

POLICY OPTIONS FOR URBAN AGRICULTURE

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1. Introduction

Throughout the globe, agriculture is increasingly a part of city landscapes. Like many urban trends, urban agriculture crosses borders North and South and is evident in both rich and poor countries. It is found in small towns and the major metropolises, and in industrial, financial and governmental urban hubs. It is found in temperate and tropical latitudes, and at sea level and high in the mountains. The United Nations Development Programme (UNDP) estimates that as many as 800 million urban residents are involved in commercial or subsistence agriculture in or around cities (UNDP 1996).

In some cities, agriculture has a very long history, but in most the growth of city farming is a relatively new trend. It is providing new jobs, food and green spaces in some of the most difficult urban environments. Looking over the globe at this new phenomenon, we can see several important trends which help inform us about the nature of this international movement. Most importantly, urban agriculture is growing in the poorest sectors of urban societies as a direct result of the increasing disparities between the global rich and the global poor. Extreme poverty in the context of harsh and stringent structural adjustment programmes, dismantling of social safety nets, and neo-liberal trade policies has driven many of the new urban agriculture movements even in cities where food is abundant. A related trend is the breakdown of rural societies in the wake of these same international policies and the resultant migration to the city of rural people who bring agricultural traditions with them. When the urban environment fails to provide them with sustained and gainful employment in either formal or informal sectors, they turn to what they know best to secure food for themselves and their families.

As a result of these two trends, the initiative for urban agriculture has come almost entirely from the communities where it is found. In almost every case (although there are significant exceptions), it is either individuals, community groups or local non-governmental organisations (NGOs) which have taken the lead in creating productive spaces within the city and its surrounding areas (UNDP 1996). In some

cases, foreign universities, NGOs and aid agencies, both bilateral and multilateral, have provided important resources, helping these groups to further their work.

When these community-based groups begin to reach a critical mass of people doing and wanting to do urban farming, they inevitably run into the barriers and limitations of working in an urban environment. These barriers range from access to land, water, seeds and technical support to zoning, public health laws and other municipal regulations regarding agriculture as an activity in the city.

In many cases, the preconceptions of technocratic city planners and managers prevents the expansion and institutionalisation of farms in the city. Agriculture is generally seen as strictly a rural activity and especially the idea of urban animal husbandry brings the worst connotations into the minds of city and health officials. Agriculture in the city goes against their image of modern civilisation and progress. Changing the preconception of city and national leaders and thus changing the policies of the local government and of national agencies will be of utmost importance to the survival, expansion and institutionalisation of local movements. In the most successful cases, some combination of local and national government agencies has come to support the efforts of the city farmers and their organisations.

This paper explores what policy options exist for urban agriculture and what tools may be useful in achieving them. It looks at conceptions of policy and how policy is made, examines the constraints of modern planning processes and suggests strategies for overcoming them. It also suggests that, while working on urban agriculture policy, we must also work on the international development policies which are at the root of problems that urban agriculture is seeking to address.

2. Why is urban agriculture important?

2.1 Benefits of urban agriculture

City farming is one of the strong and positive activities urban residents are undertaking in an effort to take control of food security, social ills and environmental degradation in their communities. It has provided food, jobs, environmental enhancement, education, beautification, inspiration and hope (UNDP 1996; Mougeot 1994).

It is significant because, in almost every case, it is home-grown, decentralised and spontaneous, which means it is fulfilling the goals of the practitioners or they would not be doing it. It is easy to get caught up in the inspirational stories of communities who are producing high-quality food for themselves and other city dwellers with very little capital investment. These small advances must be viewed, however, in the context of the major destruction that many urban and rural communities have suffered in the last decades under debt-driven structural adjustment policies and elimination of government farm supports and social welfare programmes.

In the South, the confluence of many factors such as high unemployment, increased food prices, elimination of food price subsidies, devaluation and the systematic elimination of other social safety nets, combined with non-formal access to open space and the farming tradition that rural migrants bring, has resulted in many local movements across the globe. In the North, elimination of social safety nets has been more gradual and welfare-to-work programmes and new block-grant approaches seek to reduce welfare spending (Mittal & Rosset 1999). In this context, urban agriculture has been used to employ youth, ex-convicts, homeless people and other “at risk” populations.

Like small farming sectors in rural areas, urban agriculture fulfils multiple functions and provides multiple benefits (Rosset 1999). At its best, urban agriculture cleans up dumping sites, educates youth and keeps them out of trouble, provides employment, gives utility and respect to elders, builds community, recycles kitchen and other urban “wastes”, and produces fresh nutritious food. Because virtually all of the other functions of urban agriculture can be fulfilled through other activities, producing food is perhaps the single most important benefit.

In the poorest urban communities, food security is the bottom line on why urban agriculture is important. However, urban agriculture is only one way to solve food-security issues and thus should be viewed in this larger context. Organising around urban agriculture may not always be the best way to address food-security issues, but organising around food-security issues is one of the best ways to promote urban agriculture.

2.2 Urban agriculture and community food security

Urban agriculture can provide a very good “band-aid” to many serious problems. However, it is rarely a real solution to the root causes of hunger. Because of this, it may, in some policy circles, be used as a way out of dealing with real structural issues of poverty, unemployment and malnutrition. In formulating a political strategy for advocacy efforts, this must be considered, as it can be used to trade short-term gains in urban agriculture policy for long-term losses in overall food security policy.

