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Transition to Ecological Urban Agriculture; a Challenge

Ecological agriculture is seen as especially relevant to the urban setting. The introduction in rural settings of ecological practices is still debated, although it seems that coexistence of both conventional and ecological farming in an adequate mix seems to be the best option. This begs the question whether similar arguments apply to the urban setting and which lessons can be learned for urban agriculture (1).

Editorial

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Ideas on ecological agriculture differ and various concepts exist (e.g., ecological or organic agriculture, permaculture, biodynamic agriculture). Its simplest definition is "agriculture without the use of chemical inputs (e.g., synthetic fertilisers, pesticides and herbicides, or hormones)". Yet others see it as more than applying ecological practices to maintain soil fertility, to manage crop and animal health and, for instance, understand it as a vision on healthy products and as a way of life. (For more on concepts, see Goewie on p.5).

However, the discussion in this issue is not about definitions, but rather focuses on the process of "ecologising" urban agriculture and its relevance for sustainable urban development.

WHY ECOLOGICAL URBAN AGRICULTURE?

"Ecologising" urban agriculture is an important issue for a number of reasons. The proximity of urban agriculture to large numbers of people and sources of drinking water demands means that the health and environmental risks associated with urban agriculture be minimised. The transition to ecological urban agriculture will remove the risk of contamination of soil, water and produce, by residues of agrochemicals, hormones, and through other detrimental effects of conventional agriculture.

Some urban farmers may adopt ecological practices because of environmental concerns, or see it as a way of living. Others may change to ecological farming practices for economic reasons. Where technologies are still predominantly traditional, the introduction of modern ecological practices may actually enhance the production. In cases where already substantial amounts of chemical inputs are applied, the introduction of ecological practices may reduce the production costs through savings on chemical inputs and probably reduce productivity at least initially, a situation sometimes imposed upon a region, as was the case in Cuba. In the urban setting, niche markets also exist for organically grown food.

A more ecological agriculture may also be sought since it stimulates the recycling of urban organic wastes and matches well with modern approaches to urban sanitation (eco-sanitation). Ecological agriculture is also better adapted than conventional agriculture to being combined with other functions like recreation, landscape management, maintaining biodiversity, education of youth, regeneration of deteriorated areas, etc.

Although ecological urban agriculture is not the ultimate solution to environmental degradation, economic decline or poverty alleviation, it is a positive and appropriate way of looking at sustainable (urban) development, working with nature and worth actively promoting.

TRANSITION TO ECOLOGICAL URBAN AGRICULTURE

But how can such a transition to ecological agriculture be realised? What steps should be taken? Which strategies can be applied with success? And what are the main constraints that have to be dealt with?

The introduction of ecological agriculture into the rural setting has been confronted by several constraints, including opposition to the alleged ideological character of ecological agriculture, a lack of awareness among policy-makers, lack of information and technical assistance to urban farmers, technical reasons (e.g. lack of organic materials), economic reasons (e.g., high labour requirements), etc.
+ (initial) lower output!

Urban practitioners may learn lessons from what is happening in the rural areas. However, the constraints and opportunities for "ecologising" urban agriculture may be different from those for rural agriculture, since the local conditions are different. Some of these differences include are:

- urban farmers are able to establish more direct relations with the producers and vice versa
- have greater and easier access to urban organic wastes and wastewater
- have land shortages
- have greater difficulties integrating crop and livestock farming, and internal recycling; and
- part of the urban farmers are farmers by choice or necessity, while it is usually by birth in rural areas.

Appropriate policies and support strategies should be developed, which may include the provision of information to urban farmers on ecological farming practices, support for the establishment of decentralised composting facilities, creation of farmers' markets, shifting subsidies from chemical inputs to composting activities and natural fertilisers and pesticides, participatory action research on technical problems encountered by urban farmers and gardeners, etc. Such policies would gradually lead to a more ecological way of farming within the reach of all urban farmers, which would be a step forward towards healthy food grown by healthy people, in healthy cities.

MAIN ISSUES DISCUSSED

This issue starts with a discussion of concepts, a review of experiences of the transition to ecological agriculture gained in a rural setting, and the identification of different forms of ecological agriculture (Goewie on page 5). Getachew (on page 18) uses the Ethiopian context to highlight different concepts and aspects of ecological agriculture and appropriate techniques; while on page 23, Danso et al. illustrate perceptions of ecological agriculture of farmers, planners and consumers in Ghana.

In the article by Santandreu and Dubbeling (page 9), a wider perspective is taken in exploring the links with biodiversity and poverty alleviation in Latin America. Permaculture, or Permanent Agriculture, goes even further: basically, food is grown according to ecological principles, but with a few important additions. Permaculture actively promotes local community trading structures, and self-sufficiency. This is taking the discussion a step further than ecologising agriculture. It is strongly rooted in sustainability, which includes an emphasis on the social and economic side of things as well (see experiences from the UK and Cuba on pages 21-22).

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Selbsternte: A New Concept of Urban Organic Farming in Austria

Cities like Vienna (Austria) are known for great monuments and wonderful art. At first glance, urban agriculture seems to be limited to public baroque gardens, some vineyards, *Schrebergärten* and intensive vegetable growing. But recently, clever consultants, organic farmers and "green-minded" consumers have developed a new concept of urban organic farming that allows new ways of interaction between organic farmers and urban citizens in residential areas.

Perceptions of organic agriculture by urban vegetable farmers and consumers in Ghana

A typical phenomenon of urban agriculture is its specialisation in perishable products. In Kumasi, Ghana, as in other cities in sub-Saharan Africa, vegetable market production takes place on inner-city lowland areas, close to stream and drains or in the periurban environment, where high amounts of seeds, manure/fertiliser and pesticides are used. Research is undertaken into biological production methods and to risks reducing options beyond the farm level, i.e. at markets and households, but it shows that the adoption rate of biological farming methods remained very low among vegetable growers. How to convince urban farmers and consumers?

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In this issue

The environmental gains of ecological agriculture are quite obvious, due to the absence of chemicals, and good care for the soil and animals. Some authors argue that it could be a solution for social and economic problems as well. Some organisations actively promote ecological agriculture as a way of community building (see the article of Abalimi on the positive effects on communities living in the Cape Flats, South Africa). People engage in growing healthy food together, learn to collaborate, to grow and how to market their vegetables. Ecological agriculture can help support people to gain control over their lives, as well as their own food production. It can revitalise old knowledge, alongside the introduction of new techniques, thereby revitalising local culture. In Costa Rica, students are involved in organic urban agriculture projects as part of their studies, thereby getting in touch with their local communities (see page 36).

Several authors indicate that a major constraint to ecologising urban agriculture lies in their government's active promotion of conventional agriculture, by way of subsidies on chemical inputs, among others, and not giving attention to - sometimes even discouraging - ecological practices. Nuppenau reflects on page 29 on the changes in the perceptions needed at the planning level, in order to give ecological urban agriculture, with its potential positive benefits, a chance. On page 12 Vogl and Axmann introduce a successful concept from Austria on how to bridge the gap between planners, farmers and consumers. Angeles on page 32 describes differences in perception between men and women. The articles on Cuba (page 25 and 26) and Argentina (page 34) deal with the role of local governments in the transition process towards ecological agriculture. In this process, several stages can be identified. On pages 15-16, an attempt is made by Galanti to sum up the steps needed.

One of the key factors in organic agriculture is the availability of organic material, compost and manure. In cities, large amounts of organic waste materials are available, and the composting of these materials is a good way to close the nutrient loop, to reduce costs of waste disposal, and to provide farmers with cheap composting materials. A problem, however, with commercial composting plants is that the compost may become too expensive for farmers (Furedy on page 38), one reason for many urban farmers to collect organic material from dumpsites, even though this material may be contaminated with (bio)chemical waste. The article from Getachew (page 18) shows that there are simple small-scale techniques to make the best use of what little waste you can get your hands on.

Besides knowing how to grow organic food, it is of crucial importance to know how to market it. Several articles (see for instance Vogl and Axmann, and Travez on page 17, Santandreu et al. and Small on page 30) speak of marketing problems due to location, irregularity and seasonality of production, size and appearance of ecological products, consumers' lack of trust in the green label or problems with certification standards. Certification can become a problematic issue if standards are set by the importing countries, thereby placing great pressure on urban ecological farmers. It is therefore important that countries develop their own certification processes (see Cuba experience, p. 22), and that such certification is accepted by importing countries.

Some authors (for instance Getachew, p. 18) argue that ecological agriculture stimulates the local economy and reduces energy use through recycling urban organic wastes, cutting down on transport costs, and by reducing food packaging by providing fresh and less expensive products, among other issues.

The articles from Cuba, South Africa, the Philippines, Mexico and Austria further provide successful local ecological urban agriculture initiatives and discuss the role of partnerships, gender, and extension in the transition process. The articles about the Philippines and Mexico show that women are enthusiastic about urban agriculture and that they are developing -amongst others- new management skills.

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A Strategy for Local Development of Lower-Income Urban Sectors in Rosario

Argentina, like the rest of Latin America, is confronted with the challenge of combating structural poverty. Urban agriculture – particularly when using organic methods – is seen as a viable and appropriate strategy for easing poor urban sectors. This article presents two cases in which this strategy was developed in two cities contrasting greatly in size: Rosario and Camilo Aldao.

THE NEED FOR A CONTINUED DISCUSSION

Taking into account the articles in this issue, the transition to ecological agriculture looks promising, although various constraints are identified. Readers are invited to continue to contribute to this theme, since many unknowns still exist and further examples are needed. We also invite critical evaluations of existing projects (approach, technical and economic results), discussion on the strategies to generate greater attention on ecological urban agriculture among local and national government authorities and also to generate more institutional support.

A special point of attention and discussion is the issue of gender. It is often stated that ecological agriculture requires higher labour inputs and that the major part of this labour falls under the responsibility of women, thereby burdening them even more. Is this also the case in urban agriculture? Can you confirm or falsify this statement? How can we avoid the negative effects on women and increase the positive effects?

Note:
(1) The original topic of this magazine was "Transition to Ecological Urban Agriculture and Appropriate Technologies". We received several articles on technologies, many of which related to ecological agriculture. Therefore it was decided that this issue should focus more on ecological urban agriculture, and to dedicate another UA Magazine issue, probably in 2003, to technologies and training in urban agricultural practices.

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Urban Organic Farming at the University of Costa Rica

According to a study, organic production has increased constantly in the last years in Costa Rica, involving a high diversity of crops. The Organic Farming Program of the University of Costa Rica works in research, extension, and teaching of soils, animals and plants, post harvest management, and rural development. This Programme coordinates all the activities on organic farming at the University and has cooperative links with other institutions both at national and international levels. This article narrates some of the experiences.

Myths about (Ecological) Agriculture

Ecological Agriculture and Permaculture are seen as more than producing crops without chemical inputs alone, but as part of a larger vision of a healthy life. Others do not want to go that far, but have their doubts about conventional agricultural production. Still others reject the claim that ecologically produced food is healthier. And although there seems to be increasing support for a strategy in which both (or rather several) types of agricultural production prevail, the arguments and prejudices have not changed over the years.

The following is based on material produced by the German Foundations "Scheweisfurth" and "Ecology and Agriculture" and the Dutch "Platform Organic Food and Agriculture", published in German and Dutch in 2000.

1) Hunger in the world prevails because there is not enough food. That is why we need (more) chemical inputs and biotechnological advances.
   *According to the FAO, more than 800 million people in the world do not have enough food, **BUT** hunger is a result of poverty and lack of assets, (it is an access/distribution issue as well) not because there is just not enough food. Political systems, controversies and choices in types of food to grow, create local scarcities.*
2) Ecological Agriculture is not able to produce sufficient food to provide all people with food.
   *On average, ecological farmers produce less than when using conventional practices, **BUT** in the European Union and the USA, a complete change to ecological farming would not lead to food shortages. It is intensive, conventional farming that has shown to be unsustainable in many areas – and therefore would lead to food shortages in the long term. Urban agriculture generally supplements food needs in the cities*
3) If conventionally-raised animals are able to achieve such high production levels, then these practices cannot be detrimental to them.
   *Animals produced within the intensive bio-industry yield more than under ecological farming methods, **BUT** we have recently seen how unhealthy this can be for the animals and their bosses.(e.g. the BSE and Foot and Mouth epidemics)*
4) Organic products are too expensive and mainly for the elites
   *Organic products are generally more expensive than conventional products in the supermarkets, **BUT** we actually end up paying three times for all the costs involved in non-organic products: i.e., over-the-counter costs, through taxes to sustain subsidies, and even higher taxes to cater for the negative effects on the environment.*
5) Ecological farmers are idealists and against technological innovations.
   *Ecological farmers do not favour all of the technologies developed in the past decades, **BUT** definitely use modern techniques, while innovative technologies are developed in ecological farming.*
6) Organic products don't look attractive to consumers
   *Organic products are less uniform, **But** many persons like the way they are produced, appreciate the lack of chemicals, and the taste (although the latter is indeed a matter of taste).*
7) Ecological production is deceitful
   There are gradations in ecological agriculture, and without certification and mechanisms of control, cheating can take place.

"Organic production is typically an invention of the rich in Western Europe. They are now projecting their loss in nature and biodiversity onto developing countries." This is what somebody from Africa said to me during the European Conference on Organic Production held in Copenhagen, May 2001. Another said that organic production as a notion has too many definitions. "It is too complicated for poor people to quickly understand." Intriguing was also the remark of a producer of synthetic pesticides: "organic production is nothing other than something from the Middle Ages". "How could they plead for a methodology which produces nothing else than hunger and soil exhaustion? It is even worse, they advocate organic production as the alternative for future agriculture" (Trewavar, 2001).

Eric Goewie

A green fence against insects in a small city garden

Organic Production What is it?

Those are the judgements about organic production among representatives from developing countries, industries and advocates of intensive agriculture. Fortunately, scientists and policy-makers encounter evidence that organic production does make sense. Pretty (1999) shows that organic production provides sufficient and healthy food in developing countries. Developments in Cuba show that organic production raised more advantages than was accepted before. Evidence from Western Europe demonstrates that organic production is profitable indeed. However, it is still problematic to understand exactly what falls under the notion "organic production". One thing is clear: organic production has strong potential for drawing consumer response.

The most important difference is the use of natural cycles

This article explains the discrepancy between judgement and reality concerning organic production. I shall do this along three points of view. Firstly, I will clarify what organic production actually is. I shall do that by demonstrating two scientific models. Secondly, I shall discuss the notions "intensive", "efficient", "integrated", "organic", "precision", "high-tech", "biological", "sustainable", "ecological", "agroecological" and "biodynamic" production. All of these terms are used arbitrarily. Thirdly, I shall demonstrate strong and weak aspects of organic production, focusing especially on urban agriculture. Finally, I shall address the question of whether organic production is always and under all circumstances an alternative for mainstream production.

WHAT IS ORGANIC PRODUCTION?

Organic production concerns the management of agroecosystems with the aim of getting a sufficient and sustainable provision of agronomic commodities for the national market. This management is based on respect and responsibility for, and knowledge of the biosphere. Production as such should be supported by governmental legislation and by independent research and education (Vereiken 1992). Basic to this concept is that agriculture is a societal good. Other societal goods are, for example, peace, safety and public health. In other words, people everywhere in the world have a basic right to sufficient and inexpensive food of good quality.

However, Europe and the US have a different starting point for their agricultural policy. For them, agriculture is an economic activity that should be developed with capital and technology for the benefit of the investors involved. Handsmeyer (1979) and Van der Werff (1993) show the difference between these two viewpoints in two models. Figure 1 shows a model for organic production while Figure 2 shows one for mainstream production.

The most important difference between the two figures is the use of natural cycles. Organic production is most consistent in creating natural feedback mechanisms. For instance, plant nutrients taken from the farm by harvests are replenished by nutrients from nature. Nitrogen can be captured from the atmosphere via nitrogen-fixing micro-organisms, via animal manure or compost. Phosphates originate from natural rock. Recent research demonstrated that careful soil management stimulates the development of mycorrhizae, beneficial soil fungi important for providing water-soluble phosphates, which are important for plant root development (Dekkers et al. 2001). In this way, soils are not considered as just a substrate from which plant

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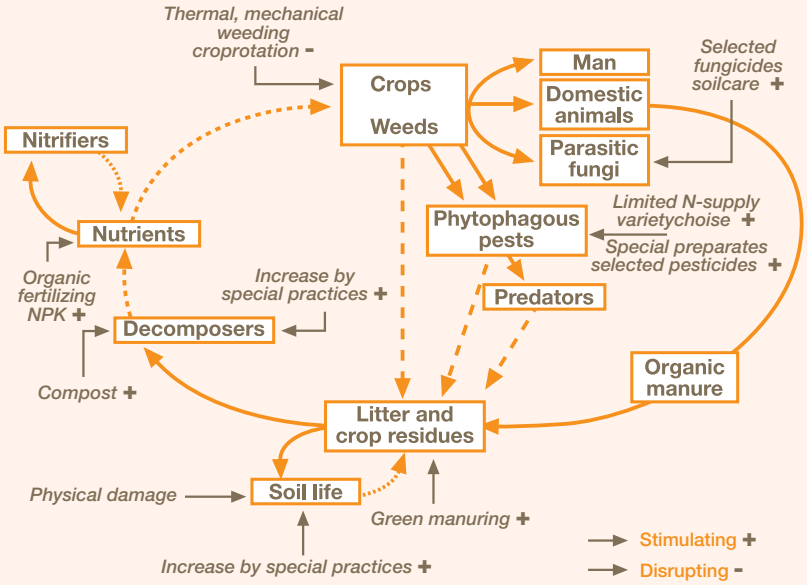

Figure 1 Agro-ecosystem *ecological*

Model of an organic food production system supported by self- organising (buffered) natural resources that are present at the production site. Each arrow hides a great deal of knowledge built by on-farm research and experience. The system is dependent on natural resources and fully dependent on farmers' decision-making skills. Note that items are linked. They form one dynamic cycle. Arrows indicated by a "+" refer to production methods that support the cycle. Arrows with a "–" disrupt the cycle.

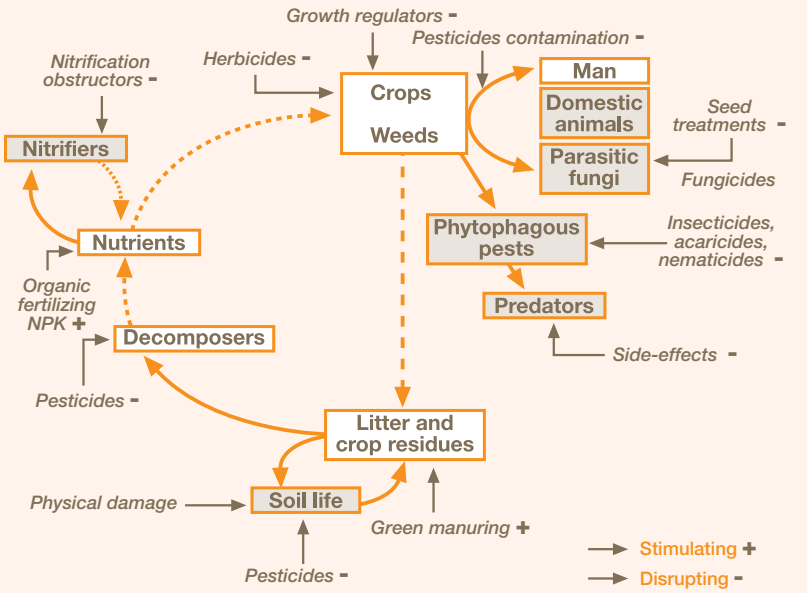

Figure 2 Agro-ecosystem conventional

Model of a conventional food production system, supported by high costs, synthetic chemicals, irrigation systems and energy. Each arrow hides a large number of scientists, institutes and public regulations (laws) at the cost of the taxpayer. The system is independent of natural resources and fully dependent on suppliers. Note that there are no cycles anymore. Arrows indicated by a "–" refer to the fact that the production method involved has been designed in order to "prevent" cycle formation. According to Odum (1971) such a system is like a pioneer ecosystem. Pioneer ecosystems typically produce high amounts of biomass per hectare and allow for low biodiversity.

roots obtain their nutrients, but as a living and self-organising ecosystem. Such a system bears beneficial organisms in the soil that contribute to a buffered system of soil fertility.

Natural cycles are prevented from developing in mainstream farms. Such farms have as their aim the production of as many kilograms per hectare as possible. Synthetic and artificial chemicals substitute natural resources.

Organic farms are self-organising systems. They are very much bound to natural resources and surroundings. They produce sufficiently, while maintaining a high level of agricultural biodiversity. Mainstream farms are disconnected from their natural surroundings. The physiology of crop plants and domestic animals are manipulated in such a way that they produce the highest numbers of kilograms per hectare. The latter system implies monocropping which ensures a quick return on investment. The management of such a production system focuses on the continuous improvement of input efficiency. That is to say that the manager must try to get as much as possible from one kilogram (e.g.) of chemical fertiliser. So, suppliers are expected to have strong influence on the development of mainstream agriculture.

There is another important difference between both production systems. Mainstream production demands a strong and reliable government. The government, which safeguards the general public interests, must play a much larger role in mainstream than in organic production, in which the farmer plays the largest role. Why is this? Intensive, mainstream agriculture, very much controlled by investors' interests, could be tempted to use more chemicals than are strictly necessary. The old assumption of "if it does not do any good, it does not do any harm" has already caused harm to society. All of the environmental pollution, soil and nature degradation as well as residues in food that we find today are strongly related to this attitude. Moreover, European research has established that only 30 to 40 % of chemical fertilisers applied are used for production, while the rest is lost. For pesticides this is even worse: only a small percentage of spraying contributes to pest pre-

vention or the killing of harmful organisms. Pimentel (1991) found that more than 95 % of each spraying went into the environment without reaching the target. Research in The Netherlands has shown that very precise management reduces such losses tremendously, without any loss of production (Aarts 2000). This research made clear that not only hard data should be of interest to researchers. Soft information such as input-output relations and processes is very important as well. Organic producers are very skilled in using this kind of information. They observe more, and know how to register and interpret observations correctly. In organic production, farmers are at the centre of their farm and become skilled managers of their farm-bound natural resources, step by step.

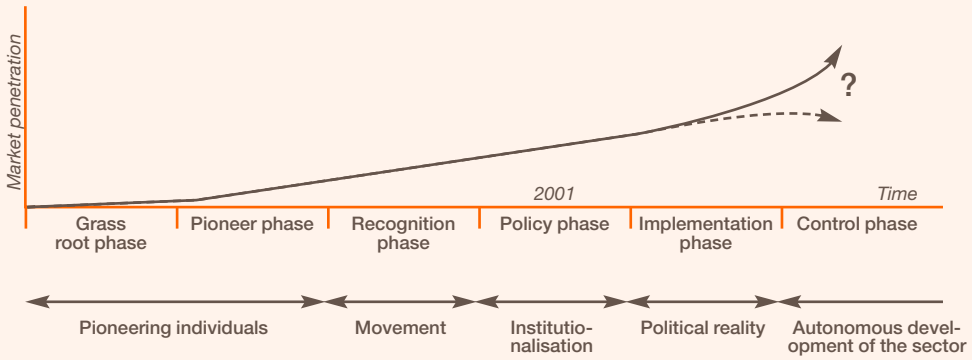

Figure 3
The history of organic production expressed as a function of market penetration over time. The solid curve represents the partly realised and expected development. The dotted curve extrapolates what also could happen. The question mark indicates where knowledge may support further growth of organic production.

