in developing countries.

To improve social learning in UPA:

- UPA projects should emphasise on environmental issues that need collective action to understand and solve them.
- UPA projects should provide an opportunity for farmers to interact with people at different levels (from the micro household level to the national level) and with people from sectors other than the agrarian sector. The current focus on farmer to farmer interaction is not sufficient to achieve deeper environmental understanding.
- Unorganised farmers need to be included in the environmental learning process.

To achieve action learning cycles and lead to change in behaviour and practices:

- UPA projects should stress the personal benefits of a better environmental understanding
- UPA projects should expose farmers to diverse sources of information
- Opportunities for reflection need to be created

To acquire new environmental skills through UPA:

- Creative and critical thinking need to be stimulated
- Enhancing farmers' planning skills provides a way to prepare for future problems

To include local knowledge and ensure local participation in the learning process:
- UPA should attain a legal status and official recognition, so that people do not feel scared to participate in UPA projects anymore or to share their knowledge
- We need to recognise that knowledge of urban residents is valuable

To develop systems thinking among UPA farmers:
- The learning process should start small, focusing on local concerns and issues that directly touch farmers. The learning could then be broadened to include issues at a bigger level.

The most urgent matter that needs to be dealt with is that any environmental learning will need to be adapted to the urban context of the farmers. Education should focus on the urban environment and will need to take into account the specific characteristics of UPA farmers, such as the fact that agriculture for many is not their main livelihood activity.

Chapter 7

UPA as a Mechanism for Community Development

Throughout the UPA literature, many community benefits are ascribed to UPA activities and projects. International development organisations, local NGOs and urban activists often claim that UPA has the potential to unite communities, strengthen community development and in general improve a community's wellbeing. Chapter 2 gave a short definition of what is meant with 'community development' in the UPA context and I would like to expand this definition here. I use Salvidar-Tanaka and Krasny's definition, which is based on the writings of Christenson and Robinson, and Warner and Hansi:

> *"Community development refers to community members analysing their own problems and taking action to improve economic, social, cultural, or environmental conditions, as well as feeling part of and identifying with the community as a whole"*
> (Saldivar-Tanaka & Krasny, 2004, p. 400)

This chapter aims to find out if UPA really acts as an effective learning mechanism for community development in developing countries. It does so in much the same fashion as the previous chapter, by analysing if UPA currently proves a mechanism for community development and if there are any points of improvement. Again the five criterion of ESD are used as a framework, mixed with action learning criteria.

It may at first seem odd to use an educational approach to community development and to see community development as a learning process. Yet community development is a process, because a united community does not just come to being in a day. Strengthening local networks, empowering weak groups and breaking down social barriers are all objectives that require the community to gain new perspectives, new skills and a different understanding of the world. In short: they require learning. ESD does not only aim to find environmental sustainability. Social sustainability is also very important. As such, community development fits right into the ESD approach to learning. Since ESD is so deeply intermingled with action learning, the latter approach is also used in this chapter.

Most authors agree that in the context of UPA, what constitutes a 'community' is not defined by place or location. A better definition here would be to say that communities are defined by the perceptions of people. Do people perceive a certain community to exist or not? Is there a "sense of shared meanings, values, understandings, practices and lifestyles" (Blewitt, 2006, p. 96)? So, in the context of this thesis: do people perceive the existence of some shared UPA community? As such, this chapter looks mostly at the role of community UPA projects and activities in community development. There are roughly two types of 'community UPA' that can usually be recognised (based on Holland, 2004). Communal UPA gardens and farms consist of one or more communal UPA sites on which several community members get allocated a small plot or together take care of certain animals. In the other type of community UPA, people have individual gardens but are united through some form of organised UPA community and thus view themselves as being part of this community. What makes these forms of community UPA different from individual UPA is that both are distinguished by the goal to have a collective impact, whereas non-united individual farmers act primarily out of self-interest (Bailkey et al., 2007; Carlsson & Manning, 2010).

7.1 Social Learning for Community Development

Social learning might be even more important in community development than in environmental learning, since a community always implies a factor of collectivity. By coming together, social interaction among community members becomes inevitable. It would then not be unlikely that this interaction leads to social learning when members share knowledge and experiences and go through learning processes together. Most communities have some sort of shared set of frameworks, ideas, tools, values from the start and these develop further throughout the learning process. Because these sets already shared, social learning among community members might be facilitated. On the other hand, a community of like-minded people might not come to new understandings if they only reinforce each other's existing perceptions. Without new inputs, the community risks getting stuck in the same learning cycle over and over again and no progress is eventually made. Especially the action learning approach sees this as a concern. Blewitt (2006) emphasises that this risk is slightly reduced by the fact that members of a community will always have different personal interests and motivations, which means not everything is shared. How does UPA fit into all this?

The "building and re-building" of a community needs social interaction between its community members (Van Veenhuizen, 2007, p. 49). Community UPA projects or activities provide this opportunity for social interaction. They can bring together people from many different social backgrounds, ethnicities, religions etc. By doing so, they offer these people a chance to discuss each other's values and opinions and to learn new things together. Learning how to work together and how to build a garden together can improve the relationships between groups of people even outside of the UPA site. Through having a shared purpose and labouring together, people learn to understand, be tolerant of and work together with people that are different from them. This improves the social climate of the total community (Krasny & Tidball, 2009). We see that current community UPA projects break down stigmas and stereotypes by the development of a new perception of others (Levkoe, 2006).