In almost all of the case studies presented in this reader, the driving force behind urban agriculture is decreased food security on account of increased poverty in urban areas. In many of the cases, this has been happening at an accelerated pace in the last decade. Advances in urban agriculture and local food production may be important steps forward, but, viewed in this larger context, may only represent desperate survival strategies in an increasingly impossible policy environment. Thus, when we discuss policy options for urban agriculture, we should keep our eyes on the overarching goal; that is, community-level food security.

In North America, the concept of Community Food Security (CFS) is fast developing as both theory and practice, with many scholars, advocates and activists attempting to create a clear definition and theoretical framework for this movement (Anderson & Cook 1999, CFSC 1999b). Even the US Secretary of Agriculture, Dan Glickman, just signed the Community Food Security Initiative, which outlines the USDA’s commitment to mobilising internal resources to promote CFS for all persons (CFSC 1999a). The concept of CFS is relatively new in the USA because it approaches the holistic nature of food security but focuses on efforts that have direct impacts for the community rather than the individual. Urban agriculture is seen as a key element of CFS but only as part of an overall effort which also includes developing closer producer/consumer relationships, supporting the development of other food outlets, protecting farmland from development, supporting rural communities as well as urban, protecting government food support systems, etc.

In Cairo, it is clear from the case study in this reader that the erosion of previous food-security programmes has promoted spontaneous household poultry production. Sources of calories such as bread, sugar and oil are still partially subsidised but protein price supports have been eliminated. Eggs are the cheapest

source of animal protein and, also for a host of other reasons, many local residents have begun raising chickens. These efforts have run into neighbourhood and institutional barriers (Gertel & Samir 2000). However, while efforts to change attitudes and policies to support the raising of chickens are clearly necessary, a CFS approach would not stop there. Achieving CFS would require continued efforts to confront the deconstruction of social safety nets and other existing CFS systems. We know that if protein and other foods are no longer subsidised today and everyone accepts this, then eventually the caloric supports will be removed as well. It is much harder to grow wheat on rooftops than it is to raise chickens. Using a CFS framework to address the root causes of food insecurity while, at the same time, addressing immediate needs has proven itself to be an important organising strategy in many cities (Biehler et al. 1999).

3. What is policy?

Policy is a nebulous concept, which often defies definition in practical terms. At its most fundamental level, it is simply an intent. In American English vernacular, as defined by the American Heritage Dictionary, policy is described as:

- *a method or course of action adopted by a government, business, organization, etc. designed to influence and determine decisions;*
- *a guiding principal or procedure;*
- *shrewdness.*

In practical terms, it is the union of laws, regulations, implementation procedures and enforcement actions towards a goal. One way to view it is the sum of the results of the intent, such that whatever is on paper is irrelevant, and thus the definition of a policy is what actually happens in the real world. This view allows for the inclusion of factors not included in official definitions, such as the role of illicit activities and the unspoken limitations of enforcement agencies. Often we think of policy as legislation but, if we dig into what policy is, we see clearly that it is not.

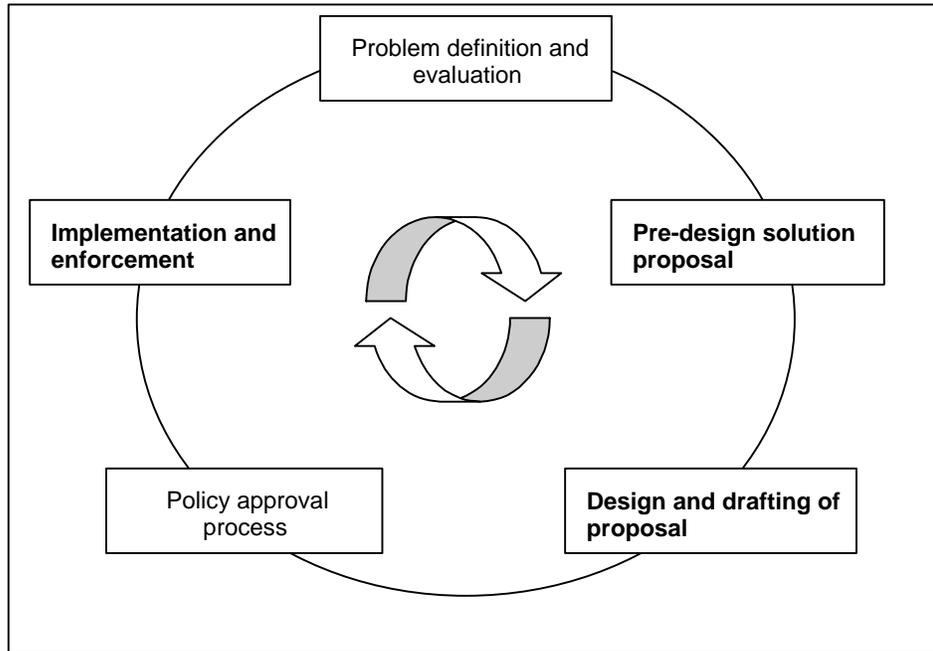
For example, in California the speed limit on highways in urban areas is 55 miles per hour (mph). That is the law. This law was established through a negotiation between the California legislature representing the concerns of its constituents (voters, corporations and other donors) and the Federal Government, which pays

for much of the construction and maintenance of freeways. It was designed to meet a commonly held ideal that we should limit the velocity of vehicles on our freeways for safety and fuel economy. However, the policy of the California Highway Patrol (CHP) is both unspoken and not necessarily in line with these goals. On the asphalt, the CHP's policy is that motorists will *usually* not be given tickets unless they are going faster than 65 mph and *generally* unless they are moving significantly faster than the flow of traffic. However, if the motorist is black or "latino", drives an unsightly vehicle or is otherwise suspect to officers' approval, the motorist may be detained for no justifiable reason and ticketed for going just over the speed limit.