DESCRIPTION OF VARIOUS NOTIONS FOR ORGANIC PRODUCTION

Production systems that differ from mainstream (intensive) production have been stigmatised for being "alternative". "Green" production systems have thus developed a political context, and green agriculture is stuck with a load for which it never asked. Researchers, farmers and consumers have therefore come up with terms in order to destigmatise their thinking about "greener" agriculture. Table 1 clarifies the differences between various green production notions. These differences are explained from the point of view of farmers' objectives and the farm spaces involved. Synonyms are sometimes necessary for special reasons relevant to specific countries, regions or cities. The various notions of organic production depend on the criteria involved. European legislation on "organic production" has been based on basic and measurable criteria. Latin America also includes societal criteria such as equity, social justice or fair trade, and therefore uses the wider term, "agroecology", instead of organic.

Table 1 Overview of various concepts used regarding greener agricultural practices

Form of agriculture	Synonym	Target of each form of agriculture	Area of use
Mainstream	❖ Mainstream agriculture ❖ Intensive production ❖ Industrial production ❖ Conventional agriculture	❖ National income	Knowledge and advice from science and extension focus only on the primary production site
Efficient	❖ Integrated agriculture ❖ Precision production ❖ High-tech production ❖ Sustainable production	❖ National income	Knowledge and advice from science and extension focus on the farm as a whole and on its surroundings
Biological	❖ Organic agriculture ❖ Ecological production ❖ Agroecological production ❖ Sustainable production (again)	❖ Farm profitability ❖ Self-organising ecosystems at and around the farm	Knowledge and advice from science and extension focus on the farm as a whole and on its surroundings
Biodynamic	❖ Biodynamic agriculture	❖ Farm profitability ❖ Self-organising ecosystems at and around the farm ❖Social and value aspects	Knowledge and advice from science and extension are extended according to certain values and farmers' experiences. They concern the effects of agricultural production as part of world systems now and in the future

STRONG AND WEAK ASPECTS OF ORGANIC PRODUCTION FOR URBAN AGRICULTURE

Organic production is generally considered to be a realistic answer to society's demand for sustainable production. Many governments therefore consider organic production to be a tool for regional development as well (Anonymous 1996). But some weaknesses are involved as well. World development, for instance, focuses more and more on globalisation and world trade. So, life in the countryside becomes less, and urban life more, important. Is organic thinking a match for this? Moreover, the success of organic production seems to be slowing down (Goewie 2002). So, will organic agriculture remain a reliable tool in the near future?

Figure 3 provides a schematic representation of the trend of organic production. We see that it developed to a certain level and has now become dependent on powerful market demands.

The question is which factors will make an impact on the further development of organic production. For urban and periurban areas, I expect that only market demand will be the determinant factor. This will increase the more the consumers become convinced that organic agriculture has an added value for which they want to pay. Therefore, the development of organic urban agriculture must also pay attention to the development of reli-

able certification and inspection systems. If not, then "organic" will lose its added value soon.

My experience with organic production worldwide is that it is most auspicious in regions where local stakeholders (e.g., regional government, farmers, consumers, nature and environmental protection organisations and research institutes) cooperate closely together. Vereiken (1992), Kabourakis (1996) and Auerbach (1999) showed that especially smallholders (family farms) together could create very efficient forms of organic production. The profitability involved has improved because of fewer costs for external inputs. Another important gain was that producers became efficient managers of their surroundings (water, air, garbage, wastes, biodiversity). They also improved the quality of their life. Smeding (2001) showed that more organic production in and around a city improves biodiversity.

Mutual learning within regional decision platforms of producers and consumers has the effect that people start to rely on their own experiences, thus becoming less dependent on those who always promise the world (Röling 1994). Moreover, platform cooperation enhances awareness concerning the use of synthetic chemicals.

Despite all of these positive aspects of organic production, we also need to take a look at the disadvantages involved. There is evidence which indicates that this type of production system imposes yet another burden on women in developing countries (Howard-Borjas, pers. comment). This is so because organic farming has higher demands on labour for weeding, plant protection and harvesting, etc. As herbicides are not permitted within organic farming, weeds must be removed by hand. Plant protection without chemicals also demands more time for inspection. Harvesting can consume more labour as well due to the wider range of crop species, each growing and ripening at different moments of the year. As women traditionally take up a great deal of the farm activities in developing countries, Borjas expects that more labour will be passed onto their shoulders. Another issue of concern is that organic crop rotations may become too narrow due to the farmers' need to grow more cash crops.

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Good presentation is important

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Table 2 SWOT analysis about urban organic production, based on experiences from all continents

Strengths	Weaknesses	Opportunities	Threats
❖ local food supply	❖ labour burden (on women) in farm management	❖ privatisation	❖ political undesirability
❖ local employment	❖ vulnerability to intensification	❖ governmental support	❖ loss of added value while up-scaling
❖ marketing	❖ impact of dangerous substances from traffic and waste	❖ good image in society	❖ (unfavourable) legislation
❖ green surroundings	❖ investments needed	❖ cooperation in research and extension	❖ emergence of gene technology
❖ social cohesion	❖ knowledge intensiveness	❖ cooperation with NGOs	❖ diseases and pests
❖ learning processes		❖ ease of platform-building	❖ commodities thinking rather focus on production processes
❖ autonomy			
❖ beauty and safety			
❖ empowerment of people			

Besides these disadvantages, are there sufficient opportunities for introducing organic production methods? And what about the threats involved? Table 2 presents an overview of the most important strengths and weaknesses of organic urban agriculture, as well as the opportunities and threats presently involved. The table also suggests what types of cooperation stakeholders should strive for in order to make urban organic production a realistic option.

CONCLUSION

Organic production is a strong concept for application by mainly small-sized family farms in and around cities, because of excellent opportunities for direct selling. Of much more importance is that consumers are in the position to see how their food is produced. This factor may address their growing concern about food quality and safety. Cooperation among acknowledged farmers on the one hand and between farmers and consumers on the other is a prerequisite. It is also important that the cooperation establishes a convincing certification and inspection system that approves the added value of organic products.

Biodiversity, Poverty and Urban Agriculture in Latin America

Up until the first half of the 20th century, the highest levels of poverty in Latin America and the Caribbean were concentrated in the rural areas. Over the years, the poor have migrated to the cities in search of higher incomes and a better life. Cities in the region have grown rapidly, and for the first time in history there are more poor people living in urban than in rural areas. Among the strategies employed by both the poorer urban population and the local governments are agriculture and biodiversity conservation. Recent research conducted in Havana (Cuba), Montevideo (Uruguay) and Porto Alegre (Brazil) provides ample examples of these.

Eric Goewie

Citygarden providing food all year for family members

The region presents the highest level of urbanisation, hosting four of the 15 largest cities in the world: Mexico City, San Paulo, Buenos Aires and Rio de Janeiro. Presently, there are more than 125 million urban poor living in the region (MacDonald and Simioni 1999), a large number of them belonging to socially marginalised groups. This "*urbanisation of poverty*" is an inevitable consequence of lack of employment, physical planning and land-use management and of lack of social, urban and environmental policies. To be able to survive, the urban poor see themselves obliged to build their houses and grow their food in the more dangerous, fragile or contaminated areas, thus causing major impacts on the ecosystems they inhabit. However, few value their contribution to the conservation of biodiversity, landscape improvement and quality of the city environment.

Biodiversity

The Agreement on Biological Diversity, signed in June 1992 during the UN Conference on Environment and Development (Rio de Janeiro –Brazil), defines biodiversity as "the variety of living organisms from various sources, among others, land, marine and other aquatic ecosystems and the ecologic systems that form a part thereof, comprising the diversity within each species, between the species and between the ecosystems"

According to various sources, at least 1,750,000 living species form the stock of genetic biodiversity on our planet (Evia and Gudynas 2000, Altieri 1992). Among them for example, between 25,000 and 75,000 count medicinal plant species, a large number of which are used in the preparation of (traditional) medicine. However, the future use of these resources is threatened by a development model that provokes the extinction of millions of species, the loss of traditional knowledge and the appropriation of species by pharmaceutic multinationals. (Vicente 1994, Martínez Alier 1995).

Various programmes have demonstrated how the urban poor develop innovative strategies to assure their food and health needs (Cabannes and Mougeot 1999). They produce, - often applying ecological farming techniques - process and market medicinal plants, fruits, small animals, fish, and vegetables. Local governments sometimes assist by, for example, stimulating the planting of native and fruit trees in public areas to improve urban aesthetics, promoting the presence of birds and insects in their cities. Recent studies allow us to understand more about the role that urban agriculture plays in improving the urban environment and urban food security in the region. Its potential depends, among other things, on the availability of land, secure access to markets, and the integration of urban agriculture into the environment by promoting sustainable use of solid and liquid wastes. Especially when practised ecologically, agriculture in the city contributes to soil con-

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servation, the urban hydrology, improvement of the microclimate and urban biodiversity, while at the same time reducing dependence on the use of chemical fertilisers and pesticides by the producers (Bakker et al. 2000, Smit 2001).

BIODIVERSITY AND ECOLOGICAL AGRICULTURE

Modern agriculture implies a "simplification of nature" in extensive areas, replacing natural biodiversity with a small number of cultivated plants and domestic animals. Historically, agricultural diversity has proven to be a way to contribute to the resilience of ecosystems and limit the incidence of pests and diseases. A broad genetic basis allows plant and animal species to adapt to varying conditions. However, specialisation and monocultures take away this natural protection, and as such provoke the increased use of agrochemicals, fertilisers and the degradation of natural resources. "Genetic erosion" is increased by the substitution of traditional varieties by "modern" ones, bred through genetic selection and manipulation.

It is shown that most agriculture in the cities in Latin America is of an ecological nature. A recent study, coordinated by UMP-LAC, IPES and IDRC indicates that "the urban agriculture practised by poor urban producers is for the most ecological and only exceptionally makes use of chemical pesticides or fertilisers, as the poor do not have access to these inputs" (Cabannes and Dubbeling 2002).

Ecological urban agriculture is not only part of the strategies implemented by the poor. Several local governments also promote ecological agriculture within their boundaries. For instance, as is stated in the guidelines developed by the National Association for Urban Agriculture from Cuba's Ministry of Agriculture, urban agriculture "*supports the formation of agroecological awareness in the conservation of the environment and the production of high-quality food products*" (Grupo Nacional de Agricultura Urbana 2001).

BIODIVERSITY AND THE CITY

Modern cities strongly affect their natural environment and the biodiversity of their surrounding areas, depleting resources to supply the urban population with food, materials and energy, while at the same time depositing their wastes and wastewater, contaminating agricultural and natural areas. The "urban footprint" contributes significantly to the loss of biodiversity.

Various countries are trying to revert this process, promoting for example conservation of biodiversity in green spaces of the city (parks and gardens, woodland areas). In Australia, an urban garden, specifically designed to create a habitat for wild species, hosts 140 different animal species on 700 square metres (Gardening Australia 1999). In the UK, home gardens have important potential for conserving urban biodiversity as they occupy up to 60 % of the urban areas in residential zones (The Bugs Project 2000). For a city to conserve biodiversity, it is necessary to ecologically manage its green spaces and agriculture, promoting cultivation of (traditional) plants, animals or aquatic species within urban settlements.

In the city of Porto Alegre (Brazil), capital of the federal State of Río Grande del Sur, the government promotes a policy of urban reforestation that incorporates the planting of native species and fruit trees. The number of native species accounts for 45% of all public green, while 6% consists of native fruit trees. As part of this policy, the municipality promotes the planting of tree corridors with species that provide shelter and food to birds and insects, such as the Grandiúva (*Trema michantha*); cinamon tree (*Aiourea saligna*); the Chá-de-bugre (*Casearia Sylvestris*); the Figueira-da-folha-graúda (*Ficus enormis*) or the Chal-chal (*Allophylus edulis*) (Sanchotene. 2000). In this way, not only the city environment is made more pleasant, also urban animal and plant biodiversity is generated.

Mariëlle Dubbeling

Open spaces that can be used for agriculture or forestry

BIODIVERSITY, URBAN AGRICULTURE AND POVERTY

Urban biodiversity is not only promoted in this way. In some cases, ecological agriculture is characterised by the production of plant and fruit species that are not available on markets and that run the risk of disappearance. (Garnett 1996, Smit 2000, Santandreu et al. 2000).

A baseline study implemented in poor neighbourhoods in the city of Montevideo (Uruguay) identified the presence of numerous species of vegetables, medicinal plants and fruit trees that are not cultivated in commercial agricultural farms. In these neighbourhoods, urban agriculture is developed mainly for home consumption and the producers cultivate local varieties ecologically, not making use of chemical products for pest and disease control, or only applying them in very small quantities. (Santandreu et al. 2000).

In the case of vegetable growing, the species cultivated are directly related to the producers' diet. Through their agricultural practices, the urban poor thus support conservation of biodiversity. The principal species identified in each plot are maize, (*Zea mays L.*), garlic (*Allium sativum L.*), potato (*Solanum tuberosun*), sweet potato (*Ipomoes batatas*), onion (*Allium cepa*), carrot (*Daucus carota*), pumpkin (*Cucurbita sp.)* and tomato (*Lycopersicon esculentum*), all forming part of the urban poor's daily diet (Santandreu et al. 2000, Elola 2000). Also, numerous fruit tree species and varieties are found, of which a large number is not commercialised or found on markets regularly, like medlar (*Eriobotrya japonica*), avocado (*Persea americana*), fig (*Ficus carica*) and native fruits like pitanga (*Eugenia uniflora*), pineapple-guava (*Feijoa sellowiana*) and passion fruit *(Passionaria).*

Another study implemented in the same city revealed that medicinal plants are found in 48 % of the agricultural plots in the city. The species include: aloe (*Aloe sp.*), rosemary (*Rosmarinus officinalis*), anacahuita (*Schinus molle*), Indian palm (*Tanacetum, malva*) and mint (*Menta sp.*) (Barg and Litovsky 1998) and their use allows for a reduction in costs for health care.

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Mariëlle Dubbeling

Biological control of pests with flowers

In Havana (Cuba), recent research conducted by FUNAT has identified among the urban grown species, the arrow root (*Maranta arundinacea L.*), yam (*Dioscorea alata*) and capulí (*Muntingia calabura Lin.*). These species, part of the traditional Cuban diet, are not cultivated anymore in rural agriculture, but remain part of popular urban agriculture. From the sago palm, flour is extracted that is used for making semolina, traditionally served to small children and the elderly or those suffering of intestinal problems, as its starch is easily digestible. Yam, on the other hand, is preferably consumed cooked or fried, forming part of most traditional dishes. The capulí, a small tree, provides small fruits and sweets that are similar to cherries (Sánchez 2001). As part of its food security policy, the National Association for Urban Agriculture, promotes these and other species as a way to "*halt the process of their extinction and optimise their different uses*" (Grupo Nacional de Agricultura Urbana 2001). The conservation of these and other species is promoted in urban gardens in poor neighbourhoods like "Old Havana", the most densely populated area of the city.

These examples demonstrate the contribution made by urban agriculture, especially as developed by the poorer population, in relation to the conservation of urban biodiversity.

FINAL COMMENTS

Considering that the urban poor practise urban agriculture, applying mainly ecological production techniques and cultivating species and varieties that form an intrinsic part of their diet, it will be interesting to study to what extent these practices contribute to the conservation of agricultural and urban biodiversity. The relation between the production of these varieties and their impact on the poor's nutrition and health, should also be studied and the production of more traditional species promoted.

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The pressure to substitute traditional seeds for modern varieties of a supposedly better quality and yield, is strong in both rural and urban agriculture. This process may respond to an economic logic, but should be questioned, and certainly it should not be applied automatically to the urban setting. Seed conservation and exchange programmes could be established that would also improve access of the urban poor to these seeds.

On the other hand, urban ecosystems are characterised by a high concentration of built-up elements and a low presence of natural elements with little variety (as can be appreciated with the planting of just one or two tree species in urban parks). A forestation and urban greening policy that promotes the use of native species, fruit and nut trees, will generate biological diversity in the city.

Mariëlle Dubbeling

Agricultural diversity is a way to contribute to the resilience of ecosystems

The study of species and varieties present in ecological agriculture will allow for a deeper understanding of its contribution to biodiversity conservation and urban food security. Markets should open to the commercialisation of ecological food crops and the access of the urban poor to these markets should be facilitated by means of technical assistance, provision of information, social organisation and adequate legislation.

Access to and security of land and inputs and capital for ecological urban agriculture should particularly be facilitated for the urban poor. To obtain this, their active participation, and that of other (non-)governmental actors, in research and promotion of sustainable urban agriculture and environmental management is indispensable.

Christian R. Vogl

A Selbsternte-consumer proudly harvesting carrots from his sub-plot: "I had a great harvest this year!"

Cities like Vienna (Austria) are known for great monuments and wonderful art. At first glance, urban agriculture seems to be limited to public baroque gardens, some vineyards, Schrebergärten and intensive vegetable growing. But recently, clever consultants, organic farmers and "green-minded" consumers have developed a new concept of urban organic farming that allows new ways of interaction between organic farmers and urban citizens in residential areas.

Selbsternte

A New Concept of Urban Organic Farming in Austria

We thank **Mrs. Regine Bruno** - senior consultant at ***Selbsternte***®- for support in the compilation of necessary data on the history of *Selbsternte* and for the possibility to establish experimental sub-plots at the *Selbsternte* plot Hietzing. Christina Westermayer, Brigitte Vogl-Lukasser and Ludwig Maurer supported us with valuable comments to the manuscript for this paper.

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On agricultural land within the urban area, organic farmers prepare arable plots (tillage, fertilisation, fencing, irrigation facilities) and sow rows with different vegetable species. Each row holds a distinct species. About 20 species can be found at each plot. In mid-May the plots are divided into subplots of between 20 and 160 m^2. Subplots are situated in a pattern, rectangular to the direction of the rows, so that they contain 3 – 6 m of every sown species. Then subplots are rented to consumers at a price of between US $80 and $ 233 for the time between May and November. The price depends on the size of the subplot (80 – 160 m^2) and the additional management offered by the farmer (irrigation, weeding, storage during winter, additional plots for flowers and herbs, etc.). Subplots are handed over for further management and harvest to consumers in May. Harvested produce is used by consumers for their own consumption. Some consumers give harvest surplus away for bartering or as a gift to friends, neighbours or colleagues. Commercialisation has not been observed yet.

The sequence of work as described above is called *Selbsternte*, literally: "Harvest by ourselves". But *Selbsternte* is not only the technical term for the concept; it is also a registered "picture & text trademark" for the consultancy office that provides the *Selbsternte(* trade label to farmers/plots, and supports all participating farmers and consumers with necessary technical information. Consultants of *Selbsternte*® advertise the concept, are engaged in the organisation of courses for consumers on organic farming, healthy cooking and several related topics. Farmers using the trademark and receiving consulting pay a licence fee to Selbsternte®.

A BRIEF HISTORY OF HOW THE IDEA SPREAD

The first *Selbsternte*-plot, was established by the organic farmer Rudolf Hascha in *Rothneusidel* (10th District of Vienna) in 1987. He got immediate support for his idea from Mrs. Bruno from the Department for Environmental Advice (*Umweltberatung*) in Vienna. Due to positive experiences of the farmer and consumers, the Municipality of Vienna decided to establish one *Selbsternte*-plot at the municipal farm *Schafflerhof*, with the aim to further develop and advertise the idea. Due to intense public relations activities more plots were established in 1994 in *Frauenhofen* (Lower Austria), 1995 in *Erlaa* (Vienna) and *Alkoven* (Upper Austria), and 1996 in *Siebenhirten* (Vienna) by different organic farmers with the advice of Mrs. Bruno. To fully support the idea, Mrs. Bruno and Mr. Walter Resch - an organic farmer - founded the company Selbsternte(in 1998. The company itself started to manage five plots located in the cities of *Asperhofen* (Lower Austria),

Laxenburg (Lower Austria), *Mödling* (Lower Austria) and two plots in *Hietzing* (Vienna). Starting in 2002, teachers and students of the technical school for gardening, Vienna, will support the management of these five plots. All the other plots are managed by independent farmers. Recently, the University of Kassel-Witzenhausen in Germany learned about the concept. They established plots at its experimental farm and advertised the concept. As a consequence, several farmers started to establish plots, supervised by the university. At Munich, Germany, city authorities also started the concept after they learned from Mrs. Bruno, but under a different name.

Today *Selbsternte* is practised on 17 plots in Vienna or neighbouring cities with a total area of 68,740 m^2 and 686 sub-plots. Twelve organic farmers, about 1,000 consumers, the technical school for gardening in Vienna and at least two University Institutes are involved in the project.

CHALLENGES FOR *SELBSTERNTE*

During the last years there have been fluctuations in the number of farmers and consumers joining the project. Although the above description gives the impression that Selbsternte embodies a simple and easy concept, it faces all of the major challenges of urban agriculture – such as disturbances by neighbours, contamination of soil and/or plants by emission, bad accessibility of plots for technical equipment necessary for soil preparation. In addition, the relationship between the parties involved and technical questions are major challenges for a successful development of the idea. Only some challenges will be discussed here.

Relations to consumers

To manage a Selbsternte plot, the farmers involved in the project have to establish close communication with consumers, which not only helps to attract them as clients (marketing), but also provides precise and unmistakable information on necessary technical and social details (e.g. regulations on "to do" and "not to do"). Crucial is information that:

- helps to avoid unachievable expectations;
- secures appropriate social relations between consumers; and
- reassures that inputs not allowed in organic farming are not used at all.

Consumers who rent sub-plots are a very heterogeneous group of people, each of them with different ideas, wishes, levels of gardening knowledge and a different perception of problems. During the course of the vegetation period, many questions that arise are addressed directly to the farmers. In many cases these questions do not only cover technical topics matching the knowledge of farmers (time of harvest of certain species, techniques for pest management, etc.), but relate to topics such as processing, storage and cooking. In addition, farmers are confronted with problems due to the social dynamics in the plot (e.g., anger on the behaviour of neighbouring consumers).

Most farmers have only limited experience and training in the handling of these communication processes. In addition, the huge amount of time necessary for consumer relations is in competition with other activities on the farm. A successful management of *Selbsternte*-plots therefore needs a concept of communication, care and education of consumers that reduces the working load for farmers but ensures good relations with consumers.

Technical skills of farmers

The concept of *Selbsternte* needs not only proper social skills but also special technical training of farmers prior to the start of the project. Farmers, who are not horticulturists, but growers of arable crops or field vegetables are used to thinking in larger scales of agriculture, than consumers, gardeners or horticulturists do.

On an arable plot of one or more hectares, failure in sowing or germination which only has an impact on a few centimetres of a row, might have no real impact on the farmer, if it is remarked at all. At a *Selbsternte* sub-plot, missing a species or some plant individuals due to technical failures effect adverse social dynamics, difficult to handle for the farmer. Therefore an adaptation of thought, management and technical equipment to small-scale horticulture is necessary and must be included in training programmes.

Some species make it necessary to establish a plant nursery in a green house. The selection of the appropriate species/variety, time of sowing, irrigation, pest management and manipulation of the microclimate in the greenhouse turns out to be a sophisticated task for inexperienced farmers, with possible economic losses. Most farmers therefore choose to outsource the cultivation of seedlings. In these cases, contracts that specify explicitly technical details, like variety, quantity, quality and time of delivery of the seedlings – are needed.

Appointments with consumers to hand over the prearranged sub-plots must be made and all the necessary preparation has to take place within a tight time schedule. Unexpected patterns of temperature or precipitation, together with possible failures in the plans for the plot might cause adverse social dynamics. To avoid this, training and exchange of know-how with experienced farmers are necessary.