With community programs there is always a risk that people are unwilling to join in collective efforts to improve their community. Kaplan (2000) suggests that most people however will be interested in joining community projects, because individuals value opportunities to do so. Kaplan looks at ways to motivate Environmentally Responsible Behaviour, but is could just as well have been Community/Socially Responsible Behaviour. According to Kaplan's research, an individual has two motives for joining a community to improve a situation. On the one hand people like to participate in finding a solution for a problem they are experiencing: they do not want to feel hopeless. On the other hand, people know that by joining a group, it is more likely that several desirable alternatives for the current unsustainable situation will be found. They also know that when more people join, it is more likely that a proposed solution will be effective. These two motives make most people willing to join community efforts aimed at improving the community (Kaplan, 2000).

7.1.1 Empirical Evidence of Social Learning

Examples from case studies on community UPA illustrate that the above processes indeed happen in UPA sites throughout the world. In New York City community gardens helped the different Latino communities to learn agricultural skills and practices from different countries. One participant said: "This is a centre for spreading the word" (Saldivar-Tanaka & Krasny, 2004, p. 409). Participants in the South African *Abalimi* project reported that the project provided a way for community members to meet each other. Now members help each other

with their gardens and also chat to each other outside of the project. Consequently the sense of anonymity in the community decreased (Marshack, 2008).

In Bosnia-Herzegovina, an UPA project was set up after the war with the intention of healing the community by letting the different ethnicities work together (AFSC in Tidball & Krasny, 2009). Unfortunately this project was never evaluated, so there is no information to conclude whether or not the project worked and social learning increased. In community UPA projects in Thailand and Sri Lanka trust in each other did increase among community members, because the learning from each other created and maintained this trust. This has led Seymoar et al. (2010) to conclude that the social learning that the UPA projects created was very important for overall community development. The communities in Thailand and Sri Lanka were not conflict-ridden as in Bosnia-Herzegovina, which means the situations for creating trust cannot be compared.

As with environmental learning, social learning for community development requires that people have an opportunity for interaction. Just sharing a UPA site might not be enough to facilitate interaction, so building a community centre can be important. The desire for such a centre is also often expressed by the participants themselves (see e.g. Saldivar-Tanaka & Krasny, 2004). Zimbabwean UPA farmers decided to build a community centre themselves. The existence of the centre then spurred new activities that strengthened the community further. The farmers organised educational discussions on environmental management, entrepreneurial training, support for orphans and other programs (Mubvami & Manyati, 2007).

7.2 Leading to a Changed Community

An awareness of the need for change in a community and a willingness to change might already be present among community members. Community UPA projects and activities will have failed in the eyes of ESD and action learning though if they do not lead to any actual change. They need to result in community members taking action beyond their engagement in UPA to improve the community's conditions. Community UPA also needs to lead to an increased sense of community. In this thesis, a 'sense of community' refers to stronger bonds between community members and to a shared feeling of being part of a group or neighbourhood among members. It was relatively easy to observe such sense of community, because many reports on the social effects of UPA include observations and responses of case study participants that demonstrated stronger bonds and group feelings.

7.2.1 Actual Changes in the Community

Initiators of UPA projects claim that their community projects can increase employment in the community, for example by creating jobs in processing or selling of food. Such upstream and downstream industries could form a basis for the revitalisation and improvement of the entire neighbourhood (Van Veenhuizen, 2007). The *Abalimi* project serves as an example: the project led to a processing and retailing industry employing community members (Small, 2007). Section 4.2 cited Nugent (2001) however, who claims that it is unlikely that upstream and downstream industries around UPA can really take off. The *Abalimi* success could thus be difficult to copy in other locations.

Projects in Kenya and Colombia show that community UPA projects can work to re-integrate vulnerable groups into society. The *Bogotá without indifference* project helped to integrate vulnerable groups, such as former guerrilla fighters, disabled people, female prisoners and HIV/AIDS patients into Colombian society (FAO, 2010b). A UPA project in Nairobi aims at

young men who used to be thieves. Now they are busy producing vegetables during daytime, using their income to go to school at night (FAO, 2010b). This project not only re-integrates these men into their community as respectable labourers, it also tries to reduce crime through offering alternative livelihood opportunities. The crime-reducing effects of UPA have been claimed by many supporters, but there is no statistical evidence of crime reduction following a community UPA project.

In Africa, UPA contributes to social cohesion in a community because it provides an opportunity to share. Several case studies on UPA in Africa report these effects. In Benin and South Africa farmers gave small amounts of their vegetables to their neighbours and also organised soup kitchens for poor community members (Dunn, 2008; Floquet et al., 2005; Marshack, 2008; Small, 2007). Farmers in Uganda sometimes give their livestock away as a gift, which also strengthened community bonds (Nasinyama et al., 2006).

A community UPA project in Sri Lanka was extremely beneficial to community development in all manner of ways. It led to the creation of women's groups and micro-credit groups. Staff and residents involved in the project also reported that community members now spent less time doing nothing or being engaged in illegal activities. What is more, some long-standing conflicts were resolved during the process of building the gardens (Seymoar et al., 2010).

7.2.2 Missing Reflection

The learning process in community development should be based on action learning cycles in which reflection by community members on the process has the same important role as the actual action these members execute. Reflection has the same importance in community development and learning as in individual learning and development (Gosling in Blewitt, 2006). A collective reflection by the whole community can improve or even be necessary for the reflection phase, because the community acts as a check on what individual members and the whole community do. When people share a sense of community it becomes necessary for them to analyse the effects of their individual behaviour on others. Likewise it makes them look at alternative behaviours (Mogensen, 1997).