The point is that legislation is only one expression of a political intent and that, when laws on the books meet the real world, policy is often determined by those who implement and enforce it. Additionally, enforcement is rarely uniform. In the Harare case study in this reader, it was reported that, even though some agricultural plots were officially registered and condoned, crops in periurban areas are frequently slashed by officials (Mbiba 2000). In Accra, the law states that no one shall use sewage drainages for agricultural purposes yet, since there is no enforcement, the practice is common (Armar-Klemesu & Maxwell 2000).

3.1 How is policy made?

Each community faces a different policy environment, and the way policy is developed, approved and implemented varies dramatically between cities and nations. In the most general terms, policy is made through the creation of political will in both the decision-making body and the implementing agencies for a particular jurisdiction. In an ideal policy environment, the policy-making process would look something like this:



In a perfect world, policy creation would be inclusive, circular and evolving. It would include all stakeholders at each stage of the process and not just during the implementation stage. In the real world, policy-making is usually exclusive, linear and static (or transitory). New paradigms of policy in the last quarter century call for the decentralisation of national political structures and the elimination of government controls for market-based controls. The result at the macro level has been the creation of a very centralised international policy-makers club (WTO (World Trade Organisation), IMF (International Monetary Fund), WB (World Bank), etc.) and decentralised and underfunded national and regional implementation agencies (Bello 1998). Because local, city, regional, national and international policy arenas are often intertwined and overlapping, understanding the relationships between distinct policy arenas will help refine advocacy efforts (UNDP 1996).

3.2 Policy arenas

This reader focuses on local-level policy initiatives but decisions at national and international level affect local policies both directly and indirectly. Good examples are the global trends towards privatisation and decentralisation of government

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agencies, institutions and utilities. It is very important to recognise which policies are coming from community, national and international arenas, and to understand the relationships between the policies and the agencies. Policies, and their governing bodies, and influential players can be mapped out by using a simple grid like the one below:

	Policy	Agency	Influences	Impact
Local				
National				
International				

This simple grid can be modified to look at different aspects of a problem such as what resources or barriers are involved at each level. There are many different problem-mapping and power-mapping approaches. Whatever methodology is used, these kinds of analyses are especially useful when working in coalitions, because they clarify basic views and assumptions about the nature of the problem, build consensus on what the key issues are, share information and develop relationships (Biehler et al. 1999). They can also help a group define which arena to focus their attention on, or how to approach multiple arenas in an organised manner.

Most policy processes above the community level do not include stakeholders in the early stages of problem analysis and pre-design. They often start at the design level based on assumptions made by policy-makers. So the earlier stakeholders can get in on a process to educate and advocate, the better. The greatest success will be through direct contact and advocacy, winning over a few key policy-makers, getting in at the problem-evaluation stage. Once engaged, it is very important to stick with the process through all the other stages. Keeping policy-makers engaged throughout the implementation and evaluation stages is also important.

This is often seen by direct service groups and community organisations as boring, hard political work that no one wants to do and generally produces few results. It takes resources and constant energy, which many groups would rather expend in other arenas such as project implementation. This explains why most direct initiatives are through private NGOs and community groups working outside the policy arena.

However, there is hope. In many cases, working with local agencies or directly with a municipal or provincial government, collaborative efforts are successful.

Finding the key individuals within a policy arena who are sympathetic to urban agriculture goals or who might be brought around through field visits and education can make or break an effort. Education of policy-makers and their constituents is extremely important in creating political will.

Political will and strong supporting constituencies are perhaps the most important factors in policy-making. Gaining them represents the moment when advocacy efforts begin to pay off. Winning the support of an individual in a decision-making position may be only half the battle; that policy-maker then has to win over other decision-makers as well as the implementers and enforcers involved. In spite of charismatic leaders, bureaucratic inertia can be a much harder force to counter. Organising should therefore include both working on specific policy-makers as well as building coalitions with other groups and agencies.

In some cases where government has played a strong role, serious and punctuated breakdowns in the food system have brought on tremendous shows of political will. The urgency of the crisis creates political will and strong constituencies in both civil society and the implementing and enforcement agencies. These moments inform us on how urban agriculture could look in all of our cities, if the political will of the policy-makers existed. One classic example of this in the United States is the “Glory Gardens” of the 1940s, which were promoted as part of the wartime effort. Food shortages and rationing were a result of putting massive resources into military action, and the urban civilians were told to produce what they could for themselves. Government policy supported this effort until the war was over.