Neighbours & Friends

Neighbouring residents compose an often-neglected group. Neighbours might have interests which are contrary to the establishment or the continuous management of *Selbsternte* plots. Especially in the first phase of the establishment of plots, neighbours are concerned. They fear the construction of new urban infrastructure on the farmers' land or restricted use of public recreation areas.

Christian R. Vogl

A Selbsternte sub-plot op 80m² clearly divided by path from other sub-plots

Moreover, people who occasionally accompany authorised consumers (friends, children) are not involved in the communication process. They might be a risk if they do not follow the established regulations. Children, for example, are not careful about sub-plot borders, which are fenced by flowers, cords or small stones only. They interpret the plot as a playground. If their parents do not instruct

them well, losses of produce are possible. Friends of consumers pose another challenge. During vacations some consumers ask their friends to irrigate and harvest the sub-plot. If border rules have not been explained carefully, it might happen that these friends work or harvest at the wrong sub-plots. These are situations, which can influence relations between neighbours.

Selbsternte consultants

The training needs of farmers, exchange of experiences between farmers, accompanying education of consumers and advertising are easier to handle at a common or outsourced level rather than at an individual level. The consultancy enterprise *Selbsternte* has been founded to address these issues. Experiences show that this is not easy an easy task to meet. The consultancy of both farmers and consumers is a full-time job, day and night. Consumer demand is high on weekends and in the evening when they return from work and manage their sub-plots. Labour costs are high in Austria, especially in and around big cities. It has still not been possible to establish a fully financed consultancy service of contracted experts. Work is carried out by a few idealistic volunteers. To secure proper advice when needed, higher fees for sub-plots, higher license fees and public subsidies will be necessary. If this cannot be realised, honorary advisors that are nominated based on experience ("senior" consumers) might be a valuable solution.

EXAMPLES OF BENEFITS OF SELBSTERNTE

The proponents of *Selbsternte* are convinced that this concept leads to ecological, economic and social benefits, which will help to design a sustainable alimentation system for small, medium and large cities. The lack of scientific data on *Selbsternte* (the analysis of our data was not yet completed at the time of this paper's submission) only allows for a hypothesis on this topic:

Ecological benefits

- Reduction of individual shopping traffic and related ecological problems: consumers who rent sub-plots live close to the *Selbsternte* plot. This leads to reduced trips (duration, frequency) to shopping malls by car.
- The concept of *Selbsternte* leads to higher agro-biodiversity in the urban area, where this concept is practised. Consumers actively enrich the sub-plot by planting additional species. Rare species, exotic species and old varieties can be found in Selbsternte plots.

Economic benefits

- The monetary value of the vegetables harvested is higher than the money invested by the plot owner. Selbsternte plots help to reduce costs for organic nutrition, compared to consumer purchases at organic shops. The first results of the authors' project confirm parts of this hypothesis. In 2001, consumers at the plot *Hietzing* invested between US $182 and $228 for the rental fee and additional inputs (except for the cost of their own labour). The value of the harvested produce (calculated: yield fresh x price for the produce at organic shops) ranges between US $410 and $645.
- Local organic gardeners, retailers of tools and other providers of necessary and permitted inputs benefit from the demand of consumers, who have rented Selbsternte plots.

Social benefits

- *Selbsternte* initiates new networks of communication and collaboration between inhabitants of residential areas, who have not yet met.
- *Selbsternte* plots serve as a meeting point for people to exchange opinions, information and knowledge (including about organic gardening).
- Passers-by get involved in the idea of organic farming, urban farming and *Selbsternte* due to people showing pride in their work at the plot and speaking to passers-by.
- Work at sub-plots helps people relax, meditate and rest after everyday business.
- Parents consciously use the work at their sub-plot to educate their children about horticulture, plant species and related topics.
- Consumers get involved in primary agricultural production. They therefore understand better the risks, challenges and pleasure that farmers face.

SCIENTIFIC CHALLENGES

Until now, only a few descriptive questions regarding Selbsternte have been addressed by students More quantitative data on the organic, economic and social impacts of *Selbsternte* are needed. *Selbsternte* sub-plots can be understood as small experimental stations where consumers merge traditional horticultural techniques with urban ideas on permaculture, sustainable land use and participatory farming. Outcomes of this participatory process of innovations have to be assessed for their potential value for the improvement of urban agriculture, but also for the development of organic farming in general.

PERSPECTIVES FOR VIENNA

Urban organic farming is at the top of Vienna's agenda. The city government, a coalition of the socio-democratic and the environmentalist (green) party will convert 600 ha of its 2,000 ha city farms to organic agriculture. As soon as possible, 30 % of all produce bought by city enterprises, like hospitals or kindergardens has to be organically grown.

Further steps are planned: The percentage of organic food in municipal kitchens should rise by up to 60 %. To rent municipal land should be possible only, if the user plans to manage it organically. The administration will also discuss the conversion to organic farming with the conventional growers of grapes and vegetables. In this context, Selbsternte should develop successfully and Vienna might become a hot spot for urban organic farming.

The data presented here are based on a research project at the Institute for Organic Farming, University for Agricultural Sciences (Vienna, Austria) realised in 2001. During the course of the vegetation period, two sub-plots at Roter-Berg had been managed differently – "extensively" and "intensively", reflecting that some consumers are on average "lazy" and others "engaged"– to survey inputs (cash, labour, irrigation water, etc.) and outputs (fresh weight and value of produce). In addition, structured interviews were held with all the consumers at the Roter Berg sub-plots, and with a random sample of 50 % of the consumers at the Selbsternte plot, St.-Gabriel. Structured interviews with farmers and Selbsternte consultants were finished in December 2001, but analysis of the data is not finished yet. Final results can eventually be requested from the authors.

Ecological agriculture is more than just the absence of chemicals in farming; it involves biodiversity, spatial controls soil and water management, green fertilisers and pest controls altogether an active, diverse and integrated approach to farming (1).

HDRA

Organoponics in Havana, Cuba

Integrating Ecological Practices into Urban Garden Management in Developing Countries

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This paper is based on a project proposal to set up urban organic gardens in Thailand. The basic idea behind the project is to provide a relatively new approach to urban and periurban agriculture. It appeals to cities in the developing countries to consider ecological practices as a response to environmental and health considerations, poverty alleviation and food security (see the experience of Marilao, UAM no. 4). Cuba is an often-cited case study (see page22 and 31 in this issue) on ecological techniques applied to urban garden management. Even though the reasons behind Cuba adopting almost entirely active ecological methods are mainly "country-external factors", it is a large-scale and field applied experiment to consider and from which to learn.
The key elements in Cuba's success have been:

- political will;
- real access to public lands;
- coordination of, not competition for, local resources;
- concrete programmes to support small producers;
- encouragement of producers' sense of ownership;
- establishment of a strong extension programme;
- guaranteed affordable inputs;
- strong local demand for fresh produce; and
- development of farmers' markets and direct marketing.

Several benefits can be mentioned: food security (including self-reliance, flexibility and using new and old knowledge), poverty alleviation, sustainable resource management, improvement of public health, and others such as the example function for rural farmers, dialogue with indigenous knowledge, and the stimulation of new types of employment (agricultural activities and industries, restaurants, tourist centres, etc.).

THE TRANSITION PROCESS

A fast transition to ecological agriculture, or to a more sustainable production system is neither practical nor possible. Hill (1985) gives three levels within the transition process:

1) the improvement of the *efficiency* of conventional practices, focusing on using fewer inputs;
2) substitution of conventional inputs for ecological ones. The main purpose at this level is to minimise *damage* to the health of citizens and the environment; and
3) the redesign of the agroecosystem, considering ecological processes and principles.

While international research has been working hard on the first two steps, not much has been done on the transition to the third level. Certified ecological systems also mostly stop at the second level. Actually, reaching the third level of transition should be the final goal in the conversion process. Important operative considerations for an effective

A fast transition is neither practical nor possible

Eric Goewie

Composting in the city

transition and set-up of an ecological gardening network will be discussed below. The list is not exhaustive but presents important conditions, in the authors' opinion.

New Culture
A first crucial step is to foster a new culture, both in administrations and in private sector, related to the significance of ecological agriculture. This would concentrate on aspects like: the suitability of ecological agriculture; environmental awareness; human health benefits (for producers and consumers); productive aspects; development and trade of ecological agriculture at local and global level. It is more appropriate to supply appropriate cultural tools to individuals and to organisations, than to follow a prohibition policy.

Vocational Training and Assistance
An ecological transition strategy, which is sufficiently adapted to local conditions, requires examining the main agro-ecosystem components: soil management; water management; weed and pest management; crop management. Technical assistance and vocational training will have to be provided from an extension service. The lesson from Cuba is that it is important to create a strong extension service in the transition to urban ecological gardens.

Alternative Resource Availability
An example is the creation of public-private partnerships to promote resource centres for urban agriculture. In Cuba "Seed Houses" were created, which sell garden inputs.

Specialised Ecological Points of Sale and Certification Bodies
It would be reasonable to create ecological points of sale in accessible areas of the cities. Specialised shops and certification bodies provide important economic return in terms of new jobs and technical skills for low-income populations. These elements are crucial in donating sustainability to the urban ecological agriculture network.

CONCLUSIONS

Consciousness of what ecological agriculture means is the mainstay for a responsible transition to such an agricultural system. In practice, the transition for farmers in developing countries is aided by the fact that ecological techniques are often more responsive to local conditions of production and accessible to low-income populations. A key component in attaining sustainability in ecological gardens is to give the produce (at least for products intended for sale) an appropriate market value through the certification process. Applying ecological techniques in urban agriculture will secure more benefits than managing urban gardens in the conventional way, especially in terms of food security, poverty alleviation, public health and sustainable resource management. Finally, the transition to ecological urban agriculture would represent an important example for the local agricultural sector, and may influence acceptance of products at international level.

Note
1. source: http://www.oxfamamerica.org/cuba/reformingag.pdf

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Adoption of Sustainable Agricultural Technologies: Economic and Non-Economic Determinants

Adapted from Trevor Young: Global Environmental Change Programme Briefings number 21, July 1998


Eric Goewie

Consumers want information about the products they buy

The environmental and economic problems associated with conventional intensive farming lead many farmers to seek alternative approaches to agricultural production. But what motivates them to change their farming methods? A study has been conducted looking at farmers in the UK, Spain and Brazil to discover the factors which determine their choice of agricultural technology and why some adopt sustainable production techniques. Organic farming was chosen as the basis for the empirical analysis used throughout the project.

The major findings to emerge were:

❖ The attitudes and opinions of organic farmers in Spain and the UK were markedly different from those using non-organic methods, while in Brazil these differences were minimal. Organic producers, on average, were younger, managed smaller holdings and were less likely to be mainly reliant on income from agriculture than their conventional counterparts. Non-economic factors played a leading role in the adoption decision in the European samples, but not in Brazil.

❖ In Brazil and Spain, organic producers were typically better educated than conventional farmers. In the UK and Spain, a much higher proportion of the organic interviewees were female and the household size of the organic producer larger.

❖ Attitudes and beliefs were found to be crucial in the UK and Spain but not in Brazil. Only in the UK was gender statistically significant and here it exerted a powerful positive effect.

❖ It is important to target potential adopters of sustainable practices in the first 4 or 5 years of their farming management. The probability of transition falls after this period. In the UK, the likelihood of farmers turning towards organic methods has increased since 1986, an increase which coincides with the establishment of the Organic Advisory Service.

❖ Some conventional producers already use many of the techniques associated with alternative agriculture - using fewer chemicals on their land - but exhibit few of the attitudes of the organic sample. It may be possible to induce these producers to change their farming practices but not until they feel that organic farming represents an economically viable option.

transition and set-up of an ecological gardening network will be discussed below. The list is not exhaustive but presents important conditions, in the authors' opinion.

New Culture
A first crucial step is to foster a new culture, both in administrations and in private sector, related to the significance of ecological agriculture. This would concentrate on aspects like: the suitability of ecological agriculture; environmental awareness; human health benefits (for producers and consumers); productive aspects; development and trade of ecological agriculture at local and global level. It is more appropriate to supply appropriate cultural tools to individuals and to organisations, than to follow a prohibition policy.

Vocational Training and Assistance
An ecological transition strategy, which is sufficiently adapted to local conditions, requires examining the main agro-ecosystem components: soil management; water management; weed and pest management; crop management. Technical assistance and vocational training will have to be provided from an extension service. The lesson from Cuba is that it is important to create a strong extension service in the transition to urban ecological gardens.

Alternative Resource Availability
An example is the creation of public-private partnerships to promote resource centres for urban agriculture. In Cuba "Seed Houses" were created, which sell garden inputs.

Specialised Ecological Points of Sale and Certification Bodies
It would be reasonable to create ecological points of sale in accessible areas of the cities. Specialised shops and certification bodies provide important economic return in terms of new jobs and technical skills for low-income populations. These elements are crucial in donating sustainability to the urban ecological agriculture network.

CONCLUSIONS

Consciousness of what ecological agriculture means is the mainstay for a responsible transition to such an agricultural system. In practice, the transition for farmers in developing countries is aided by the fact that ecological techniques are often more responsive to local conditions of production and accessible to low-income populations. A key component in attaining sustainability in ecological gardens is to give the produce (at least for products intended for sale) an appropriate market value through the certification process. Applying ecological techniques in urban agriculture will secure more benefits than managing urban gardens in the conventional way, especially in terms of food security, poverty alleviation, public health and sustainable resource management. Finally, the transition to ecological urban agriculture would represent an important example for the local agricultural sector, and may influence acceptance of products at international level.

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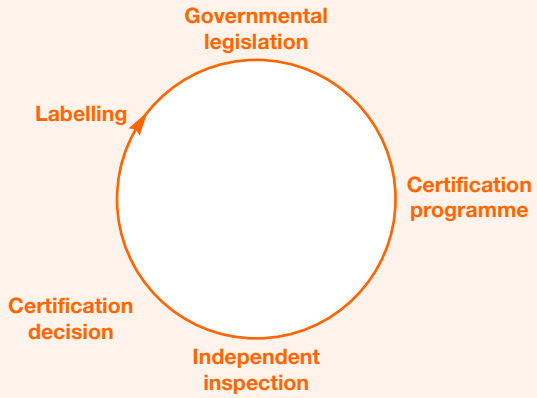
CERTIFICATION

Consumers are increasingly calling for safe and healthy food and have more knowledge about this. Once convinced, they are more likely to accept higher prices for such food. Producers should therefore thrive to prove that the quality and safety of their commodities is to consumers' standard. Labelling is a strong tool to do so. But what is labelling? And how to certify that the label does what it promises? Certification is the answer to this.

A product becomes certified, when it fulfils all criteria and standards mentioned in a certification program. Certification is nothing else than a concrete translation of legislation concerning health and environmental protection. Such a program assists inspectors to control production processes and commodities. Inspection should be independent and controllable for everybody. Once a producer has been certified, he or she is allowed to sell under a label.

The following figure shows the process of certification and labelling.



Most countries have independent inspection organisations. The producer pays for the inspection. When prices are too high, which is generally true for small holders, then certification of a co-operation of producers is possible. The cooperation receives the label and producers bring their products on the market under that cooperative label. The International Federation of Organic Movements (IFOAM) assists producers in getting production certified.

Goewie, unpublished 2002

Certification or some kind of institutionalised trust in relation to ecological agriculture, especially in the Southern countries deserves more attention. One could learn a lot from the experiences of informal, trust-based seed exchange and seed systems and the many failures of formal, certification based seed programs (Prain, personal comments).

Eric Goewie

Ecological market in Brazil

CAMPESINO EXPERIENCES IN COMMERCIALISATION, ORGANIC CERTIFICATION AND FAIR TRADE

Exchange of experiences at the Latin American Meeting

The Latin American Meeting for the Exchange of Experiences in Commercialisation, Organic Certification, and Free Trade was held in Quito from October 23-26, 2001. The meeting was organised by the Communication Programme of the Agroecology Movement of Latin America and the Caribbean (MAELA).

The meeting ratified that the commercialisation and certification of agricultural, animal, forest, and handicraft products is necessary for small- and medium-sized agricultural and animal husbandry producers in all of Latin America and the Caribbean. In addition, it is a topic of great interest for NGOs, cooperating agencies, financial entities, and regional governments. Themes such as the development of business organisation of farmers, market intervention, quality control, appropriate technologies, and financing were presented as part of the meeting.

Main Conclusions

The main conclusions were:

❖ *Business Organisation* The business vision should include adequate administrative systems, cost-efficiency, and a commitment to social justice. The organisation should also deal with issues external to the organisation.

❖ *Market* A direct and trusting relationship between the producer and the consumer or the establishment of networks of commercialisation which avoids long and inequitable intermediary chains, are an important factor for success. In addition, it is possible to close and integrate chains of production to provide incentives for the exchange of products. The ongoing search for new markets lends support to the sustainability of the projects/processes. The growing external demand for agro-ecological products provides an important opportunity, but it is important to realise that the markets for such products are different in different countries and parts of the world.

❖ *Quality Control* The establishment of local quality control systems creates close local links between society and the producer. However, with the perspective of exportation in mind, the creation of a global quality control system should be pursued. As part of such a system, training and external supervision would be necessary. At the same time, it is also very important that a system of global controls would take into account regional differences and the different types of producers involved.

❖ *Technology* All campesino commercialisation processes, programmes, or projects should make use of appropriate production technologies. This implies technologies that reduce environmental impacts and that are cost-efficient. The use of appropriate technologies should provide aggregated value to the products and serve as a factor in certification. This external technical support should be encouraged or provided by the state. However, it is also possible to seek this support from NGOs, cooperating agencies and other organisations.

❖ *Financing* The business vision should emphasise funds for recapitalisation. This will support the future sustainability of initiatives or projects in agroecological production and commercialisation. There should be a management of funds for alternative financing, without the characteristics of conventional financing (high interest rates, need for guarantees). A strategy that gives good results is one that creates local rotating funds, credit unions, or community banks.

❖ *Environment* Commercialisation should take into account fair relationships between environmental and social quality.

Producers and consumers should receive information and education about the potential and actual environmental impacts of their activities.

Internal quality control should take the environment into account as a strategic input for the productive system. Environmental sustainability should therefore be considered in order to receive certification.

Guillermo Travez

The organic approach to food production is considered by Ethiopian decision-makers as one which leads to poor yields, is backward and a reason for decaying farming systems. However, the reality is completely different.

Yilma Getachew

Hands on training on bio-intensive gardening for trainers of trainers in Wolliso Town

The Living Garden

a Bio-intensive Approach to Urban Agriculture in Ethiopia

Food security by definition is a function of providing enough quality food or the ability to purchase food. Producing only cereals using chemical agriculture cannot satisfy these functions. Organic agriculture emphasises diversity and provides both enough and quality food which generates income to purchase other food. The diversity makes the option more resistant to problems of climate change, drought or flooding, vulnerability and poverty. It further provides the family with a year-round supply of food and income together with a year-round source of employment.

Ethiopia is blessed with natural resources conducive to organic food production. Its soils are fertile and living, and its water little polluted by salts and pesticides. Also, much traditional knowledge is available.

FACTORS CONTRIBUTING TO THE NEED FOR URBAN AGRICULTURE IN ETHIOPIA

Urban areas have become an important new frontier for food production both for urban and rural settings. As the population increases amidst shrinking farmland, the arable land per capita for producing food is becoming very small, and demands diversification and intensification of farms and gardens. The following factors contribute towards the need for urban agricultural development in Ethiopia.

Ethiopia's present population is estimated at 65 million (CSA 2001). Figures indicate a fourfold increase in just 100 years. Farmlands are consequently fragmented proportionally to population increase. Today, farmlands in rural Ethiopia have been reduced to less than half a hectare per family, making it more of a gardening than a farming venture.

Two other forces that are putting pressure on the available land are city expansion and degradation. In Ethiopia, urbanisation has grown threefold in the past three decades (CSA: 2000). The economic and health problems resulting from malnutrition have caused great concern amongst planners and decision-makers.

That organic agriculture is a valid strategy for both stimulating economic growth and developing markets can be verified from my experience in promoting urban agriculture in three towns. Families in one town keep dairy cows either to supplement their meager salaries, or are totally dependent on milk and dung sales as their sole source of family income. In the other two towns, the main income source is the production of Irish potatoes and sweet potatoes together with a small amount of assorted vegetables, not only selling to local markets but also to markets within a 200 kilometer radius. In this way, organic agriculture in an urban setting can both be a tool for community building (health and vitality) and development (income generation and marketing of scarce nutritious food).

AVAILABLE TECHNOLOGIES (THE BIO-INTENSIVE GARDENING APPROACH)

The developing world in general and Ethiopia in particular badly need for technologies that are cheap, simple, locally resource-based and that can at the same time produce food sustainably. If we let the forces of nature function with little interference, the output can be very satisfying and we can let nature do the entire job.

Bio-intensive gardening is a method that capitalises on these forces of nature in all phases of development: growing, fertilisation and pest control. Below, I will primarily discuss the experiences gained at my workplace, which have focused on the bio-intensive gardening method. This method has four important components:

- production techniques;
- natural fertiliser techniques;
- natural pest and disease control techniques; and
- small-scale water harvesting techniques.

Yilma Getachew
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The production techniques include:

- Biodynamic French Intensive method;
- FAITH gardening method; and
- container gardening methods.

The Biodynamic French Intensive Method

This method, according to Jeavans (1982) is a combination of biodynamic techniques developed in Germany, and the French intensive techniques developed in France.

The Biodynamic French Intensive method is a form of organic agriculture comprising three basic principles. The first principle is to grow plants so close to each other that when they mature, their leaves will just barely touch. This creates a situation in which the microclimate and the living mulch reduce weed growth and conserve moisture. The second principle is the use of raised planting beds (60 cm deep). These plots have loose soil that allows for air, moisture and warmth together with sufficient organic nutrients that help roots to properly penetrate the soil. The third principle is to feed the soil (and not the plant) by using organic fertiliser and natural methods of pest control. In short, the method is less dependent on expensive external inputs, is space intensive, water conserving, depends on family labour only, and creates minimal pest problems. Families practising the method are likely to have well-balanced nutritious food, a better income from products that are produced without risks.

The FAITH garden method

There are numerous organic wastes from our kitchen and gardens that are not recycled to produce more food. Such wastes include: weeds, grass, leaves, kitchen wastes (peels, organic refuse, eggshells), livestock manure, ash, hedge clippings, hair trimmings, chewed sugarcane, etc.

The FAITH method includes basket gardening to make use of these wastes to produce food. This technique keeps bottomless baskets on top of a hole (30 cm diameter x 30 cm depth) dug into the ground. All kitchen and garden wastes are dumped into the hole. At the same time, desired vegetables and fruits are planted about 20 cm away from the basket. Through their root systems, the plants extract moisture and nutrients from the fermenting waste. At the end of the process, the method produces organic food and fertiliser, conserves water and protects plants.

Container Gardening Method

Container gardening includes the use of barrels, tires, hollow blocks, plastic bottles etc. In a small garden, even a paved area can be used to grow a number of different crops. This generally means growing the plants in containers. Any wall or fence can also be useful.

A suitable container is anything that holds soil, as long as it meets the following requirements: not contaminated, provide ample room for roots and excellent drainage. Tomatoes, lettuce, onions, beans, strawberries and herbs are just a few of a quite extensive list of plants that respond well to container growing and will decorate your veranda, patio, window sills etc.