In an interview with Femke Hoekstra, an expert on UPA who worked at the RUAF for four years, I asked whether community UPA projects generally include a reflection phase. She indicated that this is often not the case, especially when the UPA activities move outside a project or are individually based. Workshops and trainings do plan for some evaluation time at the end, but this time is limited and is only used for direct evaluation of the specific workshop. The RUAF does try to make farmers aware of the need for evaluation, but this evaluation is only aimed at reflection on agricultural decisions (Hoekstra, 2011). When such evaluations are being done in a collective form, e.g. by farmers discussing their reflections together, this does entail social learning and community activity. In that sense, even evaluations limited to agricultural issues can build community knowledge and bonds.

The cycles of action and reflection are important to build communities and make them stronger. The learning processes in the cycles call for collective action, planning and implementation of projects. These processes bind people together and creates bridges between otherwise separated groups (Bailkey et al., 2007). Although the paragraphs below illustrate that action is being taken as a result of community UPA projects and activities, the reflection processes need further attention of those involved in these projects and activities.

7.3 Acquiring New Skills

Community members need new skills to develop their communities and really make a difference. They especially need new social and organisational skills that allow them to make new connections and to organise activities that help them change the community. UPA activities offer a way to acquire some new skills. Sometimes community projects have the specific aim to stimulate certain new skills among participants, sometimes new skills just evolve naturally from community activities.

Many community UPA activities in developed countries aim stimulating a combination of environmental and civic activism. They combine learning about the environment with learning about democracy, for example (Dixon et al., 2009). The projects hope to give their participants new 'democratic skills'. Acquiring democratic skills is also part of many community UPA activities and projects in developing countries. Oelofse et al. (2007) indicate for example that a community garden in South Africa taught people about democracy by introducing them to the workings of committees.

Community UPA projects offer a chance for democratic learning, because they require active participation in a social movement: the garden. Marginalised groups in a society often do not have an opportunity to learn about democracy through formal education. Community UPA provides an opportunity for learning about democracy through doing: by being part of advisory, planning or evaluation committees; by learning leadership skills; or by creating garden policies. These are all examples of the skills the *Stop* project in Toronto teaches (Levkoe, 2006). In New York City, people learned democratic skills by electing garden managers, or by writing letters to their representatives in the government that they need support for their gardens (Saldivar-Tanaka & Krasny, 2004). Besides democratic skills, participants' involvement in such activities also teaches them lobbying and advocacy skills (Tidball & Krasny, 2009).

Gender is another important issue in UPA. Most UPA farmers are women (Burger et al., 2009). Empowerment of women is therefore often a specific aim of community gardens set up by NGOs. UPA literature signals that women's organisations set up by NGOs or by local women themselves as a result of their UPA participation do help with empowerment. Through these organisations, and through their UPA activities, many women acquire new skills that help further empowerment. In Sri Lanka the women's UPA societies lobbied with the local authorities, thereby improving the visibility of community issues and also negotiating improvements. The women developed negotiation and leadership skills along the way. As a result houses and infrastructure in the community improved, as did the community's access to social programs. More women are now represented in municipal committees (Tamaki et al. in Seymoar et al., 2010). Their new found expertise also led the women to give advice to disaster-effected groups, e.g. people who had experienced tsunamis (Seymoar et al., 2010).

Successful community UPA teaches people a range of other skills. The *Stop* project taught its participants how to facilitate new volunteers, organise excursions and even plan national conferences (Levkoe, 2006). An UPA project in the Philippines encouraged the community to learn about bookkeeping, marketing and gender sensitivity (Potutan et al., 2001). The FAO's *Urban producer's resource book* is a kind of manual for urban farmers or those setting up community urban farms. The book encourages urban farming communities to carry out SWOT analyses at the start of their UPA activities, to help the farmers plan their actions. This is done with easy language and pictures to help explain SWOT analysis as a tool. The

handbook also helps farmers with organising stakeholder platforms and inter-group associations, legalising their organisation and activities, and provides ideas on how to cope with the success of a program (e.g. by using profit to expand the project or help the vulnerable). Oddly, the book does not say how to deal with failure, nor does it offer reflection strategies (FAO, 2007).

7.4 Community Participation and Knowledge

Community development processes need to include local knowledge if the improvements are to prove durable. Community development rests on involvement from the community itself, so without participation by community members the process will utterly fail. Many UPA projects and activities set up by NGOs or local government risk a slow death once the NGO management pulls out or financial support stops. To increase the chances of longevity of UPA, the RUAF thinks communities need to get involved right from the start of the project and a sense of local ownership of the UPA activities needs to be developed. Yet even then the RUAF has witnessed projects crumbling as soon as external support stopped and concrete action plans were gone (Hoekstra, 2011).

Seymoar et al. (2010) present a nice illustration of the benefits of including community participation in official government UPA projects. They report that in Thailand and Sri Lanka, community gardens proved a way to bring the local authorities in contact with their constituents. The non-controversial and relatively 'safe' topic of community green plans proved a good way to strengthen relations between the two parties. This led to a renewed understanding between authorities and constituents of each other's positions and improved motivation to cooperate on either side.