In recent years, we can look to "Operation Feed Yourself" during economic crises of the 1970s in Ghana (Armar-Klemesu & Maxwell 2000), and the urban agriculture policies and programmes implemented after the fall of the Soviet Union in Cuba (Altieri et al. 1999, Companioni et al. 1999). In Ghana, people lost interest as the situation improved during the 1980s; in Cuba, however, the movement seems to have grown in spite of dramatic improvements in food security. What is evident is that, in most cases, government is not going to make these issues a high priority unless there is serious pressure from internal and external forces.

In many of the case studies, such crises exist. Hunger, poverty, malnutrition and disease all exist and are increasingly taking their toll on the urban poor. However, it is a slow and steady erosion of standards of living and not necessarily punctuated in a way that attracts government attention. The challenge for community-based

organisations is how to get government programmes in place while their crisis is not being felt by the policy-makers.

Local food-security coalitions can do problem evaluation and bring in policy-makers better than can a single group. Building such coalitions between different groups (labour, housing, environmental, health, etc.) can be difficult and exhausting. However, as all of these issues are related, it creates a place where community-wide strategy can be developed and efforts can join synergistically to produce much larger effects than the efforts of any one sector. In the USA, this type of organising has led to the creation of Food Policy Councils. These are public entities with strong stakeholder participation dedicated to analysing food-security issues and co-ordinating the actions of diverse public agencies within a given jurisdiction (Pothukuchi & Kaufman 1999, Biehler et al. 1999).

3.3 Policy environment

The policy environment is the union of all the elements that influence policy-making and enforcement. It includes the actual policy-makers and the governmental structures in which they exist, (e.g. both this particular mayor as well as “The Mayor” as a governing institution). It also includes the regional national and international context, and the formal and informal outside influences on that context. Such influences include international institutions, higher-level government, national and international corporations and other market forces, labour organisations, active social movements, crime and graft rackets, etc. The current hot-button issues and recent policy changes in other related areas are also part of the policy environment.

Unfortunately, we do not often get to choose our policy environment. Furthermore, changing the policy environment is a much larger task than advocating within it. In some cases, struggling for such change may be absolutely necessary to bring about any real policy change. In others, the policy environment may be so adverse to urban agriculture initiatives that it is not worth engaging at all, and effort may be better spent seeking how to stay out of conflict with existing agencies rather than how to bring about real change.

It is extremely important to know the policy environment thoroughly. Power-mapping is a way of documenting official structures, informal functioning, who the players are, what their powers and constraints are, and what the relations are between different agencies and other outside influences. When there is a strong

knowledge of the policy environment, it is possible to identify the best opportunities for advocacy. When working in a coalition, mapping out all of the collective knowledge can illuminate clear areas of opportunity and areas which are dead ends. Combining this with a priority list of goals can help orient coalition strategy and tactics.

3.4 Policy tools

Policy tools are the methods of creating policy change: the nuts and bolts of how to reach a defined policy goal. There may be several ways to reach any given goal and the real potential and effectiveness of each approach should be considered in detail. Below are some of the major tools currently in use:

3.4.i Electoral processes

Helping sympathetic figures get into political positions through whatever political process exists is a very important way to advance policy goals. Making urban agriculture and food security issues a part of election-campaign debates is also a way to raise public awareness. In some governmental forms, local ballot initiatives can be passed which take tax, appropriations and new programmes directly to the voter for approval.

3.4.ii Legislation

As noted above, legislation is not policy, and getting legislation passed then requires that implementation and enforcement also occur. There are many types of legislative efforts which can support urban agriculture; these are noted according to topical policy goals further below. However, general categories include the following:

Financial supports: these are actual budgetary-line items which a city, regional or national government or agency can approve to pay for specific activities necessary for urban agriculture. The breadth of activities can range from research to education, to market construction, to expanding existing programmes to better enforce existing laws. Most policy initiatives should be accompanied by financial support to pay for the proposed policy changes. Most legislative efforts will require a fiscal-impact statement which projects the costs of the proposed policy change.

Criminalisation/decriminalisation: these are changes in the penal code for activities related to urban agriculture. Examples might include giving increased penalties for destruction of crops and or other property in a community garden, or legalising the growing of vegetables in the front yard of privately-owned homes.

New programmes: the creation of new activities and divisions in existing agencies can be an effective way of getting more services for city farmers. Local government can mandate its agencies to provide or improve provision of services to farmers. It may be a simple change in language that includes farmers in a list of recipients of services from a given agency.

Zoning and other codes: seeking changes in zoning codes can open whole new areas of the city to new activities. They are often under the jurisdiction of local governments and agencies. Options include elimination of existing codes, new additions, reclassification of zoned activities and redrawing of geographical boundaries.

4. Enforcement

Ensuring enforcement of existing laws is a community watchdog effort. Knowing what laws are on the books requires legal research, but there may be beneficial laws on the books that are little known and completely forgotten or ignored. The Landless Movement in Brazil (MST) has used the existing land-reform laws to take fallow land from wealthy landowners (Langevin & Rosset 1997, Lappé et al. 1999). Enforcement of laws that contradict actual current policy or challenge powerful social sectors comes at a tremendous cost and requires strong community organisation, high levels of commitment to the issue and strong multisector alliances in order to achieve results.

Making sure that new laws and regulations are enforced requires clear definition of enforcement practices and working with enforcement agencies to ensure that the law is not interpreted differently. Enforcement policy may have to deal with a whole other set of constraints such as enforcement capacity, priority and other bureaucratic limitations, as well as graft and corruption.