MANAGEMENT OF BIO-INTENSIVE GARDENS

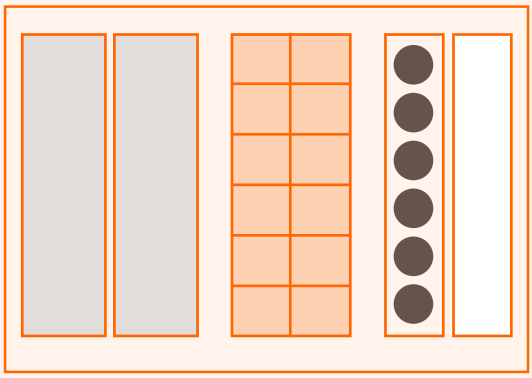
Apart from the production techniques the bio-intensive garden practitioner needs to fertilise his plots, and apply pest controls and rational water use. The following general statements enumerate the available choices.

Soil fertility

Sustaining soil fertility the natural way is the most important component in the organic farming/gardening strategy. There are a basket of choices of organic fertilisers that can be categorised as manure-based, legume-based or biomass-based. *Manure-based* fertilisers include aged manure, manure tea, earthworm casting, cow-horn manure, etc. The *Legume-based* fertilisers include intercropping with legumes (nitrogen-fixing-plants like peas, beans, leucaena, sesbania, etc.). *Biomass-based* fertilisers include compost (pit compost, heap compost, basket compost and container compost), stinging nettle manure, etc.

Additives like wood ash, bone meal, eggshells, etc. contribute greatly to organic fertilisation, by producing potash, phosphorus, calcium and iron if we allow the soil micro-organisms to work on them.

Figure I: Bio-Intensive Garden Module



The components of the module include:

- 18m² Biodynamic French Intensive plots
- 12m² FAITH garden units of 12 plots
- 6m² Container garden units that combine tires, barrels, hollow blocks, ring culture and hydroponics.
- 6m² Utility area (seedling production, pesticides, compost production, etc.)
- 28m² path

It is not a must for a family to adopt all the technologies included in the module. In areas where land space is not a limiting factor, the Biodynamic French Intensive Method is popular and highly productive. In areas where housing is highly congested, the barrel garden is popular, while the FAITH garden is popular in areas where there are plenty of organic solid wastes.

Several opportunities and constraints were recorded during the promotion of the bio-intensive garden venture, a few of which are discussed below. However, generally speaking the approach has been accepted as one means of food production and income generation addressing all sectors of the communities (women, youth, elderly, etc.) In the final analysis, the ventures can be seen as an important means of addressing community building and development.

Pest and disease controls
There are three approaches to keep pests and diseases at bay, in a natural way. The first step is to have a strong healthy plant growing in a healthy living soil that will be able to build resistance. Second is to fight harmful insects through beneficial insects and animals such as ladybirds, praying mantis, wasps, lizards, birds, etc. The third is to apply natural pesticides such as pepper, tobacco, pyrethrum, stinging nettle, etc.

Rational use of water
There are three major categories of activities aimed at the rational use of water. The first is harvesting water during the season of plenty, for use when water availability is being stretched - roof water harvesting, ponds and artificial lakes are some examples. The second is to conserve the available water (mulching, shading, precision planting, etc). The third is recycling water or reusing it for a second and third time depending on your previous use.

EXPERIENCES IN PROMOTING BIO-INTENSIVE GARDENING IN ETHIOPIA

Below is a description of the module developed on the basis of the experience I gained in my ten years of work in the promotion of urban agriculture in Ethiopia. Relying on the natural resource base, simplicity, affordability and productivity are the virtues to which the module is designed to respond towards greater sustainability, replicability and equity.
To date, 800 families have participated directly in the training programmes on bio-intensive gardening. Replicability of the technologies amongst the communities is reported to reach 8,000 families. The trainees are a mixture of male, female, urban and rural dwellers. A typical module for the demonstration training plot is about 70 m^2 (see figure below).

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Policy environment
Illegal land occupation, use of contaminated downstream city rivers and the absence of urban agriculture in city planning were forces that have discouraged this venture in Ethiopia. However, through years of campaigning by environmentalists and agriculturalists, urban agriculture is now recognised by policy-makers and included in the master plan for over four cities and towns, and others are following suit.

Urban dwellers' dilemma
The majority of urban dwellers in Ethiopia shy away from working with the garden. This is because the activity is considered to be a job for the poor and uneducated. Education is considered as the means to avoid heavy farm drudgery. This is the number one problem we the promoters of urban agriculture encounter among the educated youth. However, there have been substantial changes in attitude after the training programme.

Market Problem
The market is a real problem in the Ethiopian rural setting as far as vegetables and fruits are concerned. This is due to accustomed diets being predominantly cereal-based, coupled with the products being perishable. The overall poverty situation contributes to poor consumption and production of food rich in micronutrients.

Replicability
The town of Ankober provides an example to illustrate the potential of replicability. Only ten members of the community were selected for instruction on training of trainers, and another 90 families were provided with inputs (seeds and tools). In just six months, the number of families practising bio-intensive methods reached 1,000. The most important reason for this is that people can believe it for themselves when they see the demonstration and practitioners' plots. The only expense is seeds as they already have tools. The income generated is substantial. All other inputs needed are locally found (fertilisers and pesticides, etc.).

School of Urban Agriculture
As mentioned above, training in the bio-intensive approach to urban agriculture began in Ethiopia ten years ago. Ever since then, several training sessions were held that addressed youth clubs, women's clubs, pensioners' associations, extension agents, farmers, school teachers and students, NGO workers, etc. In all cases, the training sessions utilised little hands-on practical sessions for lack of permanent demonstration plots. Thus the need for establishing a school of urban agriculture surfaced, an idea supported by several NGOs and governmental offices (GOs). At present, the proposal for the initiative has been submitted to the government, identifying the site of the school as well as the technologies to be promoted (which are partially reflected in this article). The proposal also requested for legalisation of the school and is awaiting a favourable reply in the near future.

RECOMMENDATIONS

- An estimated 16 national and international NGOs and GOs in Ethiopia together with thousands of small gardeners all over the country have voiced their desire for a training school on urban agriculture. There are 18 such schools in Africa but none in Ethiopia. Such a school should be supported by government policy, strategy and action. (The author is deeply involved in these activities at present).
- Urban agriculture is accepted as a policy by the Addis Ababa city administration and even the city planning has included land set aside for the purpose. What is not well understood by the authorities, however, is the awareness of the potential of the organic option to urban agriculture and available technologies. Seminars, workshops and publications need to be organised to address this issue.
- The poverty eradication strategy of the country needs to include urban agriculture as among the important tools in the fight against poverty in urban areas as well as in the farmyard gardens in the rural areas.
- In general, strong support and attention towards the promotion of the bio-intensive gardening approach to urban agriculture will be an important step in addressing issues of hunger, unemployment and those pertinent to youth, women and vulnerable sectors of society. Equally important, urban agriculture's contribution to reducing poverty and unemployment can have important consequences in subsequent phases, ultimately helping in the fight against crime and disease.

Tackling Permaculture in the UK

The term "permaculture" is derived from Bill Mollison's vision of *permanent agriculture*. Permaculture is about producing food in an environmentally sound way. It is concerned with people growing their own food on their own land and using it for themselves, their immediate family and possibly the local community. This is certainly the impression we gained from examining permaculture food projects in Britain (detailed in Sherriff 1999). Since its inception permaculture has developed and diversified. It is essentially an approach to designing productive whole systems, through the maximisation of the interconnectedness of elements, which has an ethical foundation in sustainability and a scientific basis in ecology. The key characteristic is that it sets out to maximise beneficial relationships through the effective placement of elements (Mollison 1991).

One thing to note is that permaculture is quite different from organic agriculture. According to European Standards, and policed by organisations such as the UK Soil Association, organic agriculture is basically agriculture without pesticides and fertilisers, without genetically modified crops, and with compassionate animal husbandry. Permaculture will often look like organic agriculture, and the end result of a permaculture design may qualify for organic certification, but there are a number of important differences. Organic agriculture is a production method: permaculture is an approach to design.

Permaculture places more emphasis on cycling of energy and resources locally; it places greater emphasis on the maximisation of interconnectedness; **it is creative rather than regulatory**; it emphasises the use of perennials; self-regulatory systems are encouraged; and community trading structures take a clear priority over global trading. The latter is particularly striking. Whilst organisations such as the UK Soil Association should be congratulated for campaigning for more farmers' markets and other local trading initiatives, you can still buy cabbages classed as organic that have been flown hundreds of miles for each of the processing, distribution and sale stages. This is in marked contrast to, for example, Hardy's Field in Lincolnshire, which has sold carrots through a Local Exchange Trading Scheme.

If urban agriculture is about places being self-sufficient, then monocultural cropping is not appropriate. Permaculture is about crop diversity. Where self-sufficiency is not the aim, permacultural trade systems extend the scope of the project from the individual to community. Here, the Local Exchange Trading Scheme (LETS) maximises the interconnectedness between disparate elements in the community with local people offering skills or products that others require, and, in exchange, they in turn offer another skill or product. The diversity of permaculture food suits local schemes, and the financial security of the trading methods enable a greater variety of crops to be grown and creative risks to be taken. In permaculture, growing food is never seen in isolation. For example Becontree Organic Growers in Dagenham, East London, develop the local economy through LETS, work with a local university, and with colleges and conservation groups. Becontree Organic Growers are able to fulfill the criteria of Local Agenda 21 through: reusing and recycling resources, saving energy, cultivating local land, monitoring the local environment, green building and planning, community development and education, and developing the local economy.

Permaculture, by definition, seeks where possible to utilise resources frugally. This is important in urban agriculture for two reasons: it enhances its sustainability; and it makes it inexpensive to practise. The latter is particularly important where urban agriculture is proposed as a way to regenerate deprived areas. Within permaculture, resources are often recycled. From butts to collect rainwater, to compost toilets which turn human excrement into usable fertiliser, the efficient use and reuse of resources is central to permaculture's scientific and ethical foundations.

Artificial fertilisers and pesticides do not feature in permaculture. Instead soil health is maintained through a number of holistic techniques including polycultural planting and green mulching, and to deter pests through biodiverse planting and the encouragement of predators to frequent the ecosystem. Legumes, such as clover, can provide a crop with nitrogen, for example, and a biodiverse garden confuses pests and is therefore less vulnerable than a monoculture.

Permaculture produce is likely to have a higher nutritional value than conventional crops, due largely to the health of the soil (Sustain 2001). It follows that any urban agriculture initiative seeking to supply communities with a healthy alternative to the conventional would do well to follow the chemical-free and soil-building principles of organic agriculture. Permaculture provides a way of creatively applying these principles in diverse, community-centered projects.

In conclusion, permaculture is valuable as an approach to urban food production and consumption, it provides a useful methodology for food growing and for trading food locally and it should be given consideration by all those with a stake in urban agriculture.

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Community **Backyard Farming** in Cuba

The Community Patio project in Havana, Cuba encourages the practice of urban agriculture, utilising permaculture techniques (see box and article on page 31) in small spaces in the home (patios, balconies, rooftops, gardens, terraces, etc.) producing food, medicinal plants, spices and ornamental plants. It further includes environmental education and capacity-building for neighbours and other interested parties through periodic workshops, courses and conferences.

This project began in March 1998, inspired by a course given by the Dr Antonio Nuñez Jiménez Foundation for Nature and Man in June 1997, along with several months of practical training.

The project is attempting to educate the population about the importance and the benefits of utilising permaculture techniques, encouraging environmental awareness in the community. It aims to create ecological zones in the city, to improve quality of life, link organisations and institutions to the community to help promote and care for the gardens and green areas. Occupational therapy for senior citizens from the Nursing Home of the Salvador Allende Hospital also forms part of its activities.

The project beneficiaries are many. First are the 32 families directly involved. Besides this, a family medical practice that serves 120 families, a "círculo infantil" (similar to a pre-school), two elementary schools, and a group of workers and elderly patients from the Salvador Allende Hospital (Covodonga) have been incorporated into the project, along with their respective gardens. This makes for a total of 36 gardens and plots, with approximately 940 people of all ages benefiting from what is produced in these gardens. This group is made up of housewives, senior citizens, retired persons, doctors, professionals, community leaders, and children and youth from the community. The participation of women in the project is key.

The project has been extended to other zones of the city, such as the San Isidro neighborhood in Old Havana, Carmelo in the Plaza of the Revolution, and Corea in San Miguel del Padrón.

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We welcome any support and shared experiences

BENEFITS

Besides the production of food, and other plants, and the provision of an environmental education, another benefit of this project is that it promotes the recycling and reuse of solid wastes. Significant amounts of organic solid waste generated in the home, such as food wastes, can be reused for vermiculture, composting, animal feed, etc. In addition, these activities provide a means of increasing and improving human relations between the people participating in the project by means of seed exchanges, the experiences that take place in their gardens, and helping people with physical disabilities start gardens. The project also has economic benefits for low-income community members.

The link with the physical and mental health of participants is promoted through the production of medicinal plants and education in how to use them correctly, creating a natural alternative in the treatment and prevention of various ailments, especially among the elderly. Work is also being done to promote good eating habits among the population. Finally, the project conserves plant varieties that are rare or in danger of extinction.

HOW TO CREATE COMMUNITY PATIOS

❖ First observe the neighbourhood to locate people with gardens as well as natural community leaders and leaders of community organisations.
❖ Organise a meeting in which the objectives are explained of the project and how it would benefit community members personally as well as the community as a whole.
❖ Various workshops can be conducted with community members to explain the project in more detail.
❖ Begin with small activities that create a positive impact and lend credibility to the coordinating group. Such activities might include: supporting a garden, creating a permaculture group with children in a local school, etc.
❖ Invite members to become part of the coordinating group so that they feel that they are part of a team, as well as to train them on environmental themes, permaculture, and how to conduct an environmental baseline study in the community.
❖ Conduct a participatory baseline study to detect problems and opportunities in the neighbourhood.
❖ With this information, embark on a process to plan environmental actions to improve the quality of life in the neighbourhood, including the promotion of organic gardens in homes, schools, medical clinics and businesses.
❖ As part of the actions of the project, conduct workshops on how to preserve food using simple techniques and how to use compost and vermiculture to recycle domestic wastes. Look for locally-appropriate ideas: we encourage people to raise "cuy", a small Andean animal that is easy to raise and that produces meat that is high in protein.

This is not a recipe that can be applied blindly. Each neighbourhood has its own dynamic and the group that coordinates the programme may decide to move in a different direction from what we had envisaged. We respect the decisions of the coordinating group.

Permaculture Techniques
There are many different ways of looking at permaculture, whether as a practical system for growing vegetables, a form of designing a garden, or a way of living. Permaculture helps us to understand how we can take control of our lives. Its concepts have been developed by means of a system of ethics and principles. Permaculture is based on copying nature, or working with it and not against it. It makes use of the knowledge already accumulated by human beings, and when necessary, incorporates new technologies.

A typical phenomenon of urban agriculture is its specialisation in perishable products. In Kumasi, Ghana, 90 % of all lettuce and spring onions, and about 75 % of the urban fresh milk consumed is produced in the city (Cofie et al. 2001). Similar high contributions from urban agriculture are also reported from other cities in sub-Saharan Africa (Armar-Klemesu 2000). Vegetables for home consumption are often produced in backyards but market production takes place on inner-city lowland areas, close to stream and drains or in the periurban environment. These farming systems provide some of the most output- and correspondingly input-intensive ones in sub-Saharan Africa.

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Dangerous use of pesticides

Perceptions of Organic Agriculture

by Urban Vegetable Farmers and Consumers in Ghana

Eight to eleven lettuce and spring onion harvests, alternating with three cabbage harvests, all in one year, are common for an urban farmer in Kumasi. To maintain this high production level on generally marginal city soils, access to water in the dry season as well as high amounts of seeds, manure/fertilisers and pesticides are required. Increasing scientific attention towards the possible health hazards for consumers and urban farmers (Birley and Lock 1999, Mensah et al. 2001) has paved the way for local risk assessments and the promotion of organic farming alternatives.

New projects have to target the consumer

The Ghana Organic Agriculture Network (GOAN), for example, supports actively biological production methods, especially Integrated Pest Management (IPM) and compost. Other organisations, such as the International Water Management Institute (IWMI) started to look for risk-reducing options also beyond the farm level, i.e. at markets and households, as it became obvious that the adoption rate of biological farming methods remained very low among vegetable growers. In fact, although traditional or indigenous pest control methods are well known for staple crops, they could so far not convince urban farmers (1).

WHY SO LITTLE PROGRESS?

Irrigated urban vegetable production is a highly market-oriented business with high revenue fluctuation depending on input availability, exact timing to meet the optimal demand/supply ratio, and best marketing channels. Farmers have to be flexible, innovative, but take care of their profit margin. It happens too often that the breakeven point will not be reached.

With respect to innovations, farmers are likely to adjust their production system only when returns to land and labour increase simultaneously (Ruben, 2001). In labour intensive cash crop production systems, like irrigated urban agriculture, it would be crucial that additional income derived from an innovation favourably compares to labour's opportunity costs. As urban vegetable farmers spend an enormous time on irrigating their fields with watering cans (600-1600 liter per m^2 and year), any opportunity to rent motor pumps is greatly honoured. The opposite applies to labour-intensive compost-production as farmers working with GOAN reported.

Awareness of health risks, on the other hand, is low and does not appear to be a motivating factor to change practices. An example is the tomato production in Akumadan, Ghana, with high pesticide application and obvious health impacts at least on the farmers - from headaches to impotency (Mensah et al. 2001). Farmers do not only expose themselves to pesticides by not wearing protective clothing, etc., but also by opening pesticide sachets with their mouths (see photo) or testing appropriate pesticide mixtures by putting a finger in the cocktail and then in the mouth.

In this study area, IPM campaigns were accompanied with research that showed that tomato farmers using biological pesticides can obtain similar production figures than those using chemical pesticides (Appiah 2001). However, IPM decreased returns to labour and biologically produced toma-

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toes appeared to be less beautiful, thus did not meet Premium Quality requirements to attract peak prices like conventional tomatoes. This is interesting as tomatoes in Ghana are mostly used for stew. In neighbouring Ivory Coast, tomatoes are mostly used for salads, and therefore the "beauty" factor is probably even more crucial.

This combination of low problem awareness combined with insignificant economic benefits but a (perceived) higher risk of failure are reasons enough not to switch to biological farming.

On the other hand, and as mentioned above, all farmers interviewed in Kumasi, Accra or Tamale, showed a high level of flexibility, specific for urban agriculture, and adaptability to changing market demands and prices (especially in the choice of crops). This could open the door for organic farming and also initialise related in- and output markets. When expatriates living in Kumasi expressed a demand for crops produced without pesticides, some urban farmers quickly closed this niche. Higher revenues were the incentive. But this situation is still the exception. As long as there is no large-scale recognition of organic products and related consumer demand, even those farmers willing to change their production only experience frustration.

CONSUMERS' POINT OF VIEW

Balamatti (2000), who interviewed consumers in Kumasi, reported that more than 70 % of them showed a positive perception towards organic products though most of them were not aware of such an alternative. To throw some light on this, the subject was addressed in IWMI's household surveys conducted in different Ghanaian cities, however avoiding multiple-choice questions and any bias towards advantages or disadvantages of pesticides and fertilisers or different appearance of crops in terms of size or skin (see Table 1).

The results indicate a low level of awareness. About 50% of the urban households were willing to pay on average 80 % more money for organic food. Ten percent were indifferent and 40 % were of the opinion that paying approximately 50 % less would be appropriate. All three groups did not show any significant difference in education or income (IWMI, unpublished).

The reasons for wanting to pay less were, for example, that there is little logic in paying more for a product, which is produced without costly inputs, or there is no reason to pay more for a product that does not look attractive. Consumers asked in another survey also revealed that farmers as well as traders could not be trusted for selling genuine "clean" vegetables (Nurah 2001). Moreover, although organic production might reduce farm-related health risks, Maxwell et al. (1999) stressed the potential of post-harvest contamination through food handling in markets as another source of health risk. An example of this is freshening on-market vegetables with contaminated water or the use of the same bucket of water over the whole day for sprayed and untreated food.

POINTS OF INTERVENTION

As the organic farming strategies applied so far in Ghana do not appear to be economically interesting, new projects have to first of all target the consumer to catalyse market demand. Awareness training supported by labelling and education/information campaigns (e.g. by the booths selling organic food) could be provided through electronic media, especially local radio and TV channels to reach households, while seminars might target consumer groups and associations. Secondly, market traders (in our study area mostly women) should receive training in safe vegetable handling to avoid post-harvest contamination. This, however, will require in many cases better market facilities - especially access to clean water and sanitation. Finally, a significant low awareness and/or ignorance of pesticide-related health hazards have been observed especially among periurban tomato farmers in Ghana, despite a range of acute and chronic poisoning symptoms (IWMI, unpublished). This will also require more attention though it might "only" result in safer pesticide handling and not in organic farming. Subsidies for organic pesticides, but even more importantly their reliable availability throughout the year, might facilitate their adoption. A framework for a Ghanaian Crop Protection Policy with emphasis on reduced health and environmental risks is available (Gerken et al. 2001).

CONCLUSIONS

The key constraint to organic farming seems to be lack of education or awareness at the consumers' end on pesticide-related health risks and the correspondingly low market demand and economic incentive for the farmer. The question, however, is not only if the African consumer is able to perceive the advantages of biological production but if he/she can and will prioritise them in a situation of financial constraints (poverty), hunger and other more obvious health and environmental risks such as no or unsafe water supply, malaria or cholera.

Table 1: Household surveys on consumers' willingness to pay for tomatoes produced without chemicals (Source: IWMI, unpublished)

Willingness to pay	Accra (n= 994)	Kumasi (n= 838)	Tamale (n= 465)	Average pay more/less
Pay more;	48	56	52	+ 80 to 82%
Pay less;	41	36	42	- 43 to 50%
No opinion;	11	8	6	

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Note

1) Until now, Ghana's tomatoes show Lindane levels of up to 500-1000 ppm while the No-effect-level is 25 ppm (IWMI, unpubl.).

During the time of the Soviet bloc, Cuba was highly dependent on imports for a high percentage of its staple foods. The agro-industry also relied heavily on imports: thousands of tons of fertilisers, herbicides and pesticides, as well as animal feeds and petrol for machinery and transport. This was brought to a halt by the collapse of the Soviet bloc in 1990/91. Within a year, the country lost over 80 % of its foreign trade. Hunger and malnutrition returned to the island on a huge scale and Cuba faced a massive economic crisis.

HDRA

Gardening Brigade volunteers working in a school garden

Cuba's Organic Perspectives

This article is a shorter version of the article published in New Directions Magazine in 2001

The U.S. responded to these events by tightening the blockade, hoping to speed up the "inevitable" collapse of the government. During this period, the government put in place measures to produce food for its people. The enormous task facing them was to produce twice as much food with less than half of the chemical inputs.

A TRULY GREEN REVOLUTION

Pushed by the loss of imported agrochemicals and pulled by the growing awareness of environmental damage caused by conventional agriculture, the Cuban government looked to sustainable, organic methods of cultivation to resuscitate and develop domestic food production and make better use of the country's resources. A few agricultural scientists had been carrying out research on and advocating sustainable methods since the 1970s, and it is to these people that the government turned for advice.

Large tracts of land were switched from export-oriented cash crops to food crops. Government incentives encouraged unemployed people in large urban centres to move back to work on the land. Oxen were reared in large numbers to replace tractors for ploughing and transporting crops. Organic methods such as crop rotation, composting, increasing diversity of crops grown, encouraging natural predators of pests, soil and water conservation were implemented. Research institutes were set up to develop more sophisticated techniques such as worm composting, soil inoculants and bio-formulations. Over 200 bio-pesticide and biological control production centres were set up, run by university graduates, the children of the local farmers. By 1996, by-laws in Havana allowed for only organic methods of food production.