Community UPA sites are a perfect location to represent the community's traditions. The Latino community UPA projects in New York City involve local tradition by all building a *casitos*, traditional communal houses that Puerto Ricans built to remind them of home and their traditional values of sharing food and music together in the *casito* (Saldivar-Tanaka & Krasny, 2004). By enabling members to grow food or plants from their home region and build traditional building such as the *casito*, community gardens in New York City act as participatory landscapes, which minorities or migrants can adapt to resemble a bit of their home country or region (Saldivar-Tanaka & Krasny, 2004). Community UPA can also be connected to religious traditions. A community UPA project in Sri Lanka was an incentive for the locals to form Buddhist community organisations. These organisations helped member to align their urban greening and farming efforts with their spiritual and cultural values (Seymoar et al., 2010).

7.4.1 Securing Community Participation

An UPA initiative coming from the community itself might have an easier time to secure the community's participation than initiatives that come from NGOs or the local government. All community UPA initiatives need to ensure participation from the whole community though. The *Urban producer's resource book* provides steps for group advisers on how to ensure equal participation (FAO, 2007). The American Planning Association (APA) has much experience with involving local communities into (re)development plans, such as creating UPA sites. The APA suggests a number of techniques to involve the public in these cases, such as publishing a newsletter to keep people up to date on the progress, storytelling, making murals or having festivals (Hersh et al., 2010). Decorating the UPA site with murals or having a urban harvest festival are indeed done in some UPA projects (Levkoe, 2006; Tidball &

Krasny, 2009). The murals and festivals are a way to strengthen bonds between existing participants and involve non-participants by showing them the success of the project.

Guthman (2008) describes what happens when the local community does not support well-intended UPA projects brought in from outside. When community members felt the projects did not reflect their culture or identity and their participation is minimal, the projects resulted in "foot-dragging", "disappointment" and even reinforced "a sense of exclusion and stigmatisation" (Guthman, 2008, pp. 440-441). At the same time Guthman acknowledges that projects with a friction between two communities provide a space to struggle against discrimination. Despite the discomfort, the two groups are still forced to meet. Their meetings enable them to see the outlines of their own discrimination and exclusion.

7.5 Systems Thinking

Systems thinking in community development refers to an awareness among community members of the dynamics of the social, economic and environmental cycles their community is involved in. It refers to community members realising that there are broader concerns that not only relate to their community but to other communities in their region or country as well. The analysis of systems thinking in community development needed the same carefulness as systems thinking in environmental learning. Reflections of community members on their UPA activities are hard to find, so it is impossible to use their responses as an indicator of systems thinking. Sometimes however I think the actions and activities community UPA initiates can be seen as signs of systems thinking. Such examples are discussed below.

7.5.1 Expressions of Systems Thinking

Sometimes community UPA mixes with political issues. The attention for teaching democratic skills in some UPA projects and activities could be seen to reflect a wider awareness of political issues for example. According to Levkoe (2006) and other authors, democratic learning has effects beyond the community garden or farm. When people begin to learn about democracy through UPA, they become interested in broader political issues that go beyond agriculture. More importantly, successful dealing with the 'smaller' democracy of UPA projects makes people realise their capacity to deal with bigger issues. They are empowered. The members of the *Stop* project in Toronto illustrate these processes of gaining political awareness. Through the development of democratic skills (mentioned in Section 7.3), the project participants developed a sense of democracy that led them to raise awareness on wage and employment issues (Levkoe, 2006).

Cornwall has developed a theory about the 'spaces' of participation[7]. This theory is often used by scientists analysing urban community greening and UPA (e.g. in Krasny & Tidball, 2009). The term 'spaces' should not be taken literally here. Instead it refers to the "opportunities, moments and channels" that citizens can use to participate in order to develop and strengthen their community (Gaventa, 2006, p. 26). These spaces are shaped by power relations (Cornwall in Gaventa, 2006). When community UPA is initiated by community members themselves, the project or activities can be seen as a 'claimed space': the project, activities and site are claimed by the less powerful community members against the power-holding municipality. After a while however, the project often goes from being a 'claimed' to being a more institutionalised 'invited space', for example through recognition of the authorities or

[7] This theory is often quoted as being developed by John Gaventa. In fact, Gaventa himself cites Andrea Cornwall (2002) as the original source. Gaventa used her theory on spaces of participation to develop his power cube theory.

involvement of NGOs (Gaventa in Krasny & Tidball, 2009). Participation is then widened and becomes more official and regularised (Gaventa, 2006). This process is what happened with the Rotterdam UPA initiative *Tuin aan de Maas*. The community believed that their project could help to strengthen community bonds. Members also wanted to prove to the municipality that Rotterdam citizens can maintain such a project and make it a long-lasting success. One of the initiators of *Tuin aan de Maas* indicated that the collective defiance of community to the municipality further helped to strengthen the sense of community and the position of the community. The community hopes that further municipal developments in the area will include their advice and cooperation (pers. com. with J. Kuipers), making them shift from the claimed space towards the invited space.

Next to political effects, community UPA also has social effects that go beyond the practice of agriculture. Community UPA sites develop a sense of place and belonging. Through the development of new skills among community members, the community as a whole increases their sense of worth and identity (Blewitt, 2006). Throughout the literature on UPA, you can read how UPA activities instil a sense of pride in their participants that goes beyond the practice of UPA. Community gardens can act to root "the social and environmental values of a group of people" (DeLind, 2002, p. 220). Through toiling on their farms, people get connected to the history and beauty of the land and to what the land gives them. Community UPA attaches different people to one place (to the neighbourhood or to the community farm/garden) and in this way attaches people to each other. Because people realise they share this space and all its complex dynamics, they start to develop feelings of shared responsibility to take care of it and of the people who live in it (DeLind, 2002). They develop systems thinking. The *Abalimi* project is an example: participants indicated that through their communal gardens, community members developed more interest in the overall future of their neighbourhood (Marshack, 2008).