Getting new laws enforced after achieving legislative and regulatory results may be harder than getting the laws on the books, if there has not been a real shift in

political will. If the attitudes of government and enforcement agencies do not change but somehow the laws do, serious work lies ahead. Thus, policy initiatives must be structured to build constituencies as they go, so that – when critical moments arise –there are outspoken and important constituencies there to follow through.

4.1 Financial incentives

Financial incentives can take several forms. They can be cash incentives directly to farmers for complying with a set of criteria, such as not using contaminated water, or eliminating pesticide use. Tax breaks are another form of financial incentive. If a tax system already exists for producers and marketers, then tax incentives can be used in this arena. Giving retailers a tax break for buying from local producers is a good example. Tax breaks can also be given to other sectors for working in collaboration with farmers. Private corporations or other urban landowners may be given a tax break for allowing farmers to use their land. Fees for specific activities can be waived for participants in an incentive programme. Indirect financial incentives such as zoning variances or permits may be issued in public-private collaborations in exchange for providing resources to farmers. Preferential contracts and government-supported credit programmes for farmers can also be used.

4.2 Non-financial incentives

There are also a series of non-financial incentives can be used especially in public-private collaborations. Public recognition, media opportunities and other forms of legitimisation can be strong incentives for corporate sponsors. Corporations needing to improve public image with their stockholders and other groups have traditionally used social works as a means to achieve this.

4.3 Agency reform

Agency reform is not really a tool as such but rather a strategy to focus significant resources and attention on one particular agency. Successful reform not only changes the regulations, enforcement, and services; it also changes the attitude of the agency towards urban agriculture. For example, getting the Ministry of Public Health to see urban agriculture as a positive and important part of public health would dramatically change opportunities in most cities.

It is not so much obtaining the specific services, such as testing of irrigation water, but obtaining complete “buy-in” of the agency in its disease-prevention programmes, nutrition programmes, research efforts, community outreach, relations with other agencies, etc. In other situations, agencies may have farmers in cities loosely or indirectly under their mandate, and agency reform may be more an activity of making them recognise that they should be serving this community. Advocacy and constituency building in such situations can bring existing resources, programmes and/or reorientation of interventions for urban farmers.

5. Topical areas of policy action

5.1 Resource use

5.1.i Securing tenure

Land tenure is one of the most important and hardest resources for city farmers to acquire and secure. From Mexico City to Cairo, from New York to Dar es Salaam, getting and keeping access to land and title or some documented assurance of tenure is increasingly difficult in areas of ever-rising real estate values (Torres Lima et al. 2000, UNDP 1996, Biehler et al. 1999, Green Guerrillas 1999, City Farmer 1999). In many cities where men have traditionally been the holders of land titles, laws for women’s tenure are urgently needed.

Yet the backlash to uncontrolled urban sprawl is picking up. Working with planners to include agriculture as a part of greenbelts, city parks and open spaces can create mutually beneficial results, as farmers can gain access to land that is protected from future urban sprawl, and planners can justify the space as being productive. An active user population thus occupies the open space, ensuring on-site enforcement against unofficial settlement and added protection against future rezoning (Torres Lima et al. 2000, UNDP 1996, Yoveva et al. 2000, Biehler et al. 1999).

Working with public utilities and other national enterprises to gain access to rights of way and unused land may be possible. Public-private collaborations may present possibilities with the corporate sector. Many international businesses are given land concessions by State and local governments which may be requested for farming purposes. Tax breaks and other incentives can be provided by national and local governments. Organised farmers' groups, co-operatives and NGOs have

successfully negotiated user permits or leases on both public and private land for specific activities and for specific periods of time (UNDP 1996, Garnett 2000, Nuru & Bloom 1996). Making a strong case for the multiple functions and benefits of small farms is a very good approach with open-space planners (Biehler et al. 1999, UNDP 1996, Rosset 1999).

Public housing projects are increasingly including garden space and can be approached to negotiate permits or leases. This has been demonstrated notably in the North in such cities as London, San Francisco and Seattle (Garnett 2000, Nuru & Bloom 1996, Friends of P-Patch 1999). In New York City, however, gardeners have been pitted against low-income housing groups in what has turned into a nasty political battle for more than 600 gardens which the City tried to auction off, supposedly to alleviate the housing crisis. This divide-and-conquer approach of the city government has backfired, as garden groups and housing groups have banded together to fight for real low-income housing solutions without elimination of the gardens. The Trust for Public Land put up 3 million dollars to purchase 62 of the most threatened gardens, and Bette Midler's New York Restoration project acquired the remaining gardens for 1.2 million dollars (Green Guerrillas 1999, City Farmer 1999).

In some countries, good laws exist on the books for land reform. Many countries established such laws at times when the international trend set by western aid agencies was to avoid land-based revolutions and social movements by developing agrarian bases attempting to make all agricultural land productive. They may have clauses which allow a squatter to make a claim on a piece of land owned either by the state or a private landowner if the land has been unproductive for a given amount of time. The Landless Movement in Brazil (MST) has used this type of law to settle over 150,000 landless families on more than 2.1 million hectares of land left idle by wealthy land owners (Lappé et al. 1998, Langevin & Rosset 1997). The MST is now working with urban squatters and using similar tactics in urban areas. They have been successful in their organised occupation strategies because of a combination of a strong legal foundation, legal support, extremely organised and committed groups, and strong relationships with other social movements.