INCENTIVES FOR ORGANIC URBAN AGRICULTURE

For the vast majority of urban Cubans, food came from a grocery store or supermarket. Growing food was considered a part of campesino (peasant) life, left behind on the move to the city. To encourage small-scale food production in urban areas, the government distributed unused land to anyone who wanted to cultivate it. Havana, with 2.2 million people, a fifth of the island's population, was a priority area for urban food production. The provincial Ministry of Agriculture set up an urban agriculture department to give support to the new gardeners. This was delivered through outreach workers, or extensionists, based in each of the city's municipalities, and through direct support given to community efforts. The department was also responsible for "seed shops", which supplied seeds, tools, bio-formulations and sundries to the growers. This created, almost overnight, a new urban gardening culture. Organic agriculture was specifically promoted by the Cuban Organic Agriculture Organisation, which linked government researchers and extension workers.

FUTURE PERSPECTIVES

There were doubts about whether the government would continue to support a more sustainable approach to food production, and some may still say that the government would probably change its approach if the embargo were lifted and agrochemicals were freely available again. The massive adoption though of organic production has had a huge impact and it seems the support has spread across the government and is not just maintained by a few. By 1998, the Urban Agriculture Department had become part of Havana's Ministry of Agriculture and the whole ministry has adopted the organic message.

Gardens attached to schools have become more common as local food production and ecological issues become a regular part of the curriculum. Most rural homes produce their own staple foods including beans and traditional root and tuber crops. Interest in sustainable energy and appropriate technology has led to demonstration and experimentation centres, travelling libraries and extension schools opening all over the island.

At present, Cuban growers are producing for themselves and their families and for consumers who know that what has been produced has been grown organically. However, as they consider engaging in the export of high value crops such as fruit, Cuba has begun developing it's own method of organic certification, through links with the Soil Association, the International Federation of Organic Agriculture Movements and other international bodies. Once organic certification is possible, farmers will also be able to improve their incomes by selling labelled products to the tourist industry at premium prices.

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Marielle Dubbeling

Intensive production of worm humus under banana trees

In the early1990s, living conditions in Havana, the capital of Cuba, changed abruptly, with access to food becoming one of the biggest problems. For years, the city had been consuming imported farming products. Faced with this crisis, Havana had to be converted into a "productive city" that covered the majority of its population's needs. Public and private spaces that were unoccupied were transformed into productive areas. The challenge was to allow for the coexistence of the urban population with large-scale agriculture.

A **Real Effort** in the City of Havana

Organic Urban Agriculture

The economic crisis that struck the country made the revitalisation of old initiatives necessary. For instance, the concept of "Conuco"(plot and garden) has always been related to the feeding strategy of the family. The urban agriculture initiatives therefore received widespread support by state institutions, scientific, and non-governmental institutions.

Central government has supported the promotion of organic urban agriculture

THE CHALLENGE: URBAN AGRICULTURE WITHOUT CHEMICALS

Bio-pesticides

Dependence on agro-chemical inputs was to be limited. Due to the proximity of the areas used for agriculture to urban residential areas, it became necessary to create adequate legislation in order to regulate the use of chemicals and limit potential health risks. Local alternatives to control pests and diseases and to assure adequate production levels had to be found.

People began looking for alternative solutions. The creation of the *Centros de Reproducción de Entomófagos y Entomopatógenos* (CREE) helped to find answers to pests and diseases. These centres help to protect crops through biological control mechanisms, using parasite and micro-organisms for the control of pests and diseases.

Various plants have been identified that contain elements on which basis insecticides, nematocides, acaricides, moluscicides, rat poison, fungicides, bactericides and herbicides can be produced. Some impede virus attacks. One of the most important entomopathogens bacteria is the *Bacillus thuringiensis*. This species produces a toxin, which serves as an insecticide.

The use of entomopathogens and antagonist fungi for fighting against agricultural pests and diseases is also a very common form of biological control used in Cuba.

In the city of Havana, 11 CREEs have been installed over the past years, one of which is located in a high school. This permits environmental education and awareness to be raised in future generations on the use of biological preparations. Moreover, the CREEs are also training producers and extension workers in the use of traditional and low-cost control methods:

The *tabaquina* (extracted from tobacco leaves) is commonly used as a natural insecticide, especially against soft-bodied insects (dragonfly larvae, white flies, trips, and lice)

From leaves of the neem trees (*Azdirachta indica A.Juss*), a plant from the *Meliacea* family of Hindu origins, a series of products are prepared both traditionally and industrially. Its efficacy has been proven against 160 species of pest insects, as well as in the control of diseases in domestic animals.

Many other biological products used in Havana towards controlling pests and diseases are available (see www.ruaf.org for a full table, or contact the authors).

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Bio-fertilisers

The daily generation of solid waste per person in Havana amounts to 0.5 kg, which adds up to a total of 1,060 tonnes of waste produced per day in the city. The lack of fuel and spare parts for waste-collection trucks have dramatically affected the collection services of the city, leading to the use of self-made bins that often attract diseases and rodents. Thus another example of a traditional practice taken up again, is the reuse of the city's organic wastes in preparing compost and worm compost. Through a relatively simple technique, the organic waste is transformed into high-quality bio-fertilisers that improve the physical, chemical and biological conditions of the soil.

In 2000, the city of Havana produced and applied more than 69,400 tonnes of compost. For 2001, more than 80,000 tonnes were produced. Even if the figures seem high, they are unsatisfactory in terms of the producers' organic fertiliser needs.

There are twelve cooperatives (so-called *Basic Cooperative Production Units)* which collect and process the organic material and distribute part of the compost to different production centres across the city. Another part of the production is offered to shops and centres that advise on agriculture and animal husbandry. These shops and centres supply inputs such as grains, biological preparations and tools, and also provide technical advice on the use of (biological) pesticides and the (biological) means of improving the soil.

GOVERNMENTAL SUPPORT

For a large part, the central government has supported Havana to achieve these results in promoting organic urban agriculture. The city of Havana participates in a national programme on urban agriculture developed in the country, supported and directed by the agricultural ministry. The ministry annually defines certain lines of action. Each province and municipality must then reach the objectives set out, thus contributing to the decentralisation of food production and storage.

For 2001, the following action-oriented objectives were in this way created:

- to apply 10 kg/m^2 of organic material per year to *organoponicos* and intensive gardens, and a minimum 20 ton/ha on plots and patios;
- to regularly update the existence of organic material sources in the municipality and at the level of the *consejos populares* (which are sections of the government at the neighbourhood level. In the city there are 104 of these popular councils);
- to create optimal conditions for worms to breed;
- to popularise and implement vermiculture at the level of each unit of agricultural production;
- to improve the recycling and use of urban waste;
- to link teaching of agriculture and animal husbandry at different levels with productive urban agriculture practices;
- to achieve links between producers and each of the following: polytechnic agricultural and animal husbandry institutes, university faculties and scientific institutions. (nationwide, there are 33 agricultural and animal husbandry research centres, of which 19 fall directly under the Ministry of Agriculture ministry and 11 are located in Havana); and
- to raise the agroecological awareness of the population in environmental conservation while maintaining high-quality production.

FINAL COMMENTS

As stated above, Cuba has defined its lines of action under the perspective of an agroecological approach of agriculture, requiring less dependency on external inputs. Even when the country's economic situation improves, it will not get trapped anymore in the over-consumption of agrochemicals.

The work developed in Havana is the fruit of various social actors, but would not have been possible without the support of the local government authorities. They understood from the first moment the real possibilities that farming can offer to the city and its significance in confronting the difficult food situation faced by the population. Their authorities' understanding of the situation has resulted in the promotion of public policies that help to develop organic urban agriculture.

Havana's experience has demonstrated how urban agriculture has a role to play not only in reducing urban poverty, - by improving the food security of the excluded - but also in improving the urban environment through the reuse of solid organic waste produced in the city. In this way, it offers an alternative solution to the health problems of its population, provoked by developing intensive agricultural activities in intra-urban zones while applying chemical fertilisers and pesticides.

The educational support, that has existed for more than 40 years, is unquestionably a factor in the development, application and uptake of new agricultural technologies such as organic production techniques and the use of bio-fertilisers. The fruits of urban agriculture seen today are the harvest of efforts initiated years ago.

Marielle Dubbeling

Natural methods for fighting pests are very common in agricultural production in the city of Havana. For instance, yellow flowers can be used to attract beneficial insects

"…. we saw the need to look for non-conventional alternatives for large-scale production and we began to productively use lots in the urban area; we began to develop organic agriculture, and without even intending to do so, we had started urban agriculture. Urban agriculture in Havana arrived as an alternative, but it will stay in the streets, in the landscape and in its inhabitants. Ill-fated will be the ones who, at the start of the so-called "urban century" try to govern well without including urban agriculture in their political agenda."

President of the provincial government (mayor) of the city of Havana, at the opening of the international workshop "Ciudades en Crecimiento Cultivando Alimentos: Agricultura Urbana en la Agenda Política", October 10, 1999.

At the 1998 Agriculture and Animal Husbandry Expo Fair in Michoacán, a demonstration area on backyard vegetable production was set up, with the principal goal of motivating urban women farmers to produce vegetables on small pieces of land known as solares.

A low cost greenhouse designed by CENAPROS at Demonstration Area

Villegas

Training in Backyard Organic Vegetable Production in Michoacán, Mexico

Generally, only ornamental plants were grown at the time on solares, while at the same time most housewives buy their vegetables from small vendors that travel to these communities by trucks. The vegetables sold by the vendors are exposed to the sun all day, affecting the quality, and having the risk of being produced with contaminated water.

Family agricultural activity growth in the Mexican regions of Xochimilco, Milpa Alta, Tlalpan, Texcoco, Azcapotzalco and Tláhuac has improved the diets of many families, who, due to their depressed economic situation, have few opportunities to buy vegetables (Canabal 2000). Urban agriculture further creates employment and may lead to improvement in the environment when utilising organic inputs and recycling water and waste (Caridad 2000).

DEVELOPMENT OF THE PROJECT

The *Opciones de Autosuficiencia Familiar* (Family Subsistence Alternatives) project started in September of 1998. It was initiated by the CENAPROS under the National Institute of Forest, Agriculture, and Animal Husbandry Research (INIFAP), which is located in La Carreta, in the municipality of Tarímbaro, Michoacán, Mexico. The process of transferring and diffusing the technologies started with:

- ❖ meetings to explain the advantages of the new technology;
- ❖ demonstrations with the participation of growers, agents of change, and local politicians; and
- ❖ technical extension to the producers.

During the process of technology transfer, it was important to maintain a direct relationship and feedback between the researchers, the advertisers, and the growers. Equally important is to find a way to transfer the technology between the growers themselves (Moreno *et al.* 1996). With this focus in mind, and considering the limited attention that researchers directly devote to this activity, four alternatives for family self-sufficiency have been designed:

- ❖ Organic vegetable production under zero tillage, using mulch with drip irrigation. The plants are planted in the mulch of the previous plants, or transplanted.
- ❖ Vegetable production under zero tillage, using mulch with drip irrigation under gravity. The water contains chemical fertilisers.
- ❖ Organic vegetable production in plastic containers (EDNA system) and in old tires with bamboo irrigation (*Arundo donax* L.).
- ❖ Organic vegetable production in soil and containers with drip irrigation in low-cost greenhouses.

These four systems were chosen initially because of low cost, and availability of the materials to all households. In the first year, the production systems were determined by the researchers, but in the following years the comments and suggestions of the technical assistants and farmers were used to adapt them. The principal organic practice is to use compost for crop production. Compost comes from organic matter (from maize and sorghum), cow-dung and water.

In 1999, due to increased interest by agricultural authorities, women producers and students, the vegetable production system was modified to include plastic pots and old tires irrigated with bamboo (*Bambusa* spp). In addition, organic vegetable production using micro sprayer irrigation systems (Springer) was increased.

The project gained the support of the agriculture and animal husbandry development secretary of the Government of Michoacán, which led in 2000 to the assignment of an agronomist to offer technical assistance to all types of groups, from children at the pre-school level to local technicians. The person focused primarily on housewives and agronomy students.

In 2000, a group of volunteers from the System for the Total Development of the Family (DIF) started to participate in the distribution of seed packets donated to participants to motivate them to establish family gardens.

TRAINING

Between February 2000 and September 2001, twenty groups with a total of 439 people from different parts of the state of Michoacán, have attended the capacity-building courses that were offered. At first, the majority of the participants were men, but later the percentage of women increased significantly. The training system has been divided into three phases:

❖ classroom presentations ❖ field visits in the demonstration area ❖ application of interviews and requesting comments from participants in the training courses.

Training was given in composting, integrated pest management and the use of herbs from the *huertos familiares* (family gardens). No training in marketing is given yet, since the production is mainly used for consumption by the family.

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The Creation of Viable Rural-Urban Interfaces

A major theme in the creation of viable urban-rural interfaces is the creation of natural resource scarcities by urbanisation. Urbanisation is driven by the desire for short-run economic growth and wealth in ever growing cities. Therefore, periurban agriculture should provide a bypass for this ecologically unhealthy development of large urban agglomerations. Sustainable, or at least less ecologically harmful, development of mega-cities can only be reached if it is grounded in a better development of periurban agriculture, biotic resource recycling and waste management.

In other words, a more pronounced sustainable development of periurban agriculture requires a strong biotic natural resource component. It further means creating closer ties between ecological habitat functions on one hand and urban or industrial habitat functions of larger metropolitan agglomeration on the other. However, linking and integrating functions must be grounded in profound land-use planning, which, in our opinion, can only be indicative planning or the provision of orientation. This includes land zoning and taxation or subsidisation of negative or positive externalities, respectively, as policy instruments.

Creating viable urban-rural interfaces should not only be market driven. In the current deliberate and somewhat unplanned and unsustainable development of mega-cities in South-East Asia, periurban land-use planning in conjunction with building rural-urban interfaces is an important new policy tool. To achieve a critical threshold of ecological sustainability, local administrators of cities need guidance on how to balance the resource cycle and cope with organic wastes on a larger regional scale. In situations where different cycles should be closed, government interventions are needed to correct market failures. An ecologically more balanced growth of cities can only be reached if the potential interactions between market driven growth and spatially driven planning initiatives are explored.

However, agroecological land-use orientation in city planning does not intend to give state planning the upper hand, thereby hampering industrial expansion. In fact, catering for the ecological basis of city growth means to create platforms from which to initiate market development. For instance, the potential of private waste management and sewage recycling on the basis of government directives could be explored. Directives may enforce consumers to seek private companies for their sewage treatment, enforce sewage treatment companies to look for farmers that offer acceptance of organic material and sludge at lowest prices, and farmers to buy clean technologies. However, especially the urban farmers need planning and land security to start such an operation.

To achieve these objectives for sustainable development of cities, a broader investigation of the specific functions and system components of periurban agriculture is needed. Special design and treatment of functions of land-use types is urgently needed to provide local decision-makers with options for adequate land-use planning. However, the analysis cannot solely focus on periurban regions as the only, or main, support system of cities. Alternatives for purchases of functions of metropolitan areas have to be included. It is always the purchase of these functions from a global market that serves as a reference point. In particular, with respect to food imports, trade-offs appear. But local waste treatment also must be challenged on economic grounds. For instance, we all know that waste can very easily be dumped into the sea. In economic terms, the waste treatment service in this case is purchased from the sea for a zero-price. However, the property of a global community that shares the world seas is violated; not to mention, the tourism or fishing industry.

This aspect brings about a double-sided discourse into the debate on policy options for land use. On the one hand, we have to look at opportunity costs for local provision of live support of mega-cities by periurban land use. This means that we have to consider economic, ecological and social prices for dumping or offering payment to the countries willing to provide the envisaged services. On the other hand, we have to look at the earth from the perspective of a spaceship. This implies that policy-makers in these mega-cities may have a duty not to dump waste outside their borders, for instance, but should rather look at periurban land use as the dumping ground. If you look at a city like a world on its own, it becomes a micro-cosmos that has to look for its own solutions for recycling organic matter using agriculture. To seek for waste dumping as possible local alternatives might become an obligation in global debates. Hence, we have to specify limits for transactions within live support systems of mega-cities, or look for real costs.

For practical reasons, periurban land-use planning should focus on periurban agriculture providing a core local service function instead of relying on resources elsewhere. However, this requires clean technologies including in agriculture.

The challenges today are to extend this thinking to much larger regional scales, to consider modern clean technologies, and to develop or streamline modern policy instruments in such a way that we can reach a threshold of sustainability.

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Lessons from the **Cape Flats Townships**

ecological micro-farming among the poor in Cape Town

Rob Small

SAKE Community Garden, selling produce to the community

South Africa is being pulled into the global economy. Still there is a great need for locally produced food, as is shown in this story about the Cape Flats bio-zone. The Cape Flats townships, low-income settlements to the northeast of Cape Town, are vast encampments at the city gates. Job reservation laws, which protected the separation between coloured and white labour crumbled from the 1980s, and opened the way for black migrants from the Xhosa-speaking Eastern Cape homelands of the Transkei & Ciskei. In the mid-1990s, over 5,000 new arrivals/month were recorded. This has settled to about 1,200 new arrivals/month. Cape Town now hosts approximately four million people, of which about one-third are ama-Xhosa.

These settlements are frantically being converted into more formal "site-and-service" areas, which have planned streets and basic services, where squatters can re-erect shacks or build houses. Miles of box houses are built with government subsidies. But tin and plastic shacks continue to pop up everywhere, seemingly as fast as houses. Unemployment hovers officially at 40 % and is growing. Similar conditions prevail around most cities in South Africa. Were it not for the largely government-sponsored NGO and school feeding schemes and short-term municipal contract work, food riots would quickly erupt. But feeding schemes and short-term contract work cannot be maintained forever.

While the majority of government agricultural development funds are being poured into the conventional, often large-scale farm movement, the *general organic movement* - launched after the first democratic elections in 1994 – is alive and well. Thus far, the national organic movement is a civil society initiative and not a producer- or consumer-led initiative. The stakeholders are not yet nationally organised. There is also a vital, but small, emerging commercial organic farmers movement. The organic small farmers' "movement" currently exists as a West-Cape commercial association, under the banner of the Organic Small Farmers' Association (OSFA) and is a local organisation. An organic urban agriculture movement is yet to be established, but at the moment there are no lists or overarching organisations.

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ABALIMI BEZAKHAYA AND THE SCAGA PROJECT

Abalimi Bezekhaya (Planters of the Home) is an NGO - the only one in Cape Town focusing consistently on direct poverty alleviation through micro-organic vegetable gardening among the poor. Operating from two non-profit community nurseries in Nyanga (est. 1995) and Khayelitsha (est.1989), ABALIMI provides low-cost bulk compost, seed, seedlings, information , training and on-site project extension in the townships. These unique non-profit nurseries supply on average between 2,000-3,000 home-based survival gardeners per year. Abalimi projects are encouraged to be 100 % organic. Methods employed are building soil fertility using pure compost and through cultivating bio-diverse microclimates. This stimulates a wide range of bird and insect life as the basic pest control and fertility building technology. Indigenous windbreaks are employed to support soil fertility and natural pest control, which at the same time is a promotion of community based conservation knowledge and experience. No artificial fertilisers, GM seed or commercial chemical pest control measures are used.

A case study of ABALIMI's leading urban agriculture research and development project, may provide some insight into typical problems, lessons and successes, common to most projects.

The Siyazama Community Allotment Garden Association (SCAGA), on 5,000 m^2, was co-established under power lines in Macassar, Khayelithsa, in 1997 – after three years of preparation. A key research project conducted during 1997-1998 by the University of the Western Cape (UWC) Earth Sciences department found that soil fertility would stabilise after three years. Soil improvement costs (the highest cost) would then be reduced by up to 50 % and one full-time job per 750 m^2, at R 1,300/m, could be created. This meant that SCAGA could provide between 3-4 permanent full-time jobs. SCAGA, however, decided to aim for 30 subsistence "jobs" at about R 200/m each, on 30 x 100 m^2 production plots. Most members have no discernable income whatsoever, and consider this amount substantial.

Each member is earning a cash and food income, after costs, of about R 100 per member per month. The project now hosts its fourth group of 30 women and one man and is in its fifth year. It is successfully marketing high quality organic produce locally and to an organic market in Cape Town. There is a market for organic vegetables, but it is not organised. However, many small retailers (including health shops, juice bars and vegetable vendors) will often guarantee prices in advance, provided supply is guaranteed. So there are good possibilities for the marketing of organic produce.

IMPACTS OF THE SCAGA PROJECT

This small urban agriculture project, arguably more than any other in Cape Town, has had far-reaching impacts both within the community and on open space urban planning. It has sparked dozens of applications from new groups and has given planners solid proof to argue for community managed open spaces, and for self-help job creation. SCAGA is repeatedly visited by VIPs, including local government Ministers and senior officials countrywide. The Western-Cape Minister of Environment, on his 1998 tour of ABALIMI projects, said he needed to "reassure himself that such things were indeed possible in the poor communities". He spoke of a "general view in government circles" that "sustainable community greening and urban agriculture was an impossible dream". This gives a clear indication of attitudes among government decision-makers in 1998.

Impacts on the environment have been quite substantial. Soil fertility inputs, partly due to the planted windbreaks and as predicted by the UWC research - are decreasing substantially. Water, drawn by an electric pressure pump from five well-points (fresh water lies about 5 meters down) and fed into low-lying overhead sprinklers, costs about R 100/month . It will be even cheaper once the drum-drip system **(see photo)**, has been fully accepted and installed. In mid-summer, one 200-litre drum filled three times a day irrigates 100 m^2. There is still resistance to this technology because it is not what "successful farmers" use in South Africa. Pests, once a headache – especially the tiny white Khayelitsha Snail – are hardly mentioned now. The windbreaks are above waist height and host a multitude of indigenous birds, who relish little white snails.

Improved health is becoming a hard outcome as is the medicinal use of fresh organic food for immune system building and the all-purpose therapeutic value of organic agricultural work. New members often come with signs of malnourishment. They have little energy and less money. An experiment, launched in 2001, provided survival subsidies of R 50 per month to such members until first crops matured. This experiment worked and the women later remarked upon their substantial all-round health improvement after consuming their own organic produce.

There have also been impacts on the position and role of women. The first crops were planted by a pioneer group of 28 women and two men in 1997. It took a year to progressively deep-trench the land, to break up a substratum of calcified conglomerate 15 cm under the topsoil. The traditional "Ilima" (mutual-help work) was used to get unemployed men to provide muscle. Traditional beer and food were served. Because the two male members volunteered more time at the garden (they did not have to run homes as well) the women let them lead, but some friction arose when it was decreed that everything had to be sold. Women have often been banished "back home" to the Eastern Cape by husbands, who felt threatened by their wife's empowerment.

Local multi-purpose leguminous biomass crops are being sought which, together with small livestock and other standard organic technologies, will replace external inputs of manure, reducing new project set-up costs.

Rob Small

Drum Drip Technology

FUTURE PROSPECTS

❖ New groups need about seven years to establish. This is due to social, not practical parameters. The wonderful remnants of traditional land-based values and mutual help, while making it easy to begin, are crumbling. Personal dynamics and power issues are the greatest single obstacle to group sustainability, fed by a (now fading) culture of political entitlement and a belief that the city brings an end to land-based work.

❖ ABALIMI facilitates organic agriculture, but they are now forming relationships with NGOs who provide in-field organisation-building support. Because micro-farming is still seen as a temporary first step on the journey out of poverty, we are building in to all projects a variety of non-gardening developmental opportunities, while participants experience the benefits of cooperative organic gardening. Group savings schemes are becoming mandatory, while events like Christmas celebrations and Ilima's stimulate cultural renewal.