Community UPA also leads people to create networks that stretch outside their community. UPA practitioners connect their organisation with gardening or UPA organisations in other regions or other countries for example (Levkoe, 2006). To improve their gardens and their whole neighbourhoods, Latino community gardens in New York City formed coalitions to help each other raise funds, organise protest rallies, do workshops and hold voter registration bureaus (Saldivar-Tanaka & Krasny, 2004). The existence of food banks based on UPA around the world, such as the *Voedseltuin* (Food Garden) in Rotterdam, are proof of how UPA practitioners start to care about the vulnerable members of their society. Through food banks they share their produce with those in need throughout the whole city.

Another wider social effect of community UPA is its effect on the position of women. Community UPA can improve women's positions in some communities. For example in South Africa, where women proved to be such good leaders and managers in the *Abalimi* project, that this earned them the respect of the community and changed the general esteem of women in the community (Small, 2007).

7.6 Barriers to Community Development

The above contributions of UPA certainly do not hold true for all community UPA activities. After evaluating UPA activities in Cuba, the USA and Australia, Snowdon (Snowdon, 2010) reported that some projects lacked certain aspects of community development. They failed to foster democratic learning for example, nor led to the creation of new networks.

One of the reasons for such failures could be that working together can create tensions. In *Abalimi* project for instance, people felt it was unfair for the NGO that set up the project to compare productivity and success of the gardens, as people had different plot sizes, resources and time available. Some participants did not like it when they had to conform to group policies, choosing instead to go their own way (Marshack, 2008). Another problem arising in the *Abalimi* project was that few community members were willing to participate substantially unless they were paid, according to fellow participants (Marshack, 2008).

Community development can also be hampered when some people are excluded from the projects. This could happen when these people are seen as being different from the dominant community, for example because they have a different ethnicity (Saldivar-Tanaka & Krasny, 2004). A final problem involves management of the communal garden or farm. If one or more people take control, they can become 'dictators' of the gardens, making the rest of the community unwilling to cooperate (Westphal, 2003).

7.7 Summary

Overall, this chapter has shown that community UPA projects and activities can be an effective mechanism for community development, because they provide ample opportunity for learning. They require people to come together, interact and labour towards the common objective of making their projects or activities a success. By doing so these projects and activities offer an opportunity for social learning and for participants to acquire new skills. It also manages to infer aspects of systems thinking on community members, making them take action on political and social matters that go beyond their own communities.

Community development is very much dependent on the participation of the community members, without which it would not work. It is therefore very important to give community members the opportunity to participate and to include their knowledge into these projects. Yet participation is also depends on the willingness of the community members to do so and their acceptance of each other's inputs. The current lack of reflection in community UPA is another barrier to lasting community development. It is on these points that UPA might struggle as a mechanism for community development.

Chapter 8

Discussion and Conclusion

This final chapter answers the two main questions in this thesis. Is UPA an effective learning mechanism for environmental learning? And is it an effective learning mechanism for community development? The Discussion section first presents several difficulties I encountered during my research. My final conclusions on the use of UPA as a learning mechanism for environmental learning and community development in developing countries are presented in the Conclusions section.

8.1 Discussion

8.1.1 Research Difficulties

The first and most important difficulty in my research involved the contents of the UPA literature. The quality of the literature proved an issue. I have mentioned the problem of biased literature earlier. This problem was present throughout the entire thesis research. There is plenty of literature to be found on UPA, but most of it was written by researchers connected to either the RUAF or the IDRC, the two biggest organisations promoting and supporting UPA in developing countries, or by Western initiators of UPA projects. Publications also often lacked validity. This lack is caused because authors copy references that are very old or, worse, refer to studies that are unfounded (Webb, 2011). I tried to track all information back to its source and found that information presented as opinion or guess in its source reference was misinterpreted several times before being presented as fact in the newest publication. In many surveys on UPA in specific countries, no mention was made of the methodology used in gathering and analysing the data, which made it impossible to judge the value of this information. I therefore often refrained from using such data in this report.

These issues with the literature were part of the reason for conducting the first part of my research, the critical evaluation of UPA that tried to separate fact from fiction. The dubious status of the information on UPA and the lack of rigorous data made such a reality check necessary, but at the same time made it hard to separate claim from evidence in Chapters 3 and 4. The nature of the UPA publications also made it difficult to analyse some of the criteria used in the framework in Chapters 6 and 7. I had wanted to analyse both UPA projects initiated by Western-style NGOs, and UPA activities initiated by local people that were without any form of further organisation. The latter proved difficult to analyse, because most reports on environmental learning and community development only look at projects. Dunn (2008) is an exception, because she publishes the answers to open interviews she conducted with UPA farmers. These answers give real in-depth insight into the motivations and worries of UPA farmers in South African communities. I think self-initiated UPA activities need further research, since most UPA in developing countries does not happen in project-form. What is more, official reports, scientific research and strategic documents should stop using unvalidated data copied from other sources. We cannot make future UPA policies effective and or encourage further development of UPA if our policies are based on wrong information.