Getting real reform laws on the books in the current context is extremely difficult. The World Bank as well as some of the regional development banks are promoting titling and digital upgrading of the cadastre in an attempt to resolve titling difficulties in many countries. Most of these efforts are designed to register titles in

order to provide small farmers with collateral for production loans, and to split up communally held lands for similar reasons (Torres Lima et al. 2000). Regardless of these trends, there is little or no talk of urban land reform in these circles. However, improvements in procedures for registration and resolving ownership disputes may be a vehicle for better titling for those who have unregistered ownership.

In a very rare case for this decade, Cuba has implemented a new agrarian reform, which is distributing land to small farmers in urban areas. This programme is carried out through the collaboration of the *Poder Popular* (neighbourhood-level government) and the Urban Agriculture Office of the Ministry of Agriculture. These lands are given in usufruct ownership in perpetuity – as long as they are kept productive. Many other state-run enterprises have been giving farmers access to their lands in a sort of joint-venture arrangement called Farms of a New Type.

5.1.ii Access to water

After land, water is probably the second most important resource for urban agriculture. For many areas, year-round production would be possible if it were not for water limitations. Additionally, in many tropical areas, the best time for small-scale vegetable production is in the cool winter months, when there is usually little rain.

There are many ways to address this issue. In areas where potable-water systems exist, changing the rules about using water for agriculture can be a viable alternative. This debate often comes down to an issue of priorities and, when pushed to the wall, local water boards will often say that there is not enough water for everyone and that providing water for drinking and washing clothes is more important than providing water for producing food. It is critical to work with other members of the community who share the water system, educating them about the importance of food production for that area, and to show real benefits of irrigation for the rest of the community in terms of increased access to fresh foods.

In areas where little water is available, seeking financial resources to install cisterns, wells and/or irrigation systems is another route. In areas where neither of these options is possible, educating farmers or would-be farmers about reducing water needs through planting crops that need little water, heavy mulching, simple drip systems and rainwater-collection systems may be the only alternative.

Working for increased sewage treatment can provide urban agriculture with both fertiliser and water, but must be done carefully to avoid accumulation of heavy metals and biological contaminants. This topic is handled in the health section below.

5.2 Technical support services

In these times of Enhanced Structural Adjustment Programmes (ESAPs), trade liberalisation and privatisation, the slashing of state budgets for services is being pushed throughout the globe (Bello 1998, Lappé et al. 1999, Mellor 1998). The impact of this on agriculture has been an increased reliance on contractors, corporations and NGOs for services to farmers, while national research and extension agencies are being reduced to seed and pesticide registration and testing, and some crop development (Conroy et al. 1996).

Corporations generally provide services only to contract farmers producing for the export market or those consuming considerable amounts of chemical inputs. This leaves the NGO sector for most subsistence farmers and small farmers producing for the local market. Increasingly, successful farmer organisations are hiring their own advisors who must respond directly to their needs.

Policy initiatives that seek to build technical extension services should promote a flexible approach that recognises the success of existing organisations and builds on those efforts rather than creating competing or duplicating efforts. New extension models based on a high degree of farmer participation in the pre-project analysis and development stages have been highly successful compared to traditional teach-and-visit models (Antholt 1998, Chambers 1983, Bunch 1985).

Even if extension services are provided through public agencies, it is often advantageous to require farmers to share costs or at least pay a nominal charge for extension services for several reasons. Most importantly, this gives increased rights to the farmer, as the service is no longer a gift but rather is paid. It removes some of the financial burden from government and reduces paternalistic relations between extension agents and farmers. Finally, it moves the accountability of a project back into the hands of the beneficiaries, making the results production- and demand-driven (Antholt 1998). Another model, further into the competitive market model, is to seek state funding for private extension services, where farmer

organisations receive grants which they use to contract the extension services they need.

In spite of the global trend to cut state spending in these areas, there are countries providing extension services for city farmers. Case studies from Cuba, the Philippines, Tanzania, China and Mexico show that this is possible in some contexts (Companiononi et al. 1999, Mougeot 1994, Murphy 1999, Potutan et al. 2000, Jacobi et. al. 2000, Torres Lima et al. 2000).

5.3 Input/output support services

All governments have policies that affect the commercial sector of urban agriculture. At a bare minimum, there are state controls over some aspects of pesticide sales and local markets for produce and meat. There are, however, many aspects of the input/output service sector which are generally not addressed.

5.3.i Farm implements and conventional inputs

Traditionally, national agricultural extension services tried to leverage state expenditures for staff time to obtain foreign-aid packages of seeds, fertiliser and pesticides. In some cities, this same model of rural extension has been replicated. Foreign companies traditionally used aid packages of this kind to introduce their chemical products to new markets.

In areas where small farmers were brought into the global economy through the expansion of the fresh fruit and vegetable industry and non-traditional export crop programmes, there are innumerable retail outlets selling these products in small quantities for small farmers. Technicians paid by the export contractor or the chemical companies work with contract farmers and are often paid based on commission from sales. For production for subsistence and local markets, however, the cost of these imported chemicals and seeds is often prohibitive. Additionally, the replication of Green Revolution off-the-shelf technological packages for small farmers has been shown to cause social disintegration and stratification, and increases farmers' exposure to health and financial risks (Conroy et al. 1996, Thrupp 1995, Shiva 1993). Thus, there is a tremendous need for specialised and alternative products and services geared toward the small- and medium-scale subsistence and commercial urban farming sector.