❖ The mini-nurseries will start selling compost and grow their own seedlings, thereby increasing their self reliance. Tunnels, cold-storage rooms and value-adding packing sheds are a logical next step, producing out-of-season table food for cooperative marketing. Also, an urban-to-rural capacity-building programme will be founded to enable genuine organic farmers to return to abandoned Eastern Cape lands.

❖ There is certification available via the OSFA and one or two other marketing interests. This is not yet compulsory, although they are trying to get it legislated. At the moment certification is costly. This can pose a problem as it can marginalise small producers, and hands the power over to (organic) commercial interests. In this way, organic produce might become an elite product. The whole certification debate is yet to be had openly in South Africa. There are opportunities however to put in place something a bit different from the "elite-organic-market".

This social impulse, combined with relative economic success, provides the first examples in South Africa of sustainable urban community organic gardens as a new lifestyle choice. There is no limit to what can be achieved once people have found a way to work again in trust and love on the land.

The promotion of sustainable local livelihoods through urban agriculture will be unsustainable if urban farmers get trapped in the same cycle of dependency on expensive chemical farm inputs, like fertiliser and pesticides. This realisation has led to the promotion of organic urban farming by local community organisations in the cities of Valencia and Malaybalay in Bukidnon province, and Cagayan de Oro city in Mindanao, Philippines.

Leonora Angeles

A MAKAKABUS member explains their income statement for the year-ending December 2000 at their General Assembly in Valencia City, January 14, 2001

The **Struggle** for Sustainable Livelihood

Gender and Organic Urban Agriculture in Valencia City, Philippines

These organisations are supported by the Canadian International Development Agency (CIDA), in their production and marketing of organic rice, fertiliser and other produce through a regional non-government organisation (NGO).

The promotion of sustainable integrated livelihoods through organic urban agriculture would have to take into account not just local knowledge, participation and ownership, but also consider gender identities and social relations that underpin local organisational dynamics. These social relations may undermine organisational strengthening of the institutions involved.

The following experience shows how women farmers in peri-urban areas organised and seperated themselves from the male-dominated parent cooperative. And in this process of sisterhood they became more successful in promoting organic farming than the men. But it also shows how development aid could be effective in the promotion of sustainable agricultural practices and in assisting the poor coordinated by local community members.

PARTNERSHIPS FOR ORGANIC FARMING

The farmer cooperative and women's organisation referred to in this case study are active in the periurban villages of Valencia, a newly chartered city in Bukidnon on Northern Mindanao. They are both supported by the Bukidnon Centre for Sustainable Agriculture (BCSA). BCSA works with researchers from the College of Agriculture at Xavier University in nearby Cagayan de Oro City to assist local farmers' organisations in promoting organic agriculture. Xavier University researchers and BCSA have been part of the MASIPAG (1), which has branches in other nearby cities of Malaybalay, Cagayan de Oro, Davao and Cotabato. In Bukidnon, the BCSA works with three grassroots organisations, the Bukidnon MASIPAG Farmers' Multipurpose Cooperative (BMFMC), MAKAKABUS (2) women's organisation, and the Upland Development Farmers.

ORGANISATIONAL ROOTS AND CAPACITY-BUILDING

MAKAKABUS was formally established in June 1999 when it left the parent organisation, the BMFMC. At the start of the BMFMC in 1997, initially with 60 farmers including ten women, CIDA funds were used to build a small rice mill and an organic fertiliser plant and to purchase a rice thresher, a farm tractor and a six-wheeler truck. However due to capital erosion and lack of marketing skills, the cooperative's organic rice and fertiliser did not sell well. The women members of BMFMC wanted to assist the male leadership in getting the cooperative back on its feet. The women proposed pig raising to supplement incomes derived from rice and fertiliser production. Pig-raising was considered not too labour-intensive work for the women and easily combined with backyard gardens and domestic responsibilities. However, there was much resistance from the male members. Most of the women were wives and daughters of male members of BMFMC who were not used to admitting their limitations in public. The male members were of the opinion that raising pigs would be contrary to promoting organic and sustainable farming, since the pigs consume commercial feeds, despite the argument of the women that these feeds would only be temporarily used, given the long gestation period needed. The technical researchers from Xavier University supported the men's position. The women felt challenged, and decided to set up their own autonomous organisation called MAKAKABUS, but still be affiliated with the BMFM Cooperative. It was decided that BMFMC would focus on rice and organic fertiliser production while MAKAKABUS would concentrate on the marketing of their produce.

The marketing of organic rice and fertiliser has always been a problem. Reasons are the low purchasing power of the rural and urban poor, lack of distribution outlets, and small-scale production that forces organic farmers to sell their produce at prices 10-20 % higher than non-organic products. These problems are further compounded by the landlocked location of Valencia, requiring a four-hour trip by land to the distribution capital of Cagayan de Oro.

Membership of MAKAKABUS grew quickly as if the new organisational identity and independence from the parent cooperative suddenly unleashed women's interests in community development issues. The women in the community now

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joined MAKAKABUS instead of BMFMC. From a low number of 45 initial female members of the Cooperative in late 1999, the organisation was able to expand to 106 members in 2000, and to 200 members in June 2001. The women's cooperative also earned profits and raised new capital in three months equal to what the male-dominated cooperative achieved in three years. Clearly the BSCA and Xavier University partners overlooked women's potentials and capabilities. Realising this, BCSA now supports the MAKAKABUS women, providing accounting and financial training services and organisational capacity-building and strengthening.

Unlike the BMFMC that mainly accepts farmer owner-cultivators as members, many MAKAKABUS members are from landless families in Valencia. Since many women do not have access to land or do not own land titles, MAKAKABUS leaders realise that this membership restriction discriminates mostly against women agricultural workers. MAKAKABUS created a highly functional organisational structure composed of core committees and departments, and a group of cluster chairs, one in each of the seven Valencia villages to date where MAKAKABUS has members that meet bi-monthly. The women practise flexibility and "learning-by-doing" in everything they do. When having a single treasurer for the whole organisation no longer suited their needs, they created the position of secretary-treasurer to assist the person in charge in each of the four activity departments, i.e. Livelihood, Organic Fertiliser, Equipment, and Lending. The organisation was able to face the birth pangs and many other trials through transparency, especially in all its financial transactions and record-keeping, and democratic processes employed in all organisational activities. They also came up with clear guidelines for members and non-members, such as criteria for lending and borrowing, payment requirements, repayment schedules, and return of machines borrowed, especially in the tricky business of equipment rentals.

INTEGRATED AND DIVERSIFIED REVENUE SOURCES

MAKAKABUS always looks for new opportunities for additional income to assist more members. While the BMFMC wanted to concentrate mainly on rice and fertiliser production, MAKAKABUS women knew the value of farm diversification and marketing. "We do not concentrate only on one thing - we are into everything," the president of MAKAKABUS said, referring to its diversified activities, ranging from rice production and marketing, organic fertiliser sales, to mixed rice-duck raising, pig dispersal, micro-credit as production loan, farm equipment rental and a small catering business.

MAKAKABUS concentrated on marketing organic rice and fertiliser using innovative strategies. Following exposure trips to other areas in Mindanao doing organic farming, MAKAKABUS thought of the idea of demonstration farms to market its products to other cooperatives. The strategy worked when they were able to attract a big sales contract from the Integrated People's Multipurpose Cooperative (IPMC) that would like to purchase 2,600 bags of organic fertiliser. This led to another good connection when one of the members of the IMPC board of trustees, a professor of agriculture at the nearby Central Mindanao University (CMU) in Musuan. The professor saw potential in linking up CMU Agricultural College's teaching and research programmes, particularly in having students do their undergraduate and graduate theses on sustainable agriculture, with MAKAKABUS, BMFMC and BCSA's organic farming practices. Given CMU's geographic proximity to MAKAKABUS, this new partnership with CMU made more sense than Xavier University in Cagayan.

SUSTAINABLE LIVELIHOODS FOR THE POOR

The experience of MAKAKABUS shows the importance of organisational autonomy and good leadership skills harnessed by strong social partnerships between international donor agencies and local organisations. Efforts by donor agencies, like CIDA's PDAP in this case, are commendable for their current efforts to address the issue of financial accountability while giving full ownership and voice to local partners. Supporting intermediary organisations such as NGOs like BCSA and Xavier University, although initially gender-blind in their programming, have shown the importance of gender analysis, organisational capacity-building and adaptation to local cultures and social relations.

More importantly, the men and women of BMFMC and MAKAKABUS have demonstrated that open lines of communication, careful gender negotiations, and value of sex-role complementarity, intrinsic in the local culture, could be potential sources of organisational revitalisation and new forms of institutional co-operation. Instead of creating a wedge between the two organisations, they turned their initial conflict over approaches into a source of new opportunities, without letting past history exacerbate gender conflict or disturb domestic or marital relations. The (re)construction of gender identities and relations therefore could help promote organic urban agriculture especially when women and men believe in the merits of organic farming for the environment, their families, community and future generations. Taking a pragmatic approach, MAKAKABUS knows that organisational strengthening and sustainability partly rest upon a healthy revenue base and a well-consolidated membership base, or a good combination of material resources and human capital. Hence, while it fully supports organic rice and fertiliser production, it knows the importance of good marketing strategies and looking for additional income sources, given the still limited local market for organic rice and fertiliser.

Leonora Angeles

The warehouse stores the organic rice stock and rental farm equipment

Notes

1) MASIPAG means "hardworking" and in the vernacular stands for *Magsasaka at Siyentipiko Para sa Siyentipikong Agrikultura*, or Farmers and Scientists for Scientific Agriculture. It is a national network of Filipino scientists, farmers groups, and development practitioners campaigning against the spread of genetically modified seedlings and unsustainable commercial agricultural practices.

2) MAKAKABUS means pro-poor, and stands for *Malahutayong Kahiusahan sa Kababayen-an Bukidnon*)

Argentina, like the rest of Latin America, is confronted with the challenge of combating structural poverty. Urban agriculture – particularly when using organic methods – is seen as a viable and appropriate strategy for easing poor urban sectors. This article presents two cases in which this strategy was developed by CEPAR (Rosario's Centre for Studies in Agroecological Production) in collaboration with a number of other institutions. The two cases come from cities contrasting greatly in size: Rosario, located in the central province of Santa Fé with one million inhabitants, and Camilo Aldao with only 5,500 inhabitants.

CEPAR

Compost heap for urban agriculture in Camilo Aldao

A Strategy for Local Development

Organic Urban Agriculture in Rosario of Lower-Income Urban Sectors

Various development models aim to improve the living conditions of the population through processes of decentralisation, local participation and optimal use of local resources.

Organic agricultural production is based on the principle of biological equilibrium in nature. It is a system that allows for a sufficient level of productivity, while also avoiding risk to producers, consumers and the environment to chemical contamination. Organic agriculture is not conservative or "backward", but rather incorporates the latest research developments, and promotes active participation of farmers, while respecting their knowledge, culture and experience.

THE WORK IN ROSARIO

Since 1988, CEPAR has been working in the poor neighbourhoods of Rosario, setting up small food security and urban agriculture projects. The work was first carried out on an individual basis with community-based institutions and later together with the Municipality of Rosario. Between 1991 and 1997, the municipal partner was the Department for Home Gardens under the Secretariat of Social Promotion, but from 2002 onwards the project collaborated under the umbrella of the Municipal Urban Agriculture Programme, in which CEPAR played an active role.

In the first phase, the programme supported the development of 2,859 family, community and school gardens, producing 1,400 tonnes of vegetables per year.

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The programme also included 2,200 families who produced chickens, with an estimated production level of 44,000 kilograms per year. The project's methodology has strongly emphasised "learning by doing", while capacity-building has been an essential part of the backstopping provided to the families and community groups. Each neighbourhood or school has therefore had a local promoter trained in participatory technology development.

Under the programme, a cooperative for organic home gardeners was organised comprising of 50 non-earning families. The cooperative focused on the production and marketing of organic vegetables in community gardens located in irregular settlements. Commercialisation of the products not needed for home consumption generates income for the participating families and strengthens their organisational and management capacities.

The results are very positive. Six organic community gardens were established with a total surface area of 37,550 m^2, including one garden for aromatic and medicinal plants. All 50 participating families have become self-sufficient in their vegetable needs and have generated an additional income of about US $120 per participant, per month. Two Home Gardener Cooperatives were formed and alternative marketing structures were established, such as direct sales to homes (of bags or crates) and sales at weekly fairs in the centre of the city. The urban environment has been improved through the elimination of waste sites (which have been converted into the gardens), while cooperative agreements with the municipality have also resulted; i.e., the free provision of organic vegetables to community soup kitchens and to people suffering from health problems.

THE MARKETING OF URBAN ORGANIC VEGETABLES IN ROSARIO

The marketing of products began spontaneously, initiated by gardeners surplus production and the need for earning an income. In December 1993, a "commercialisation pilot" was set up: the Street Fair of Natural Products. Family and community gardeners of 18 organic vegetable gardens participated. This experience was successful in that it was able to attract consumers to purchase the vegetables supplied. The Fair further served as an important stimulus for the gardeners to organise themselves and to further extend such efforts. It became clear that they needed to qualify themselves in marketing organic products by using a different "sales logic" than for conventional products.

The Department of Vegetable Gardens in Rosario's municipal government offered a training programme, together with the Pro-Garden Programme and CEPAR. One result of this was the development of weekly direct sales of baskets of vegetables to homes. In 1995, the Cooperative of Gardens was initiated with the objective of producing organic vegetables in a quantity and quality that allow for commercialisation. The cooperative decided to have a Weekly Fair of Natural Products in a central square of Rosario, on Saturdays.

Without losing the flexibility of each gardener selecting their own best vegetables,

the weekly fair taught them to take up a common standard of presentation. A committee took charge of ensuring quality control for the group, rejecting vegetables that did not fit into the pre-set norms. At the fair, each community garden had its own stand to which the group brought its products. Besides vegetables, seedlings of vegetables and aromatic plants, as well as creams and dyes from medicinal plants were sold (the last being monitored by a biochemistry company hired by the municipality).

The money collected was then paid to each gardener in proportion to his/her contribution. The prices were agreed upon by all of the members of the cooperative in order to avoid competition between members. The municipality supported the project by offering the operation of the fair, the stand and transport of the vegetables from the gardens to the square. The gardeners' cooperative brought satisfaction to the members as it provided them with a sense of identity, ownership, as well as facilitating them with a structure for obtaining subsidies, credit and a means for marketing and management. In 1997, the cooperative included 11 vegetable gardens involving 70 members and a 52,600 m^2 area under production.

THE EXPERIENCE OF CAMILO ALDAO

The project "Production and Commercialisation of Organic Vegetables Produced on Fallow Land Areas in Camilo Aldao" is implemented in the city of Camilo, in the province of Cordoba. This project aims to attain self-sufficiency for the participating families through production and marketing. The municipal government plays an important role as project facilitator and is supported by the technical assistance of CEPAR and the P*rohuerta* (Pro-Garden) programme of INTA Marcos Juárez. In this project, fallow plots located in the urban centre are put to productive use.

In the selection process of the participants, priority is given to households headed by women and to those households without employment for over two years. All participants must be willing to work in a group and to gradually employ management strategies. The gardeners are trained in organic production techniques and advised by professionals from CEPAR and INTA Prohuerta. Only those technologies were promoted that are accessible to lower-income groups, low-cost and easily applied.

The gardens were organised as community gardens, where each family works individually on its own plot. Simultaneously, a "social company" was formed under the name of HOCA (Organic Home Garden of Camilo Aldao), its name and logo having been selected by the participants themselves.

The process of obtaining certification has been initiated, and for the time being, the products qualify as "organic production in transition", as set out in the current laws on organic production. The production process is accompanied by a food education programme, which has brought together the various educational institutions in the village.

Different schools and levels were involved to carry out promotional activities with their neighbouring schools. Students were taught about nutrition and the value of organic vegetables, and responsible consumption. The community was also invited to attend sessions, and one such meeting featured doctors of the public hospital speaking on this same theme.

Students at one of the schools with a social orientation, participated in the project as interns to formulate and carry out a survey of the town's population. In this survey, students investigated people's understanding of organic production, the qualities of healthy food and the degree of knowledge on the *emprendimiento* HOCA. Students in another agriculture oriented school, participated in field experiments on organic vegetable gardening, studying techniques that had previously been ignored.

The main results are:

- 2.5 hectares of fallow urban land were allocated, recuperated and made productive.
- Income was generated for 20 households (it is estimated that, next to savings, additional sales generate approximately 160 pesos per month, per family).
- 200 inhabitants of Camilo Aldao and 20 Argentinean technical staff were trained in organic production techniques.
- Organic vegetables were sold directly to consumers and small stores under a specific logo.

FINAL REMARKS

The experience in Argentina has the following lessons for similar projects:

- *Inter-institutional cooperation* It is important to involve local governments to assure the integration of the activities into the design of (municipal) projects on urban agriculture and food security, and to avoid risks of short-term project cycles.
- *Participation of the urban farming families* Also the participating families should be involved in the programme design and implementation, as it will ensure their commitment.
- *Organisation* All actors should agree on the working methodology and the programme organisation, in relation to the production and marketing process.
- *Training* Educational programmes on organic production should be based on technologies that support growth processes rather than an emphasis on (only) input substitution. Both scientific and local knowledge should therefore be included in order to manage different variables and the available resources in an efficient way.
- *Production management* To reach good production results, a series of steps should be followed to gradually shift the system toward a state of equilibrium of the biological productive processes. The sustainable conversion of the production system towards an organic farming system is based on three fundamental aspects: the improvement of soil fertility and the soil's biological structure, the gradual diversification of the production system, and an increased rate of nutrient recycling.

The Market in Rosario where organic vegetables are sold

Garden in Rosario

CEPAR

J.R. Briceno

Students interacting with the community

The origin of organic farming in Costa Rica is mainly based on cultural practices of native Americans. Some of the experiences were adopted by the Spaniards in the colonial period and have been conserved by small farmers, despite the variety of chemical products promoted by the "Green Revolution." For instance, the "slash and mulch seeding" that is a direct application of bean seeds to uncleared land, the weeds then being cut and used as mulch (Briceño and Meléndez 1999).

Urban Organic Farming at the University of Costa Rica

This paper is based on the experiences of the Communal University Work (CUW) "Urban Organic Agriculture" project (TC468) of the University of Costa Rica.

Studies on rural organic production in Costa Rica have been performed by CEDECO, a Costa Rican NGO devoted to educational projects (CEDECO 1998). According to this study, organic production has increased constantly in the last years, involving a high diversity of crops like: traditional crops (coffee, banana and beans), followed by other non-traditional crops (blackberry, mango, roots, herbs and tubercles). The area devoted to organic farming is 9,229 ha, involving 4,360 farmers (actually comprising less than 2 % of national organic production), 465 of whom work in the rural agricultural industry in the production of compost, coffee processing, sugar, jelly, honey, cheese and achiote.

It has been pointed out that farmers choose organic methods for four reasons: environmental conscience, low-cost production, better prices for organic products and family health. Some of the organic knowledge has its origin in conventional agricultural research.

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This is the case of organic banana and cocoa, produced on the Atlantic coast of Costa Rica. Crop materials were abandoned by conventional farmers because of the high production costs and are managed today without chemicals by the American natives. In the same way, coffee is produced by individual farmers and farmers' cooperatives like Caraigres' Organic Coffee from the Acosta zone (south of San José), and the mentioned case of "slash and mulch seeding" produced in the same zone as well as in other hillside lands.

In Costa Rica, as in the world at the beginning of the industrial era, people move from rural zones to urban places in search of new opportunities. This phenomenon has caused a dramatic increase in the population in the capital, generating two types of "urban farmers": those who attained their fields close to the capital before they were merged into the urban area; and those who have maintained their agricultural skills and who produce in their backyards or in small open yards nearby.

UNIVERSITY OF COSTA RICA'S (UCR) EXPERIENCE WITH ORGANIC FARMING

The Organic Farming Program of the University of Costa Rica (PAO-UCR) works in research, extension, and teaching of soils, animals and plants, post harvest management, and rural development.

This Programme coordinates all the activities on organic farming at the UCR and has cooperative links with other institutions both at national and international levels:

Research: soil organic matter, slash/mulch bean production, biodegradable plastics for banana plantations, tropical alternatives for animal feed, bio-fertilisers, entomopathogens, insect repellents, composting, marketing, post-harvesting, organic legislation, etc.;
Extension: management of solid residues at elementary schools, "clean technology" bulletin, organic farming extension to small farmers, CUW in urban organic agriculture; and
Training: regular course in organic farming in the department of Agronomy, short courses to professionals and farmers in agronomy (PAO-UCR 2000).

Among the extension projects, it is important to highlight the experience gained by PAO-UCR with the project, "Management of residues at elementary schools of the Curridabat county" (the CURRI project), which included the participation of children. In this project it was possible to establish permanent links with children, teachers, and parents through activities such as recycling and organically managed school gardens. As a point of interest, many of these children are now teenagers or young adults who

have become the "seed" for these ideas within their community (Alvarado and Briceño 1999).

The CURRI project extended into the "Urban Organic Agriculture" (UOA) project developed by the Communal University Work (CUW) students as one of their graduation requirements. In our case, the objective of the CUW in the project permits UCR students to serve the community by helping to establish organic production plots at neighbourhood homes. Specific objectives of the UOA-CUW are: to organise the production of organic crops in backyards of neighbourhoods in two communities in the capital; to work in the establishment and maintenance of organic production units at volunteer homes; to teach the procedures regarding inputs needed in organic production; and to promote the consumption of organic products and the preparation of written materials.

METHODOLOGY

The first phase of the UOA-CUW was developed at Tirrases, a small community in Curridabat county, and a second phase is now beginning (January 2002) at Santa Ana county close to the UCR's organic farm, under the administration of PAO-UCR. The students enrolled in the UOA-CUW belong to different career orientations and so develop very diverse activities from agricultural production, waste management, nutrition or law, to communications.

The planned production of plants consists mainly of vegetables, medicinal and ornamental plants. The students were divided into three main areas: plant production, dissemination of materials on production and training, the collection of other experiences on vegetable production at home through their own interest or led by other agencies, while also allowing for participatory interaction between the groups.

RESULTS OF THE FIRST PHASE

The first phase of UOA-CUW at Tirrases began with introductory lectures for the students, who were divided according to three groups mentioned above. The CUW's introductory session began with seven elementary teachers from the Centro America school at Tirrases, which were interested in the UOA's work. After this training session, these teachers contacted 30 people in the community (mainly parents of the elementary school students) who wished to participate. These people were later invited to attend lectures on organic farming, nutrition, food technology, etc. These activities permitted contact and the exchange of ideas with the CUW students and teachers. Elementary school students also received lectures on topics of organic production as decided by the students at CUW.

After this initial process, the students in the production groups began to produce plants in the backyards of participating neighbours and demonstrated how to produce compost, vermicompost, liquid fertilisers and repellents. The training groups used facilities at the Centro America school at Tirrases, and at the community greenhouse facilities.

In the second phase of the project, people from the community of Santa Ana county, close to UCR's organic farm were contacted in order to repeat the first phase with the support of the farm's facilities. Compared to Tirrases, Santa Ana has a higher population distributed over the urban, periurban and rural zones, and more diverse activities in agriculture, commerce and services.

RESULTS, LIMITATIONS AND SOLUTIONS

(in the development of the UOA-CUW in Tirrases in the period 2000-2001)

Production

Results: Vegetable plots were established in backyards, which involved land preparation, seeding, fertilisation, and plant protection measures using repellents and micro-organisms. Participants received assistance for two production seasons.
Limitations: Better interaction between neighbours and CUW students is necessary as people request more student visits. The UCR's main campus transportation of materials and students presents a limitation, as UCR's transportation schedule must be prepared months in advance and is not flexible enough to satisfy the neighbour's requests for assistance.
Solutions: Improvement in transportation services is necessary.