The division found in the UPA literature between the objectives of UPA in developing and developed countries is another concern for the sustainability of UPA. Especially environmental learning is underrepresented in research in developing countries. Chapters 3 and 4 showed that although UPA has many benefits on the household and system level, it also brings with it many problems. Many of the claims associated with UPA, such as its

contribution to food security, cannot be proven significantly. We therefore need a more cautious approach to the promotion of UPA (Webb, 2011, pp. 205-206), that simultaneously broadens the scope of UPA research in developing countries beyond food security and poverty alleviation. Instead, future research should further investigate the use of UPA as mechanism for environmental learning and community development, especially since the pressure to make cities sustainable is mounting.

8.1.2 Reflection on the Use of the ESD Approach

My choice for the ESD approach as a framework for analysis requires some reflective comments, since it is not a straightforward choice. As I explained in Chapter 2, ESD at this point is still mainly an ideological approach to education and does not represent a specific teaching method or instrument for learning. To transform the ideology into something more concrete and observable however, I have made ESD into a learning instrument by identifying the five ESD-criteria. I felt this was necessary in order to use ESD as a framework for analysis, but it does mean I changed the fundamental vagueness of ESD.

ESD is intentionally without prescribed teaching methods and instruments, because this requires the learner to find his own way of learning. From an educational perspective there is much to say for making the learner responsible for his own learning process in this way. By leaving the specifics of the learning process undefined, the approach also allows learners to adapt the learning to their own context. On the other hand, we cannot assume that the content or process of learning will be in accordance with ESD if the learner is left to his own devices. The five criteria cannot secure an 'ESD-approved' learning process. For example, a social learning process among colleagues that all heavily use pesticides is not likely to lead to environmental learning or a change in behaviour in the way ESD would like to see. It therefore sometimes was a bit of a puzzle to find out what ESD would say on UPA, and if UPA is a strategy that could be used by educators aiming at sustainable development.

The five criteria that I eventually chose as my framework for analysis presented their own difficulties. Some of these have already been discussed in Chapters 6 and 7, such as the difficulty of observing systems thinking. Community participation was also problematic, since nearly all discussions on development interventions now debate local participation. What is the right level of involvement, for example, and who should be involved? Answers to such questions are likely to differ, depending on whether they are answered by the locals themselves or by the external organisation that is imposing the five criteria framework.

It was also difficult to determine how to operationalise the criteria. At what point can you identify a change in practices? More importantly, how can you determine whether a change is the result of UPA or of other processes and experiences happening in a practitioner's life? UPA is not an isolated process, and should be viewed in relationship with other processes a farmer is involved in. This is especially important to take into account when UPA activities are not part of an established program with defined actions. Throughout my thesis I have tried to keep these issues in mind. Forgetting them would mean succumbing to the common intervention bias in development thinking, which is to see change only as the result of one intervention.

8.1.3 Reflection on the Use of the Action Learning Approach

Applying the action learning approach to UPA was difficult at times. Action learning first developed in the context of organisations and companies as vocational training. Although it has been adapted over the years to fit wider educational purposes, some of its goals and methods are still more production-oriented. It can have a very strong instrumental focus that

assumes all the possibilities of a Western context, such as having participants who finished secondary education or having access to class rooms (Jennings, 1996). This meant that action learning was not always apt to apply to the informal economy of UPA with its focus on social development and environmental sustainability. During my analysis it was important to keep in mind the limitations that are present in developing countries and to adapt some of the action learning aspects to the specific context.

If the criteria of action learning are imposed externally on UPA situations, they are likely to conflict with the positions of those already involved in UPA. In Chapters 6 and 7, I already mentioned the problems with including reflection cycles and participative learning in the learning process and the debate between a micro-focus versus a macro/systems focus. Opinions on what constitutes 'hands-on experience learning' are likely to differ as well, both between and among insiders and external agents. Some projects and theorists will claim that the whole act of UPA is hands-on learning experience; others refer to specific events and programs within an UPA project, such as the FFS workshops. I have tried to look at UPA from both perspectives. In general, all UPA activities are treated as learning through experience, but in Sections 6.2 and 7.2 I tried to look at the specific hands-on occasions within UPA projects and activities.

8.1.4 Should UPA be a Learning Mechanism?

This thesis analysed the question whether UPA is a learning mechanism. Whether UPA should be a learning mechanism is a whole different question, and one that deserves some further thought. What do UPA practitioners think of UPA as a learning mechanism? Do they want it to be an instrument for learning? Making environmental learning and community development a primary objective of UPA projects and activities means that other objectives can be lost. No matter how noble or flexible ESD and action learning are, as the objectives of environmental learning and community development become more institutionalised in UPA, UPA activities are likely to suffer the instrumental project thinking that can create tensions between project objectives and the wishes of project participants.

UPA activities that have a project and collective mentality weaken the power of the individual practitioner. With this type of activities, individual farmers are usually not responsible for initiating or managing project activities and they have to adhere to collective rules. A stronger focus on environmental learning and community development through ESD and action learning can also overwrite the potential of the individual learning process. UPA projects according to ESD and action learning philosophy make the individual part of a collective project learning process. This is not necessarily a better form of learning for every individual. Individual learning processes can take a different form than ESD or action learning and can have different outcomes or time lengths, but they can be just as powerful as social or communal learning processes. It is crucial in the development of UPA as a learning mechanism that individual learning processes are acknowledged and appreciated.