5.3.ii Compost and other amendments, pest control products

As many urban farmers are working with very limited resources and very close to high-density populations, urban farms should be basing their production on organic or semi-organic methods and not using dangerous chemical pesticides (Companiononi et al. 1999). This requires both qualitatively and quantitatively different sets of input services than for conventional farming practices.

Networks of small stores that provide the appropriate tools, seeds, soil amendments and pest controls can be created through government programmes, as they have been in Cuba (Companiononi et al. 1999). These networks can be directly run by the state, or they can be created through incentive programmes working with existing or new store-owners. Incentives might include low-interest start-up credits, access to cheap or subsidised products, small business management training, exclusive contracts with state suppliers, etc. One of the biggest obstacles for such networks is creating an adequate supply of locally produced non-chemical inputs.

Co-ordinated efforts between municipal solid-waste managers and new entrepreneurial composters have emerged in some areas (Biehler et al. 1999, UNDP 1996). In areas of the USA where advanced recycling programmes exist, the cost of managing municipal waste is so high that local governments are paying private companies to compost the landscaping residues from city parks as well as providing home pick-up services for vegetative household wastes (not including kitchen waste). This reduces the volume of waste destined for landfills and thus reduces costs for the municipality. The company is then required to provide compost to both city agencies and urban farmers. The composters sell the rest to rural farmers and private landscaping companies.

In other areas, local animal farmers may give away their manure so they do not have to pay for waste removal. City projects providing transportation for the manure could eliminate illegal dumping and subsequent water contamination and, at the same time, provide farmers with organic fertilisers. In some cities, market demand for manure is so high that animal farmers sell their manure; this provides them with added income and pays for transportation.

Biological pest controls have been successfully used in urban environments and can be locally produced. Havana has several Centres for the Reproduction of Biological Controls (CREEs) and local farmers have access to both artisanally

produced biological pest controls as well as products from national industrial-scale production (Altieri et al. 1999, Companioni et al. 1999, Murphy 1999).

Seed needs are very different for urban farmers. They need small amounts of a wide variety of cultivars adapted to the different urban environment and market demands. Open-pollinated seeds are preferred, as they can be saved and reproduced. Research and development programmes for urban varieties are important, and storage and well co-ordinated distribution projects can help to keep a viable stock of pre-packaged seed available. As space in urban gardens is often extremely limited, urban seedling production can be an area for expansion of small enterprises.

5.3.iii Markets

Active urban-farming economies and the food-security needs of urban populations demand a highly decentralised system of point-of-sale outlets for fresh foods. Markets for meat and produce are generally created and regulated by municipal governments and often with inspection from national health agencies. At the most basic level, creating more market spaces in more areas is an important starting-point. Many cities simply do not have enough outlets, or the outlets are concentrated in commercial districts. Changing point-of-sale and business licensing regulations can also increase on-site sales. Seeking increased funding for market construction and maintenance is the most obvious approach, but organised farmer groups may need only space and permits to begin markets in new communities. The Farmers' Market movement in the USA has taken off without the construction of new market places, by setting up mobile neighbourhood markets once a week in specific locations.

Tax incentives, price supports and fixed contracts with state distribution chains are other approaches. Farmer groups may work with local agencies to obtain fixed preferential contracts for school-lunch programmes, hospitals, cafeterias, and other programmes and enterprises. Farm-to-market and home-to-market transportation is another area which should be considered when improving the market system.

5.4 Health impacts

5.4.i Pesticides

In most countries, chemical pesticide use by small farmers is a serious health issue (Murray 1994, Potutan et al. 2000). Farmers often seek the most toxic pesticide at

the lowest price to ensure effectiveness, and many countries still allow the use of very toxic and persistent substances. Protective measures are not regularly used by small farmers, and backpack sprayers have constant leaks. Transportation, storage and disposal are other high-risk issues. When small farmers apply pesticides in high-density urban environments, pesticides become an even bigger public-health issue.

Municipal ordinances preventing the urban sale and use of agrochemicals or heavy local taxation on urban pesticide sales can reduce pesticide use. Prohibiting urban use in farming requires a great deal of enforcement. If pesticide products are readily available in other areas, prohibition and taxation may only increase farmer production costs and create black-market sales which are less regulated and potentially more hazardous as they involve rebottling, sales without labels and unsafe transportation (such as on public buses). Eliminating key products from the national market may therefore be a better approach. Farmer incentives and education programmes are other approaches.

Cuba's biological-control system based on small-scale, decentralised intermediate technology laboratories is a highly replicable model for governmental and NGO agencies attempting to find a real solution to the pesticide problem in cities. They are low cost yet highly profitable, and can eliminate dependence on dangerous, imported chemical inputs (Rosset 1998).

5.4.ii Lead and heavy metals

Lead in soils and in the air is a major contaminant that green leafy vegetables can concentrate in their leaves. In a recent case in Richmond, California, the children of a low-income Laotian family suffered serious learning and brain function disabilities caused by lead concentrations in the greens they harvested from their garden. This story, which was highly publicised in the USA, goes undocumented in most countries throughout the world.