Materials

Results: Students are taught how to prepare the materials for production. This preparation included organic fertilisers (from leaves and fruits), micro-organisms for plant protection and repellents.
Limitations: The amount supplied was not enough to satisfy the requirements of the community.
Solutions: Although the neighbours must prepare their own products, more resources are needed to provide the necessary materials, independent of whether such materials are distributed free or are sold.

Training area

Results: Many conferences were offered to neighbours, teachers, and elementary school students. Dissemination materials were designed, and there was a recompilation of the information on production, nutrition, post-harvest and food technology. An inventory was made of the community's reality, knowledge on organic agriculture, eating habits and their use of chemicals at home.
Limitations: Not being able to adequately extend the acquired experience.
Solutions: More resources in order to edit and print manuscripts prepared by the students.

FINAL REMARKS

It is clear that despite the limitations of this project, important gains were made from the experiences and ideas that deserve further analysis. There needs to be a process of reflection to be able to analyse the experiences, questions and suggestions coming from the UOA-CUW, as it was developed by the group of professors PAO-UCR with the various career-orientations of students over one and a half years in 2000/2001.

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Organic Waste at Low Cost

Dilemmas of a Transition Period

Eric Goewie

Groups of cityfarmers have created a common compost place

Farmers generally recognize the benefits of organic matter and seek to acquire it. The following materials can be of use: farm animal manure; household organic wastes; agricultural residues; market green wastes; food wastes; food processing industry wastes; manure from pig and poultry farms; slaughterhouse residues; raw solid wastes, decomposed matter from garbage dumps, and commercial composts.

Adapted from a presentation at the 6th World Congress on Integrated Resources Management, Geneva 2002.

Demand is high, but studies in Africa and India show that farmers have difficulty acquiring enough organic matter at suitable prices (Brook and Davila 2000, University of Birmingham et al. 2000, Furedy and Kulkarni, in preparation).

Composting of municipal solid wastes is now being promoted to reduce the amounts of waste requiring disposal and treatment by cities. Controlled composting is the safest way to produce high quality products for fertilization and soil amendment. However, the amounts produced in compost plants in developing countries are insignificant. Both large plants and small community-based ones have encountered numerous technical and marketing problems. Furthermore, the products of both types of plants are costly especially when compared with subsidized chemical fertilizers. When all expenses are calculated, the costs can be enormous. For instance, the cost of compost produced by a pilot compost plant in Bangalore, India, was US $1,514 per ton, with a hidden cost (1) of another US $724 (Lardinois and Marchand 2000). The poorest quality compost, made from mixed municipal wastes in Bangalore, is sold at about US $30 per ton. Even wealthy farmers in India, growing profitable crops such as flowers and vegetables, may not be able to afford the products of private compost plants (University Birmingham et al. 2000; Furedy and Kulkarni, in preparation).

An inevitable and important consequence of the high cost of compost products is that compost companies seek special customers: plantations, expensive hotels, golf courses, and farmers growing very valuable crops. Successful companies find their markets through extensive networks, some with international reach. Unless some special customers are close by, little compost is sold locally. Composts from urban wastes thus may help reduce municipal disposal but are a limited solution to the needs of urban and periurban farmers for organic matter.

LOW-COST ORGANIC WASTE PROCESSING AND REUSE

The selective dispersal of locally-generated wastes (via the products of compost plants) is a radical change from the time when urban organic waste was largely reused in or near the city. Nevertheless, even today, large amounts of urban organic waste are directly used as feed, fodder and fertilizer.

Current agricultural practices include:

- application to the fields of decomposed solid wastes that have been manually sorted at disposal sites or farms;
- on-farm co-composting of urban animal and agricultural wastes (also applies to "backyard farms");
- cultivation of dumpsites (closed or operating), and grazing of animals thereon.

The practice of using municipal solid wastes is growing in West Africa. It has been estimated for Kano (Nigeria) that, in the 1990s, 25% of the fertilizer needs of near-urban farmers was met by using

Compost companies seeks special customers

municipal waste (Lewcock 1994, Brook and Davila 2000). In Mali, poor farmers growing vegetables and cereals send women and children to municipal waste transfer points and dumpsites around centres like Bamako, Ouagadougou or Conakry. After some initial sorting, loads of garbage are carried for further sorting on the farm. Those who are somewhat better off pay municipal garbage truck drivers to unload waste near their fields (Dulac 2001).

While farmers' access to municipal waste is usually "informal", a number of Indian cities and towns allows farmers to remove waste from dumps for a fee (e.g., Autonagar dump, Hyderabad). Auctions used to be held at dumpsites.

In comparison to the cost of Rs 1500-Rs 5000 per ton (US $32-106) for compost made from mixed municipal solid wastes, Indian farmers acquiring waste

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directly from dumpsites pay about Rs 300-Rs 500 (US $6-11) per tonne (2). Compost (even when made from solid waste) costs at least four to five times as much as decomposed garbage.

A variant on removing solid waste from the dumps is the "mining" of dumpsites. This is the extraction of decomposed matter from levels of waste deposited some years before, or from closed dumps. At Beijing's main dump, the municipality encouraged such removal by supplying rotating drum sieves to replace the simple wood-frame ones onto which farmers shoveled the waste. At Bombay's Deonar dump, a private company mined lower deposit levels. In Yangon, Burma, an old dump was leveled by informal removal of "compost" over a period of years. The site, opposite the city's green market, had received at least 1.5 million tonnes of waste since the 1940s. (All of these examples were observed by the author in the 1990s).

THREAT TO LOW-COST INFORMAL REUSE

The use of recently disposed organic waste is under threat, especially in Asian cities, because the waste now contains numerous contaminants: plastics, broken glass, metal fragments, and biomedical wastes. In India today, it is estimated that only 50 %-35 % of the municipal solid waste of major cities is organic. Consequently, the cost of taking out the inorganics at the farm has increased. Both farm labourers and draught animals are liable to injury, while farmers note deterioration of their soils after some years of application (Furedy and Kulkani, forthcoming). Similar problems have been noted in Ghana (Brook and Davila 2000: 140). In a number of places, farmers are no longer accessing municipal solid waste (Nunan 2002).

POTENTIAL FOR IMPROVING LOW-COST REUSE

Can declining practices of low-cost organic waste recovery be rejuvenated?

National and local policies for industrial waste minimization, proper treatment of biomedical wastes and separate collection of urban organic wastes could, in the long run, rescue valuable organic material for use in food production. But it will be many years before most developing countries can effectively implement these policies on a large scale. In the transition period, options for managing waste disposal and farmer access may be feasible for some cities and towns. Managing dumps for organic waste recovery and mining old waste deposits are worth trying.

The quality of some disposed solid waste from the cities could be improved if sites at a dump (pits or heaps) were designated to receive the least contaminated waste - that collected from green markets, parks, and residential areas producing the 'best' waste (i.e., that containing the most organic material). Farmers would be permitted to buy decomposed wastes from the designated areas. Wastes from hospitals and toxic industries would have to be deposited well away from the waste-sale areas.

The advantages of mining old dumps (or old levels of current ones) are that they contain few toxic and manufactured contaminants and that the organic material is thoroughly decomposed and stable. The waste is easier to sift on site, considerably reducing transport costs compared to those for unsorted raw municipal waste.

Ensuring that there are less contaminated areas at dumps requires both good solid waste collection and consistent management at the disposal site. Reaching lower, "purer" disposal levels at dumps on any scale would require equipment that the poorest farmers would not possess. Nevertheless, farmers are highly motivated to reuse organic matter. Ways to allow them access to low-cost organic material is a topic that warrants the attention of public officials and aid agencies.

Controlled composting in cities will do little for low- and middle-income urban agriculturists. While both effective national and regional action for waste minimization and good waste management can contribute to less contaminated waste streams, enabling farmers to obtain the least contaminated solid wastes at dumpsites is the easiest and cheapest way to meet their urgent needs for soil amendments and fertilizer. This requires cities, regions and national governments to think adaptively in promoting organic waste reuse by urban and periurban food producers.

Community Based Compost Station in Accra, Ghana Drechsel/Kunze

The use of resently disposed organic waste is under threat

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Notes

1) "Hidden cost" refers to any cost that is not apparent in standard accounting, or, in general parlance, not immediately apparent, but nevertheless important for the production process. The hidden costs of compost for instance, would be any costs involved, not reported by the compost plant, like government subsidies, or international aid for personnel, training, etc.

2) I am grateful to Dr Fiona Nunan for supplying information that enabled me to estimate the costs of organic matter from dumps around Hubli-Dharwad, Karnataka, India.

In the twin city Hubli-Dharwad, untreated sewage is commonly used for irrigation in peri-urban agriculture. Farmers extract sewage for irrigation from sewage nallahs (open sewers) and underground sewer pipes. In this semi-arid climate the waste water is an extremely valuable resource for farmers, as pumping from sewage nallahs or drains is cheaper than a borehole, which makes the practice more accessible to farmers with fewer financial resources. It also provides an irrigation source during the dry season, when farmers can sell their produce for three to five times the kharif (monsoon) season prices.

Andrew Bradford

Sewage irrigation

Risk Reduction

in Hubli-Dharwad, India in Sewage Irrigated Farming Systems

High nutrient loading increases crop yields and reduces the need for fertiliser inputs, although it also results in an increased incidence of weeds and pests, with the latter controlled by habitual blanket spraying of organo-phosphate pesticides. Unregulated and continuous irrigation with sewage may lead to environmental problems such as soil sickness, soil and groundwater contamination, and phytotoxicity (Hunshal et al. 1997, Hicks and Hird 2000, Siddiqui 2000, Bradford 2001).

Furthermore, irrigating with sewage poses serious public health risks, as raw sewage is a major source of pathogens and may contain highly poisonous chemical toxins from industrial sources (Furedy et al 1999, Zarsky and Hunter 1999). The adoption of certain micro technologies can reduce the risks faced by farmers who have irrigated with sewage.

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SEWAGE FILTRATION AND IRRIGATION

Regardless of the cropping systems used the sewage irrigation method utilised along the Dharwad and Hubli sewage nallahs remains the same in that it consists of an overland flow and furrow irrigation system. Along both the Dharwad and Hubli transects, farmers use a ridge and furrow system to prevent the waterlogging of crops. However, the use of ridge and furrow irrigation, rather than flood irrigation, does not reduce the risk of crop contamination or reduce farmer exposure to sewage. The results of an exploratory crop test at the University of Agricultural Sciences, Dharwad, showed that crop samples taken from a ridge were still contaminated by the sewage flowing in the furrow. In addition, farmers stand in the flowing sewage in the furrow rather than damaging the ridges during transplanting and weeding operations, thus increasing their contact and exposure to raw sewage. During the dry season, vegetable crops are irrigated every two days and tree crops every ten days.

Although all farmers have adopted a common irrigation method, one aspect, which remains heterogeneous, is that of sewage filtration. Most farmers have adopted some method of filtering the sewage as it is pumped from the Nallah. The filtration serves two purposes: it prevents debris entering the pump thereby reducing wear and tear, and it prevents the fouling of soils with any debris and solid wastes present in the sewage. The various forms of filtration include: improvised gauze filters round the inlet; inlet pipe positioned inside pierced plastic barrels that act as large sieves; sieve baskets woven from natural fibres; and on one farm in Maradagi the use of a settling tank, which also serves as a sewage storage tank to ensure a sufficient irrigation supply when the sewage flow is low. If filtration is not used, any solid waste flowing in the sewage that can pass through the inlet is pumped onto the fields. As the sewage infiltrates into the soil the solids remain on the surface, clogging the topsoil with plastics and other debris. After tilling operations, the waste becomes half buried, resulting in potentially hazardous conditions for farmers.

VEGETABLE PRODUCTION

A distinct feature of the intensive vegetable production systems is

Some informal farmer to farmer networks already contibrute to the process

the continuous year-round production of vegetables and the absence of a fallow. The proximity to urban areas - i.e., the source of sewage - ensures a reliable irrigation supply during the dry season (February - May). These production systems are predominantly found at Madihal in Dharwad and at Bidanal on the outskirts of Hubli. The ease of access to local urban markets and high urban demand ensure a secure market for vegetable production, particularly during the dry season when vegetable market prices increase three- to fivefold (Hunshal *et al.* 1997). The intensive vegetable production systems require considerably higher labour inputs than field crop and agroforestry based systems. Household members normally meet these labour inputs, but during peak periods, additional farm labourers may be hired.

The increased incidence of pests associated with sewage-irrigated vegetable production systems results from a combination of factors. The planting of vegetable crops in monoculture blocks increases their susceptibility to pests. In addition, the warm climate provides opportunistic breeding conditions for crop pests and the continuous growth of crops during the dry season ensures that at a time when land is normally barren and arid, substantial green plant mass is available which allows insect populations to thrive when they would normally encounter a seasonal decline. *Plutella xylostella* (diamondback moth, DBM) and *Helicoverpa armigera* are two such pests that thrive on sewage-irrigated crops. DBM affects aubergine and most *Brassica* species, while *Helicoverpa armigera* infests most vegetable crops. During interviews, farmers on both sewage nallahs identified *Helicoverpa armigera* as a major pest currently affecting aubergine, chilli, okra, onion and tomato crops. Furthermore, Alagawadi (2001) has raised a further concern suggesting that boring pests (e.g. *Helicoverpa armigera*) that invade crop fruits (e.g. aubergine) on sewage-irrigated fields are likely to increase bacterial contamination of the crop by providing additional entry routes.

The increase in pest incidence has more implications for farmers and the environment than the increase in weed incidence. The effects of the "pesticide treadmill" combined with the continuous cultivation of crops in climates favourable to pests and where generations may exceed 14 per year has resulted in pests becoming practically resistant to all insecticides. The prolific multiplication of pests such as DBM and *Helicoverpa armigera* has resulted in crop failures and high economic losses, with the outcome in Madihal of farmers no longer growing certain crops (e.g. cabbage) due to the lack of an effective pest control. Furthermore, despite the failure of organo-phosphates pesticides to provide effective crop protection, farmers have responded by increasing the frequency of pesticide application; weekly spraying is now a regular occurrence with some farmers spraying twice weekly. Farmers also mix pesticides prior to spraying, potentially hazardous remedies advocated by the pesticide dealers who remain the main source of extension information to peri-urban farmers. The net result is an increased risk of crop contamination and of farmers being exposed to pesticide poisoning.

INTEGRATED PEST MANAGEMENT (IPM)

An IPM trial was conducted in sewage-irrigated vegetable cropping systems using the bacterium *Bacillus thuringiensis* (*Bt*) and light traps over two seasons. While there was some crop loss due to delayed treatments, the results proved an overall success. In terms of extension success and the uptake of technologies the research work had mixed results (bearing in mind that the trial was research- rather than extension-based). Once the trial was concluded, the farmer who had participated stopped using *Bt* spray and reverted back to applying chemical pesticides. The farmer's decision to revert back may have resulted from a lack of confidence to continue using biological pesticides without the regular attendance of the researcher and the fact that *Bt* is not widely retailed and hence inconvenient to purchase. Conversely, farmers at Madihal have been keen to duplicate the light traps used in the trial and now use light bulbs (to attract moths at night) underneath which are located tubs of kerosene, which kills any moths that land in the fuel (Bradford 2001).

CONCLUSIONS AND POLICY IMPLICATIONS

The risks and dangers from irrigating with sewage are well documented, and in much of this literature, sewage treatment is often advocated to mitigate the public health and environmental risks (see Allison *et al.* 1998, Birley and Lock 1999, Furedy *et al.* 1999, Blumenthal *et al.* 2001, and Gueye *et al.* 2001). However, since the Hubli-Dharwad Municipal Corporation has failed in its legal requirement to treat the sewage discharged from the city region and are unlikely to implement such a programme in the near future on the grounds of high costs, farmers using sewage should be encouraged and supported to adopt safer and more sustainable farming practices. The farmers along the sewage nallahs have clearly demonstrated a readiness to adopt alternative pest control strategies with some informal farmer-to-farmer networks already contributing to that process. However, the change from the current reliance on chemical pesticides to IPM strategies will require long-term support through participatory approaches such as the use of farmer field schools that empower farmers through education and training. The development of micro technologies at the farm level to reduce risk is crucial in reducing the pest risk, and examples are clearly evident in Hubli-Dharwad, where some innovative farmers have diversified their agro-ecosystems by incorporating agroforestry practices.

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FURTHER READING

AGROECOLOGICAL INNOVATIONS

Norman Uphoff (ed.). 2001. London (UK): Earthscan. 328 pages. ISBN: 1 85383 857 8 (paperback); 1 85383 856 X (hardback).

Agroecological Innovations presents a groundbreaking collection of innovative, successful and diverse approaches to agricultural development. Documented in 12 case studies, these approaches draw upon greater knowledge, skill and labour input, rather than on larger, unsustainable capital expenditure, and are shown to increase yield substantially, sometimes doubling or tripling output. This volume presents both key concepts and operational means for reorienting agricultural efforts towards more environment-friendly and socially desirable approaches to the pressing problem of food security in the developed as well as developing world. It is a vital guide and resource for professionals and policy-makers involved in agriculture and food production as well as an important text for academics and researchers.To order:
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ORGANIC FOOD AND FARMING: MYTH AND REALITY

Soil Association (2001)

Organic Food and Farming: Myth and Reality counters the myths spread by the opponents of organic food and farming. The booklet examines some of the key issues around organic food and it's production. It takes up the challenge of answering the critics-critics who range from public relations companies defending agribusiness to the heads of national food authorities and some academics. It exposes the misleading and erroneous statements made against organic food, and provides the facts that prove them wrong. In particular,
6 areas are examined: health, food poisoning, damage to the envorinment, price of organic produce, world food problem, care of animals. The report, jointly published by the Soil Association and Sustain , is endorsed by 36 public interest groups ranging from the National Federation of Women's Institutes to WWF-UK. The document can also be downloaded for free from the internet as a Pdf-file. Go to the the soil association website www.soilassociation.org.uk follow: shop/books etc/Soil association publications/Organic Food and Farming: Myth and Reality.

THE FAITH GARDEN MODULE

Yilma Getachew (1996) In: The Urban Farmer series, No 1. Addis Ababa, Ethiopia.

The publication is more of a training manual targeting training of trainers on urban agriculture in the Ethiopia setting. It is aimed at introducing urban agriculture techniques that are categorised under organic production, natural fertilisation and pest control, and water harvesting techniques together with raring small livestock in an integrated manner. The first issue from the series describes the FAITH garden module where using 15m2 of land space, a family can be self - sufficient in micro-nutrition rich food and as the same time recycles all of the household generated organic waste in the process of producing food. The manual is the first of the anticipated 15 issues to be published in the future.

THE ORIGINS OF THE ORGANIC MOVEMENT

Philip Conford. 2002. Edinburgh (Scotland, UK): Floris Books. 287 pages. ISBN 0-86315-336-4.

Genetically modified crops, BSE, Aftosis, salmonella in chicken or chemical residues on food have caused and still do cause concern about the way food is produced. The public is being assured that foodstuffs from industrial modes of production cannot possibly be a health risk: an astonishingly optimistic assumption, unlikely to allay consumer scepticism. That is why organic production receives more and more attention from Governments, scientists, retailers and producers. The author, concerned about such a simplistic view, states however that the organic movement tends to offer its methods as an antidote to those problems. He sees that the principles of organic production can sound negative, based solely on rejection. However, Conford's book gives another view: profound explanations about the basic principles behind the organic concept. He presents the most important dimensions of organic food production in twelve chapters. Starting with a well-underpinned discussion about the drive for efficiency, he comes to the reasons why organic production came into being. Naturalness, health, logical agriculture and even spirituality were important reasons for creating the organic concept. Conford shows how each part of the world developed its own approach of such reasons.
He beautifully demonstrates that organic production is successful and brings his information across in a clear, sober, complete and reliable manner. This book should be read by everybody wanting to know more about organic food production, whether that is for reasons of history, state-of-the-art or simply to gain a better understanding. To order: contact Floris Books at 15 Harrison Gardens, Edinburgh, Scotland (by Eric Goewie)

WORLD MARKETS FOR ORGANIC FRUIT AND VEGETABLES. OPPORTUNITIES FOR DEVELOPING COUNTRIES IN THE PRODUCTION AND EXPORT OF ORGANIC HORTICULTURAL PRODUCTS

FAO/ITC/CTA. 2001. 317 pp. CTA number 1055.

This is a solid guide, which explains almost all that an interested trader, exporter or producer needs to know. What are the requirements for producing and exporting organic products to major markets? What are the characteristics of the individual markets of countries in the EU, in the USA or Japan? Who certifies what, which labels mean what, what is local competition? Etcetera. Detailed country profiles and case studies of production and exports from countries like Argentina, Chile, Cameroon, Dominican Republic, Papua New Guinea and Zambia are given. This publication is based on a study commissioned by FAO, CTA and the International Trade Centre (comprising UNCTAD and WTO). It gives a huge amount of useful facts (by CTA).

NEW BOOKS

REVIEW OF URBAN AND PERI-URBAN TRANSFORMATIONS AND LIVELIHOODS IN EAST AND SOUTHERN AFRICA

Beacon Mbiba (ed.). 2002. Urban and Peri-urban Research Network (Peri-NET). London, UK: South Bank University.

This reader is a compilation of work in progress by members of the Peri-NET in East and Southern Africa. Peri-NET aims to link and enhance young scholars on intellectual capacity-building in African institutions and producing knowledge for use by, and in partnership with, local authorities, governments and communities. The reader consists of six papers, drawing from experiences from Uganda, Zambia, Kenya and Zimbabwe. Some of this work has been presented and discussed at the Regional Workshop on "The Political Economy of Urban and Peri-Urban Agriculture in East and Southern Africa" held in Harare, Zimbabwe, February 2001.

SUSTAINABLE COMMUNITIES IN EUROPE

William M Lafferty (ed.). 2001. London (UK): Earthscan Publications Ltd.

This book presents detailed research into the participation and involvement of local communities in 11 European countries. Overviews of implementation in each country are accompanied by comparative analysis of positive and negative changes to date. Useful examples of best practice case studies are provided, and crucial barriers to achieving sustainability highlighted. This most broad-based and systematic study of LA21 ever produced offers important lessons and suggestions for the future which will be invaluable in preparations for the forthcoming "Earth Summit 2002" to be held in Johannesburg, South Africa.

INFORMATION AND COMMUNICATIONS TECHNOLOGY: TECHNOLOGY AS POTENTIAL CATALYST FOR SUSTAINABLE URBAN DEVELOPMENT - EXPERIENCES IN EINDHOVEN, HELSINKI, MANCHESTER, MARSEILLES AND THE HAGUE

L van den Berg and W van Winden (eds). 2002. EURICUR Series. Ashgate, UK: European Institute for Comparative Urban Research. 140 pages. ISBN 0 7546 1880 3.

By examining and comparing the mentioned five European cities, this book sheds light on the impact of ICT on urban development and considers the consequences for urban management. The case studies show how cities use these new technologies to improve the delivery of municipal services to increase civil participation and local democracy, to help their citizens and businesses make the shift to the information society, but also to fight the potential digital divide. New insights are given in the discussion of economic, social and accessibility issues. The contents consist of four main parts: Introduction and Context; ICT and the City; Conclusions and Synthesis; and the Case Studies. The book can be ordered by e-mail from: jetherington@ashgatepub.co.uk.