For many UPA farmers, the primary objective for their activities is food production, although Chapter 3 cast some doubts whether this objective is justified. Nonetheless, most UPA practitioners value UPA as a food production mechanism. If environmental learning and community development became main objectives of UPA, this would mean that this value would change or become less significant. The core of UPA activities would alter, which would have profound effects on UPA practitioners. It could change the willingness and motivation to engage in UPA for example, and the ways of production. It might also mean that farmers lose interest in UPA as a form of urban production, since the 'production' side of the story would lose importance. This negatively affects the overall development of UPA.

Another current objective of many UPA practitioners is leisure through engaging in UPA. Making UPA a distinct learning activity could mean that this leisure is lost in the eyes of the practitioners.

Future UPA projects and activities willing to include environmental learning and community development should be careful to consider these tensions between what the UPA project wants and what the practitioners want from the project. There are also the problems of UPA as established in Chapter 3 and 4 to consider. The evaluation of these problems show that they are significant and persistent problems that need to be addressed before positively answering that UPA should be a learning mechanism.

The use of the five criteria frameworks means that the approach taken to both environmental learning and learning for community development is instrumental, as if these five criteria can simply be applied to any UPA situation in order to lead to learning (and eventually, to change). Such an approach however, would fail. The five criteria should not be understood as a tool that will transform UPA in any situation. Instead, I have tried to explain throughout this thesis how situations of individual and community UPA re-interpret, transform and re-invent the criteria. I see this flexibility as a necessary and good way of adapting the criteria so that they become the best possible learning mechanism for every different situation. I nonetheless feel that certain aspects of the criteria should not be re-interpreted, especially if UPA is to be a long term learning mechanism. Aspects of reflection and systems thinking should be maintained. In this sense my use of ESD and action learning remains very instrumental and it could oppose UPA practitioners' own views on how to best use UPA.

8.2 Conclusions

8.2.1 UPA as an Environmental Learning Mechanism

Is UPA an effective learning mechanism for environmental learning among adults in developing countries? And if it is, are there any points that need improvement in order to make it a better education strategy? Chapter 6 tried to answer these two questions by comparing information on current UPA activities and projects with five criteria for effective learning posed by the ESD and action learning approaches. One conclusion that follows from the analysis is that current UPA activities do act as a learning mechanism for environmental learning for the practitioners of UPA. The analysis of the literature also showed that UPA did not benefit environmental learning among non-practitioners. I suspect this is because non-practitioners are not involved in UPA enough for it to make a real difference. UPA farms in developed countries are often open for visitors, in the developing countries this often is not the case unless there are programs for children. Non-practitioners therefore do not have a lot of contact with the practice of UPA, which reduces their learning opportunities. On the other hand, there has not been much research into the effect of UPA on non-practitioners, so all my conclusions on this matter remain speculation.

Among practitioners then UPA does improve environmental learning. The social learning that occurs among the UPA practitioners allows them to learn about different environments and about each other's problems with the environment. It allows them to share strategies for dealing with these problems. Through their UPA activities, the practitioners also acquire skills that can help them with environmental learning, and that can help them put their learning into practice. Putting learning into practice, using hands-on experience and following action learning strategies is already a common practice in most UPA learning programs. This enables practitioners to make a change not only in their awareness of environmental issues, but also in their behaviour towards these issues. The new skills help with this. The most

obvious change in practice at this moment is UPA farmers turning towards organic production after they have experienced why organic production would be beneficial for them.

ESD and action learning see local participation and inclusion of participants' own knowledge as essential elements of a good learning process. From the examples in Chapter 6 we can see that many UPA programs already include locals and their knowledge. This helps to let UPA farmers adapt environmental strategies to their own context and also helps them prepare for future environmental issues. The last criterion in the analysis involved systems thinking, which was hard to conceptualize. There certainly is a need for UPA practitioners to think about the wider social and biophysical systems if they want to gain more environmental understanding. I found two examples of UPA projects that stimulated systems thinking, but overall it was hard to recognise it in current UPA activities and projects.

The uncertainty of the farmers' willingness to learn and change and of their time and resources available is the main point that needs careful consideration if UPA is used as an environmental learning mechanism. To improve the chances for social learning and learning through reflection, UPA practitioners need to have possibilities to come together to share information and reflect. Finally, although thinking in larger systems is important, such thinking should be stimulated by letting practitioners explore the smaller environmental issues first so that the learning process can build up to larger issues.

Apart from these constraints that indicate the room for improvement, what we see overall is that the emphasis of UPA activities and projects on environmental learning is still largely absent. Especially the larger elements of environmental learning are lacking, for example learning about the larger dynamics between humans and the environment or about environmental problems on regional scale. When environmental learning happens through UPA at the moment, it seems almost a positive side-effect or an afterthought. If UPA truly is to be an effective mechanism for environmental learning, this environmental learning should take more priority in the UPA programs. The challenge then becomes how to increase the focus on environmental learning in UPA programs, while still taking into account the issues with instrumental agendas of UPA programs explained in Section 8.1.4.

8.2.2 UPA as a Community Development Learning Mechanism

What constitutes as 'community development' will differ for each community. In some communities social cohesion is low; other communities will benefit more from economic improvements. This made it difficult to analyse the value of UPA for community development, since it required looking at all the different areas to which UPA can contribute.
A further difficulty is that ESD and action learning prescribe change, but do not specify who needs to evaluate the changes in a community. Policy makers will distinguish and appreciate different changes than will the community members (Dorius, 2009). The question then becomes whether UPA is a good learning mechanism for community development in the eyes of the policy makers and NGOs, or in the eyes of the communities themselves.