In many other cases, lead and heavy metals have been reported as contaminants of soil, water and vegetables and can cause direct health impacts. Such reports can provoke consumer and policy-makers' distrust of all locally produced foods, regardless of actual contamination (Gertel & Samir 2000, Mbiba 2000, Torres Lima et al. 2000, Garnett 2000). Regular testing of all foods is a policy that can help ensure a safe food supply, and all foods unfit for human consumption should be destroyed.

Other options are to seek serious toxic-abatement programmes to solve the root of the problem. Efforts should be made to convince health agencies to include urban agriculture into existing programmes. Working to eliminate the release of lead, heavy metals and industrial toxins in poor communities is an uphill battle against industry. Many efforts in the Environmental Justice movement have had successes in increasing enforcement of existing environmental regulations and forcing industry to reduce emissions. Where these toxins are found in the soil, soil removal and replacement is the ideal solution, but raised beds with imported soil may be the only viable option.

In many cities, as solid waste disposal becomes a more complicated and costly issue, the use of municipal solid waste is being considered for composting and food production. Like sewage solids, these new waste products need to be thoroughly tested and, in many cases, may be inappropriate for use in agriculture. Batteries, paints, solvents and other toxins find their way into virtually all landfills at some level. Unless compostable waste is separated at the source rather than at the landfill, there is no way to extract “clean” materials.

5.4.iii Biological contamination

In some cities, farmers use drainage runoff and raw sewage to irrigate. While public health laws exist to prevent this practice, implementation is varied (Gertel & Samir 2000, Mbiba 2000). Sewage can be treated through pond systems that are relatively inexpensive and low in maintenance and that produce multiple benefits. These systems have long residency periods (>60 days); this eliminates faecal-borne pathogens, making the effluent free of biological contaminants. The system uses algae to consume excess nutrients and oxygenate the water. These algae can bio-accumulate heavy metals and other industrial wastes to the extent that, when it is removed, the effluent going to agriculture is free of these contaminants and the algae can be treated as a solid toxic waste rather than a liquid one. If there are no industrial toxins in the sewage, the algae can be used as animal feed or fertiliser.

Modern plants to treat industrial sewage are expensive to build, require much energy, have short residency periods (about 3 days – if something is not working properly, they pass pathogens right through), have many special moving parts and depend on chemicals. They also have massive sediment build-up, which is often dumped on rural agricultural land, contaminating it with heavy metals and other contaminants. Promoting pond facilities can solve multiple problems of health risks, waste disposal, and needs for fertiliser and water.

5.4.iv Disease prevention

Poorly managed animal production can cause risks to public health. Accumulation of faecal materials can provide breeding grounds for harmful pathogens as well as the insect vectors that carry them. Poorly managed compost piles can become hospices for flies, rats and other vermin. Finding policy initiatives that can both prevent such problems and promote urban animal husbandry and composting is not easy. Public health officials would rather eliminate the potential for problems than work to find a mutually beneficial solution. Increased public-education campaigns on food sanitation may better address the issue as, in some cases, a large portion of the foods are contaminated whether they come from urban or rural sources.

6. Conclusions

Urban agriculture is providing solutions to many of our cities' problems at the community level. It is increasing food security, while providing home-grown employment opportunities, environmental clean-up, beautification and offering recreational and educational activities for young and old. While some city and national governments have taken leadership in promoting urban agriculture through policy initiatives, most have not.

Without institutionalised support for their efforts, urban farmers in most cities will have to continue to struggle against existing regulations, agencies and financial disincentives. Advocating for policy change in those areas without sufficient support is worth the effort, for small changes in policy can mean big changes for farmers. Local governments need to awaken to the fact that, for relatively small investment in personnel, capital, and legislative and regulatory change, they can catalyse communities to help solve so many of their immediate needs. While international food policy and the transnational conglomerates that drive it continues to put the squeeze on lower- and middle-class urban populations, it is the responsibility of local government to provide at least a policy context in which people can create their own solutions.

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1. Identify options for implementing urban agriculture in the proposed sustainable community 2. Assess these options based on a number of criteria 3. Develop a comprehensive strategy and implementation plan for urban agriculture in SEFC. This study was divided into two phases. Phase 1 of the project involved developing a rationale for urban agriculture, identifying the current regulatory and policy constraints on urban agriculture, brainstorming. 13 SEFC Urban Agriculture Strategy " Final Report. options for food production, processing and distribution. Urban Agriculture Policy, Planning, and Practice - A Report for the City of Hamilton, 2013. Urban Agriculture is the practice of cultivating, processing, and distributing food and other products in and around cities; it can be accompanied by a variety of complementary activities in its pre- and post-production phases, and it serves a variety of social, environmental, economic, nutritional, and recreational needs. Information on policy and planning supports used by municipalities that are currently fostering urban agriculture activities will be provided to aid decision makers in understanding how urban agriculture can be integrated into Hamilton's municipal structure.

Vertical farming is a revolutionary and more sustainable method of agriculture than its counterpart as it lowers the requirement of water to up to 70% and also saves considerable space and soil. This innovation in the field of agriculture with sustainability as its motto is making more and more heads turn today with its eco-friendly methods and making the possibility of farming real in difficult environs. Let us check out the top 13 vertical farming innovations that could end up in your plate in the near future!