ENVIRONMENTAL PROBLEMS IN AN URBANIZING WORLD

Jorge E Hardoy, Diana Mitlin and David Satterthwaite. 2001. London: Earthscan Publications, Ltd. 464 pages. ISBN 1853837 199 (paperback).

This updated and much expanded edition of the classic *Environmental problems in Third World Cities* describes environmental problems and their effect on human health, local ecosystems and global cycles. It points to the political causes that underpin many of these problems – including ineffective, unaccountable governments, and aid agencies' reluctance to work with the urban poor. It also highlights innovative solutions. In their analysis, the authors show that cities can meet sustainable development goals. There are practical, affordable solutions to their environmental problems, but most of these depend on more competent and accountable city governments and on more support for low-income households and their organisations. The book also outlines the changes needed from international aid agencies to support this. Order from Earthscan: www.earthscan.co.uk

ALTERNATIVE PERSPECTIVES ON LIVELIHOODS, AGRICULTURE AND AIR POLLUTION - AGRICULTURE IN URBAN AND PERI-URBAN AREAS IN A DEVELOPING COUNTRY

Neela Mukherjee. 2001. Hampshire (UK): Ashgate Publishing Limited.

This book provides a 'synthesis' picture of development, urbanisation and pollution in India, based on field research undertaken in the agricultural belts of Haryana and Utar Pradesh. Unlike previous studies, it presents the perspectives of the farmers themselves on the role of agriculture, the impact of air pollution on health, quality of life and the effectiveness of the existing support networks available to them. Using field studies of direct relevance to development practitioners, agencies, NGOs, environmentalists, policy-makers and researchers, it captures the views of the complete spectrum of social groups to provide the most comprehensive and balanced analysis of one of the key issues facing India today. The findings highlight the pivotal role agriculture plays in societal and cultural issues such as gender roles, health and food security as well as the traditional concepts of livelihood, employment and income.

HOMESTEAD FOOD PRODUCTION - A STRATEGY TO COMBAT MALNUTRITION AND POVERTY

Helen Keller International/Asia-Pacific. 2001. Jakarta (Indonesia): Helen Keller International.

This publication highlights the extensive work of HKI and of individuals working with HKI in the area of food-based approaches and the efforts to identify their different impacts. First the current knowledge on food-based approaches and their impact on nutritional status, health and development is reviewed, with an emphasis on Homestead food production and social marketing of vitamin A-rich foods. These issues are discussed in the context of HKI's food-based programmes in the Asia-Pacific region. Following are key articles that have brought food-based approaches such as homestead food production into the mainstream of scientific and programmatic discussion. These articles highlight the extensive work conducted by HKI in Bangladesh, the important findings about the bioavailability of vitamin A from fruits and vegetables, and social marketing in Indonesia, and experiences in evaluating food-based programme approaches.

www.organic-europe.net
This site was set up by Stiftung Ökologie & Landbau, (website http://www.soel.de) in Germany in 2000, and is co-funded by the EU Commission, Agricultural Directorate-General (website http://www.europa.eu.int/comm/index_en.htm). It contains information on organic agriculture in Europe, like country reports on organic farming in 25 European countries, information on organisations, standards and certifications, state policy and training. The database on organic research lists projects, institutions, researchers, networks, resources and events. It further contains a section on EU documents and organic farming statistics, resources and news.

http://www.demeter.net/inhalt.php
Demeter is the only ecological association that has built up a network of individual certification organisations worldwide. In 1997 Demeter-International was founded by 19 Demeter organisations from Europe, America, Africa and Australasia for closer cooperation in the legal, economic and spiritual spheres. Thus Demeter-International represents around 3,000 Demeter producers in 35 countries. On the website, you will find information on international production and processing standards, international marketing, and accreditation councils, as well as a list of 19 biodynamic gardening organisations all over the world.

http://www.ota.com
The Organic Trade Association (OTA) is a membership-based business association representing the organic industry in Canada, the United States and Mexico. Established in 1985 as the Organic Food Production Association of North America, the Organic Trade Association works to promote organic products in the marketplace and to protect the integrity of organic standards.

http://www.pbh.gov.br/meio-ambiente/cevae.htm
This is the (Portuguese-language) website of the Municipality of Belo Horizonte, Brazil. On this page you will find information on experiences with the CEVAES (Os Centros de Vivência Agroecológica) Centre and its work on urban agriculture in the city. CEVAES is composed of public community groups on policy and environment. They work in several project areas such as environmental education, food security, health and ecological farming.

http://www.ias.unu.edu/proceedings/icibs/ibs/ibsnet/
This site is the work of a network of people, to have a forum and seek cooperation in the applications of the integrated biosystems approach in agriculture, industry, forestry and habitat. It is coordinated by Jacky Foo, from the Department of Biotechnology at the Royal Institute of Technology, Stockholm, and the UNESCO Microbial Resources Centre, in Stockholm, Sweden.

http://www.permacultureactivist.net/pcresources/PcResources2.htm
This site includes a global directory of permaculture organisations in Africa, Europe, North America, Latin America and Asia. In addition, there is general information on permaculture; e.g., a list of sites on permaculture technologies, bioregional and ecovillages and a virtual library on permaculture. The global directory is part of the site of *The Permaculture Activist*, a North American periodical. ***http://www.comp.leeds.ac.uk/pfaf/Links.html#AF*** is a similar site, with permaculture organisations listed by country.

http://www.inventariando.com/agricultura_organica.php
This website in Spanish is part of a larger portal side on sustainable development. This particular page gives information on recent international and Latin American discussions and events on organic agriculture. It gives: ❖ Information on a recent publication of Helga Willer und Minou Yussefi (sponsored by NürnbergMesse in collaboration with IFOAM also at www.soel.de); ❖ The results of an electronic conference organised by Chorlavi Group on the access of farmers to organic markets from 26 November-17 December 2001 (see also ***http://www.grupochorlavi.org*** also in Spanish).

http://www.hdra.org.uk/index.htm
Henry Doubleday Research Association (HDRA) is Europe's largest organic membership organisation. It is dedicated to researching and promoting organic gardening, farming and food. The site contains practical information on how to grow organically yourself, as well as news on everything touching organics. HDRA also has an overseas programme, divided into research and advisory activities, to help countries and organisations find information and resources on organic gardening.

http://www.ifoam.org/conf/table4.html
The 14th Organic World Congress for the International Federation of Organic Agriculture Movements IFOAM 2002 will be held from 15-27 August 2002 in Victoria BC, Canada with the theme: "Cultivating Communities". The Canadian Organic Growers is organising the 2002 Organic World Congress on behalf of the IFOAM. Besides the 14th Organic World Congress, the 4th IFOAM Organic World Exhibition, the 7th International Congress on Viticulture and Wine, and the IFOAM General Assembly will be held concurrently. For more information about the Canadian Organic Growers, see: ***http://www.cog.ca*** .

http://www.formatkenya.org
This site is for the Forum for Organic Resource Management (FORMAT) in Kenya. The website recently has been updated with information from the second national event held late last year. It also has useful links to information on research grants for M.Sc. training in agriculture in East and Southern Africa (as well as ***www.rockforum.org***).

www.toolkitparticipation.com
Citizen participation in local governance is an important theme in policy and development debates. This website aims to contribute to this debate, by offering a platform for organisations, citizens and local governments to exchange experiences. The toolkit offers information on tools for promoting citizen participation in local governance. Over one hundred cases are described and analysed. The site also presents articles and links for further reference.

www.sustainablealternatives.net
The sustainable alternatives network is an initiative trying to connect people, information and markets to protect the global environment. It offers decision-making support, in the form of incentives and hands-on advice, when confronted with a critical investment or policy choice. Solutions are offered that enhance economic viability and protect the environment. Many links on sustainability and organic agriculture can be found with "market places" and information on sustainable energy, natural resources, cleaner production, transportation, financing and policy options.

CREATING SUSTAINABLE URBAN ENVIRONMENTS - FUTURE FORMS FOR CITY LIVING

23-26 September 2002, Oxford, UK

This is the fifth symposium of the International Urban Planning and Environment Association. Contact: upe5@brookes.ac.uk or Sarah Taylor at the Oxford Centre for Sustainable Development, School of Architecture, Oxford Brookes University, Gipsy Lane, Headington, Oxford, OX3 OBP, UK.

WORLD SUMMIT ON SUSTAINABLE DEVELOPMENT (RIO EARTH SUMMIT +10)

26 August- 6 September 2002, Johannesburg, South Africa

Ten years after the World Summit on Sustainable Development in Rio, Brazil, this follow-up Summit in Johannesburg will bring together tens of thousands of participants, including heads of state and government, national delegates and leaders from NGOs, businesses and other major groups to focus the world's attention and direct action will be focused on taking stock of the environmental situation in the results of agreements made, to be summarised in the various chapters and subsequent conventions. National and regional preparations are already in full swing. More info is available at: http://www.un.org/esa/agenda21/ or http://www.earthsummit2002.org/ .

ECOSCAPE ECO-INDUSTRY ECO-CULTURE, THE FIFTH INTERNATIONAL ECO-CITY CONFERENCE

19-23 August 2002, Shenzhen, China

The first four Eco-city conferences were held in Berkeley, California, USA in 1990; Adelaide, Australia in 1992; Dakar/Yoff, Senegal in 1996; and Curitiba, Brazil in 2000. The campaign of the "Eco-city Development" is currently expanding in both industrial and developing countries. The event is initiated by the Eco-city Builders International, the Society for Human Ecology, the International Society for Eco-Engineering, and co-sponsored by the Ecological Society of China, SCOPE/CAST, RCEES/CAS, the Shenzhen government, the Chinese Association for Ecological Economics, the Chinese Association for Science and Technology, the Chinese Association for Urban Sciences, the Chinese Association for Sustainable Development, and the Chinese Society for Urban Planning. The main themes of this conference are: ❖ Theories and methodologies in urban ecology, industrial ecology and human ecology; ❖ Technologies and instruments for eco-settlement, eco-industry and eco-landscape preservation and ecologically informed development; ❖ Institutional enhancement and citizen's participation for eco-culture and capacity-building; and ❖ Experience in whole systems approaches to transforming cities as living organisms and living environments. All abstracts of presentations and posters will be collected in conference proceedings as well as being displayed on the internet. A book on Eco-city development might be published after the conference depending on the quality of the resources. The conference language will be English. Contact persons are: Prof. Dr. Rusong WANG (main organiser), Ms. Yajuan Shi and Ying Hu (secretary), at the Chinese Academy of Sciences at:
Tel.: +86 10 62849103, 62849101;
Fax: +86 10 62943807, 62943822;
e-mail: wangrs@mail.rcees.ac.cn or huying@mail.rcees.ac.cn;
Websites: http://www.rcees.ac.cn , http://www.icsu-scope.org.cn .

FORESTRY SERVING URBANISED SOCIETIES, IUFRO EUROPEAN REGIONAL CONFERENCE

27-30 August 2002, Copenhagen, Denmark

This conference aims to identify promising approaches and developments in the relationship between forestry and urban societies. The role of forestry research as the foundation for the development of forest planning and management is a central issue. The objectives are: to define the role of forestry and forestry research within an increasingly urban society; to identify and explore promising scientific and technological findings with regard to the urban aspects of forestry; and to identify new directions and strategies in forestry research in the context of extended networking with other disciplines as well. The conference will have the following six central themes: the development of urban forestry; the environmental & ecological functions and benefits of forests and trees in urban societies; socio-economic aspects of forests and trees in urban societies; and forestry and degraded areas in urban societies. Further information is available from the conference secretariat at the Danish Centre for Forest, Landscape and Planning. Contact Dr. Cecil Konijnendijk by e-mail: cck@fsl.dk; Fax: +45 45 76 32 33; Tel.: +45 45 76 32 00. Or go to: http://iufro.boku.ac.at/iufro/meetings/europe2002/first-call.htm

IFOAM 2002 ORGANIC WORLD CONGRESS: CULTIVATING COMMUNITIES

21-28 August 2002, Victoria, British Columbia, Canada

The IFOAM 2002 Organic World Congress "Cultivating Communities" will bring together representatives of the organic movement from around the world, and is open to everyone interested in organic agriculture and sustainable development - farmers, researchers, advisors, food processors, traders, certifiers, policy-makers and consumers.
More information at: http://www.cog.ca or www.ifoam.org .

INTERNATIONAL CONFERENCE ON URBAN HORTICULTURE

2-6 September 2002, Zurich, Switzerland

The aim of the Conference on Urban Horticulture is to present and discuss visions, innovations, research themes and solution concepts for urban green areas. Garden design and plant utilisation as well as the interactions between people and designed nature form the central themes of the conference. The five themes are Plants and Society; Public Green; Plant use and Landscaping; Assortment Development, Evaluation and Production; and Ecological Engineering. Visit: http://www.urbanhorticulture.ch/ or send an e-mail to: conference@hortikultur.ch .

CLEVELAND BOTANICAL GARDEN'S *RIPE FROM DOWNTOWN*™ SYMPOSIUM

18-20 July 2002, Cleveland, Ohio, USA

This national symposium focuses on the creation of Garden-Based Entrepreneur Programmes for Youth. Schools and gardening organisations throughout the USA discover that adding an entrepreneur element to a youth gardening programme motivates the current youth to work, learn, and develop business and life skills. The "Ripe from Downtown Symposium" has gathered many of the best garden-based youth entrepreneur programmes in the country in order for them to share their knowledge and experience with others interested in starting their own programmes. Information and registration: Cleveland Botanical Garden, Ripe from

Downtown, 11030 East Boulevard, Cleveland, OH 44106, USA Tel.: (Mon-Fri 9a.m.–5p.m.): +1 216 7211600 extension 123, or Fax: +1 216 7212056.

SECOND INTERNATIONAL CONFERENCE ON URBAN REGENERATION AND SUSTAINABILITY: "THE SUSTAINABLE CITY 2002"

3-5 July 2002, Segovia, Spain

The Sustainable City 2002 stems from a series of conferences originating from the need to bring together different academics, professional and practitioners from a wide range of disciplines, to exchange ideas and identify best policies in practice for a viable urban environment. The conference aims to address many interrelated aspects of the urban environment, from transport and mobility to social exclusions and crime prevention. It is hoped that the meeting will build on the contributions made in previous meetings, which successfully managed to provide an international view of the problems facing modern cities and their solutions.

This conference is being organised by the Wessex Institute of Technology, UK.

For further information, contact the conference secretariat, Wessex Institute of Technology, Ashurst, Southampton, SO40 7AA, UK;
Tel.: + 44 (0) 238 029 3223;
Fax: + 44 (0) 238 029 2853;
e-mail: lsouthcott@wessex.ac.uk
or, for the latest conference information visit http://www.wessex.ac.ukor : http://www.uwin.siu.edu/dir_announce/callpaper/04022001.html .

ELECTRONIC CONFERENCE ON USE OF URBAN WASTE WATER

25 June - 5 July 2002

IWMI chairs the virtual water forum on urban wastewater re-use in very-low-income countries, on the World Water Forum website (http://www.worldwaterforum.org/). For more discussion, information on publications and events related to waste water please visit the IWMI website on: http://www.cgiar.org/iwmi/health/wastew/index.htm

A sequence of events is in the pipeline to fully discuss the subject of wastewater re-use. June/July RUAF and IWMI will jointly organise an electronic conference. More information and topic papers will soon be published on the RUAF and IWMI website. IWMI is also organising an international Expert Meeting in September in Hyderabad. And no.8 of the UA Magazine will be dedicated to this subject to inform you on some of the results.

SEMINAR ON URBAN AND PERI-URBAN AGRICULTURE IN CENTRAL AND EASTERN EUROPE

20-22 June 2002, Sofia, Bulgaria

This seminar will discuss the results of a three-year project called "Soil and Water Management in Agricultural Production in Urban Areas (SWAPUA)". The topics to be discussed include the potentials and limitations of urban agriculture for urban food production, poverty alleviation, and urban environmental management. The integration of agriculture into urban planning as well as the socio-economic impacts and potential of urban agricultural activities will be reviewed. City officials and senior staff of sectoral government organisations, NGOs and research institutes from Central and Eastern Europe are invited to participate in this important workshop. The seminar is co-funded by the EC and OSF; OSF is offering funds to a number of CEE participants to cover travel and accommodations costs. For registration and further information please contact Antoaneta Yoveva at: e-mail: ayoveva@aster.net ; Tel.: +359 2 9801540; by post: Room 207, Alabin Street 22, Sofia 1000, Bulgaria.

WORLD FOOD SUMMIT: FIVE YEARS LATER

10-13 June 2002, Rome, Italy

The World Food Summit: "Five Years Later", originally scheduled from 5-9 November 2001 has been rescheduled to 10-13 June 2002, in Rome, Italy. This summit was announced by the FAO Council when it became clear that the original summit's goal of cutting the number of hungry by half by the year 2015 would not be met without renewed effort. For further information see: www.fao.org, or contact: the Media Relations Branch: +39 06 5705 3625.
A special issue of the UA Magazine has been prepared on the topic.

FIFTH INTERNATIONAL WORKSHOP ON ECOLOGY AND DEVELOPMENT

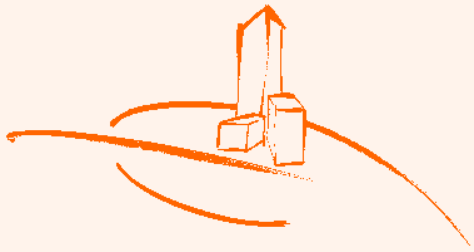
3-7 June 2002, Matanzas, Cuba

The Study Centre for Environment of the University of Matanzas (CENAM), together with other institutes is organising this workshop with the objective to exchange information and discuss alternative solutions on environmental management, education and technologies. Among the wide spectrum of themes, urban planning and the environment is one. The workshop will be held in Spanish and English. Please contact Dr. Juana Zoila Junco Horta, CENAM, Universidad de Matanzas, CUBA at: Fax +53 52 253101; Tel.: +53 52 261432; e-mail: cemam@umcc.cu or cemam@quimec.umcc.cu or see: http://www.umcc.cu/ecodes/.

URBAN POLICY IMPLICATIONS OF ENHANCING FOOD SECURITY IN AFRICAN CITIES

27-31 May 2002, Nairobi, Kenya

This workshop is organised by UNHCS in partnership with the FAO, IDRC and SIUPA (CIP-based Strategic Initiative on UPA). Urban food security has become an issue on which governments, community-based organizations (CBOs), NGOs and UN agencies are placing a lot of emphasis. Emerging dynamics in sustainable urban development have given rise to new policy issues that need to be addressed by urban planners and managers and other relevant decision-makers. In the light of the increasing importance of urban agriculture in the fight against urban poverty, how should cities respond to



this phenomenon? How should urban planners and managers address peri-urban land conflicts? And what approaches should city authorities and urban planners adopt in order to facilitate the influx of food into cities and its marketing? The objectives are: to review and discuss the relative contribution of urban agriculture to the overall food needs of cities in Africa and to urban poverty reduction in general; to discuss the policy implications of urban food security; to recommend urban policy guidelines. There are five working groups:

- Working Group 1: Urban food security and poverty reduction;
- Working Group 2: Rural-urban food flows, internal distribution infrastructure and services;
- Working Group 3: Urban agriculture - covering land tenure, land-use conflicts, planning and development (including technical extension and environmental management);
- Working Group 4: Peri-urban agriculture - covering land tenure, land-use conflicts, planning and development;
- Working Group 5: Credit and investment in urban and peri-urban agriculture.

Contact: Urban and Regional Economy Unit, Urban Economy and Finance Branch, UNCHS (Habitat), P.O. Box 30030, Nairobi, Kenya.
Tel: +254 2 624521; Fax: +254 2 623080; e-mail: rose.muraya@unchs.org.

URBAN AGRICULTURE: EMERGING OPPORTUNITIES IN SCIENCE, EDUCATION AND POLICY

20-22 May 2002, Dallas, Texas, USA

This symposium aims to define and describe the components and issues of urban agriculture and examine the common ground and opportunities that exist between urban and rural communities. At the meeting, the CAST (Council for Agricultural Science and Technology) document on urban agriculture will be released and discussed. Contributing authors will provide abstracts that will be published in book form. In addition, invited speakers will provide chapters for a book on the proceedings to be published within six months of the meeting. Other written products from the symposium could include an executive summary for use with key leaders (e.g., legislators) and press packets on urban agriculture for the media.
Contact: urbanag@tamu.edu or go to: http://urbanag.tamu.edu .

FEEDING CITIES IN THE HORN OF AFRICA

7-9 May 2002, Addis Ababa, Ethiopia

This conference is organised by the Municipality of Addis Ababa and the Food and Agriculture Organization of the United Nations (FAO), under the auspices of: World Bank Horn of Africa Food Security Initiative and FAO Food Supply and Distribution to Cities Initiative, in collaboration with: GTZ, UNDP, UNICEF, WHO and WFP. (East African Cities are growing rapidly. Their growth is accompanied by an increase in the number of urban households living in poverty. City and Local Authorities (CLAs) can play an important role in reducing urban food insecurity and should be supported technically and financially.) The objectives of the workshop are: - to identify major food security challenges in feeding East African cities and the role that CLAs can play;- to prepare a plan of action for the next ten years to strengthen the capacity of CLAs in enhancing urban food security; and- to facilitate South-South and North-South collaboration and technical assistance partnerships between CLAs, to address specific urban food supply and distribution constraints. More information can be found at: http://www.fao.org/ag/ags/agsm/sada/eastafrica/index.htm.

UN-HABITAT WORLD URBAN FORUM

29 April-3 May 2002, Nairobi, Kenya

In its resolution 18/5 from 16 February 2001, the UN Commission on Human Settlements requested the executive director to, *inter alia*, "promote a merger of the Urban Environment Forum and the International Forum on Urban Poverty into a new World Urban Forum, with a view to strengthening the coordination of international support to the implementation of the Habitat Agenda". Following from this request, the first session of the unified World Urban Forum will be held from 29 April - 3 May 2002 at the headquarters of the United Nations Centre for Human Settlements (Habitat) in Nairobi, Kenya. Participation in the World Urban Forum will be open-ended, but is, in principle, limited to representatives from national governments and Habitat Agenda Partners. The latter comprise local authorities, the Global Parliamentarians on Habitat, NGOs, CBOs, human settlement professionals, research institutions and academies of science, the private, business and non-profit sectors, foundations, relevant UN organisations and other international agencies.
For more details please visit:
http://www.unchs.org/uf/introduction.htm .

INTERNATIONAL CONFERENCE ON BUILDING SUSTAINABLE CITIES

18-20 April 2002, Isle San Servolo Venice, Italy.

This Conference is organised by a consortium of universities (Florence, Venice, Turin) in Italy and the University of Salford, UK, and seeks to discuss recent developments in the development, design, use and management of the built environment, with attention to the strategies politicians and planners could employ. More information can be found at: http://www.scpm.salford.ac.uk/venice.

INTERNATIONAL CONFERENCE OF ORGANICS RECYCLING

28 and 29 November, 2002
Japan Organics Recycling Association.

General information of conference is listed in English on the webside:
http://www.jora.gr.jp/symp/eng/guide.html
or you could contact Kazuhiro Yamazaki,
Senior Counselor, yamazaki@jora.gr.jp,
Tel: +81-3-5283-0678; Fax +81-3-5283-0679.

BIOFACH 2002

14-17 February 2002, Nuremberg, Germany

BIOFACH 2002 was organised in the Exhibition Centre Nuremberg, Germany. The organisers counted more than 27,000 experts from all over the world, visiting the expo and gathering information about the international range of organic food and natural products from about 1900 exhibitors. The International Federation of Organic Agriculture Movements (IFOAM) supported BIOFACH 2002.
For more information please visit:
http://www.biofach.de.