Surveys and interviews among participants showed that many indicated that their community did change for the better because of the local UPA activities. The tone in most reports by researchers and policy makers, the external agents, is also very positive on UPA as a learning mechanism for community development. So UPA is an effective learning mechanism for community development in the perspective of both locals and external agents.

I found a lot of evidence of learning processes through community UPA that led to significant changes in a community. The social learning through UPA breaks down stigmas and creates

new social bonds within communities. UPA breaks down distrust and increase social cohesion, because it creates opportunities to share and to work together on something constructive to the neighbourhood. UPA also works to integrate vulnerable groups into their communities. Community UPA sites can be a way to express traditional knowledge, practices and events. It is unlikely though that UPA has the potential to economically improve communities. Community UPA does work well to increase the knowledge on and practice of democracy and civic activism. It serves as a way for community members to learn political, organisational and networking skills. This empowers the community members and the community as a whole. At the same time, UPA activities focusing on improving gender-related issues have shown to empower women. Besides such political effects, community UPA also has social effects that benefit community development at a higher level: it strengthens the community's sense of identity, pride and self-confidence.

The effects of UPA on learning for community development as described above are such that they are likely to extend beyond the immediate community. They serve to strengthen a community's overall political position for example, or help to create networks of communities. Community participation is very important to uphold these effects and also to uphold the longevity of UPA. The importance of local participation is such that this is one of the points of improvement in using UPA as a learning mechanism for community development. It is already recognised as very important, but UPA projects should do everything they can to secure local participation and support in the project and to make sure that there is a sense of local ownership over the UPA activities. Without such support and sense of ownership, UPA is likely to be resented by the locals and to prove an unsustainable project.

Another point of improvement involves the issue of reflection on the learning by community members. The problem now is that we do not know whether there is any reflection on the learning process either by individual farmers or the community as a whole. Common sense dictates that most farmers will probably reflect naturally on their experiences in a certain respect. The problem is that we do not know the extent of their reflections. In light of community development (and of environmental learning) it is important that farmers reflect also on these issues, alone and with each other. Unfortunately, I have not come across any ideas on how we can assure that UPA farmers learn through reflection, apart from the idea of offering farmers designated reflection time during UPA activities.

8.2.3 Environmental Learning and Community Development go Hand in Hand

The research for this thesis started with the question if UPA is a good mechanism for environmental learning. I quickly realised that in the context of UPA, environmental learning often goes hand in hand with community development. The possibilities of UPA for community development therefore became the second question I analysed.

Environmental learning and community development learning are not separate processes, although the division into separate chapters might imply so. In fact they are mutually reinforcing. The sense of place and belonging, and the positive atmosphere created by community UPA activities and projects are strong motivations for people to start caring about the environment in their neighbourhoods. A community UPA project in Sri Lanka led to the creation of eco-learning centres near local schools for example (Seymoar et al., 2010). Community action is important for environmental learning and change, as individual action is not enough to deal with the scale of environmental problems these days (Gaillard & Ferreira, 2009). Effective environmental education aims at both individual and collective changes in environmental understanding (Fien in Gaillard & Ferreira, 2009). At the same time

environmental learning can contribute to community development, because environmental activism and awareness might generate awareness and activism among UPA practitioners on other issues present in the community. Taking care of the biophysical environment can evolve into taking care of the social environment, as Clover (2002) shows.

If UPA is to be a better instrument for environmental learning and community development however, there are some considerations to take into account apart from the earlier mentioned points of improvement. What the analysis of UPA activities and projects has shown is that working with urban farmers is very different than working with rural farmers. Urban farmers do not have the same motivations, interests and backgrounds as rural farmers. Programs aiming to improve environmental learning and community development among UPA farmers can therefore not adopt the same strategies as similar programs among rural farmers.

As long as UPA retains the ambiguous legal status it has in many countries, both environmental learning and community development will be seriously hampered. Chapter 6 mentioned some initiatives with UPA in Kampala, Uganda, for example that can be characterised as environmental learning. The organisation responsible admits that unless UPA gets a clear legal status these initiatives cannot diffuse to a larger scale (Van Veenhuizen, 2006). No learning activity is likely to take place if such activity is considered illegal, nor will communication or extension workers then be able to guide UPA farmers in their learning processes (Boud et al., 1993; Conway, 2006).

My final concern is with the agency in UPA. My analysis focused on both UPA projects initiated by external development agents (governmental and non-governmental) and on individual UPA activities initiated by farmers themselves. What the five criteria-framework has shown is that a project form of UPA has more potential of actually achieving environmental learning and community development, since it is unrealistic that individual UPA farmers can adhere to all five criteria. This brings with it an important problem about the sustainability of such projects on the long term. How durable are UPA environmental learning and community development programs once the external (financial) support stops?

My research has shown that in many ways UPA does act as a learning mechanism for environmental learning and community development. But is it an effective learning mechanism? I would say not until some of the problems are dealt with. To use it as an effective learning mechanism, we need to solve the practical problems of legality and agency. We need to increase reflection and go beyond the current local scale of learning to deal with the issues that now hamper learning through UPA. Using UPA as an effective learning mechanism balances out at least some of the urban problems in developing countries by generating better environmental understanding and stronger communities.

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