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The Urban Gardens Program for HIV-Affected Women and Children: A Review and Look to the Future

April 2013

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THE SCIENCE OF IMPROVING LIVES

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Contents

Abbreviations and Acronyms

AC	area coordinator
AEO	agriculture extension officer
AIDS	Acquired Immunodeficiency Syndrome
DAI	Development Alternatives Inc.
EMMP	Environment Mitigation and Monitoring Plan
FANTA	Food and Nutrition Technical Assistance III Project
FEO	finance and enterprise officer
FHI	Family Health International
GSL	group savings and loan
HIO	health integration officer
HIV	human immunodeficiency virus
IEE	initial environmental examination
IFAD	International Fund for Agricultural Development
IP	implementing partner
L	litre(s)
m	meter(s)
m^2	square meter(s)
NGO	nongovernmental organisation
OVC	orphans and vulnerable children
PEPFAR	United States President's Emergency Plan for AIDS Relief
PLHIV	people living with HIV
RFP	Request for Proposals
SWOT	strengths, weaknesses, opportunities, threats
U.S.	United States
UGP	Urban Gardens Program for HIV-Affected Women and Children
USAID	U.S. Agency for International Development

Executive Summary

Food and livelihood insecurity is an insidious and long-term consequence of HIV, affecting the health, productivity, and asset stabilisation of families affected by the disease. Access to a reliable and safe food supply can be especially difficult for HIV-vulnerable populations in urban areas, where the means of food production are limited and where in many places food prices are increasing. Many interventions have been implemented to address this complex problem, but few have been well documented or evaluated.

Development Alternatives Inc. (DAI) has implemented a broad portfolio of economic-strengthening programs designed to improve the health and livelihood outcomes of HIV-infected and -affected people, families, and communities, in terms of social, economic, nutritional, and household asset productivity. The Urban Gardens Program for HIV-Affected Women and Children (UGP) established 188 school gardens targeting a beneficiary group of orphans and vulnerable children (OVC) and 186 community group gardens targeting a beneficiary group of adult people living with HIV (PLHIV) in 23 urban centres across Ethiopia. UGP was implemented in two phases: Phase I occurred from 2005 through 2008, and Phase II from 2009 through 2012. More than 122,000 OVC and 10,000 PLHIV were directly affected by this program and experienced improved food and income and a greater overall sense of well-being and empowerment. The program also strengthened the capacity of local implementing partners (IPs) to deliver agronomic, nutrition, and marketing skills to these marginalised urban groups. The program's success was tied to strong linkages with governmental and organisational health services and the sustainability of local partner organisations.

The U.S. Agency for International Development (USAID) asked the Food and Nutrition Technical Assistance III Project (FANTA) to conduct a review of UGP. This review, which was carried out in collaboration with USAID country managers, former DAI/UGP area coordinators, local IPs and government counterparts, and the UGP project technical manager, aimed to assess program acceptability and ownership, evaluate outcomes (on economic, social, nutritional, behaviour, and health variables) and identify options for transitioning and sustaining the program's successful activities.

The review indicates that, despite the results achieved during the program's operation, the school gardens ceased to function once UGP lost its funding and stopped providing technical support. Although the drip irrigation supplies remained on site, they were not being used, and garden beds were drying up and reverting back to virgin land. The review also revealed a number of other flaws in terms of sustainability. The drip irrigation technology, while state of the art for medium-sized producers, was too large, too costly, and too difficult to repair or even maintain by school and adult group gardeners. Of the 122,000 OVC who went through their 1-year course, very few continued to use the skills they had learned in micro-gardening and none continued to use drip irrigation technology, as it was unsuitable for urban living. Agronomically, UGP training gave little to no attention to soil health development, water conservation with mulching, deep digging, plant spacing, or local soil amendments.

For school gardens to continue, it will be important to create curriculum-oriented garden classrooms; to focus on a new paradigm of 'grow more with less'; to allocate a smaller land area for each student; and to provide adequate training in container gardening techniques. Further, changing the time frame that students participate in the program from September–June to January–December will allow them to be properly trained and mentored by outgoing participants; will give teachers adequate time to select student gardeners and to provide support for the start-up of new student gardening groups; and will allow students to carry on the gardening activity for a full half-year after the rainy period (June–September).

Community group gardens were well established by UGP and are likely to continue to operate successfully without further interventions. Broader agronomic training, using the *Urban Garden Dialogue* method (UGP 2011b) and focusing on bio-intensive gardening, composting, and water conservation measures, would significantly enhance productivity outcomes. Drip irrigation systems are working at minimal efficiency and should be assessed on a garden-by-garden basis, with most gardens moving to simpler, more locally appropriate watering methods. The opportunity for further enhancement of economic and nutritional outcomes should be explored, with potential activities, including a more involved market assessment, training on improved post-harvest handling, and cooking skills training, delivered by trained IP extension staff.

Follow-on programs that include high-quality, hands-on, dialogue-based, neighbourhood network-oriented training with local IPs could achieve significant reductions in extreme poverty, food insecurity, and childhood stunting. Moving forward, the focus must be on locally appropriate, small-scale, high-yield agricultural techniques that are best suited to meet urban challenges while taking advantage of the many market and population outreach opportunities that these areas present.

1 Background

1.1 Overview of the Urban Gardens Program for HIV-Affected Women and Children

The Urban Gardens Program for HIV-Affected Women and Children (UGP), funded by the U.S. Agency for International Development (USAID) through the United States President's Emergency Plan for AIDS Relief (PEPFAR), was implemented in six regions across Ethiopia. Phase I of UGP (2005–2008) established urban gardens in schools and on public land in many cities throughout Ethiopia. Phase II of the program (2009–2012) targeted the regions' most vulnerable women and children, providing structured urban agricultural activities to strengthen food and livelihood insecurity and promoting linkages between HIV-affected communities and health services and facilities.

Over the course of its full 7 years of funding, UGP established a total of 374 gardens—188 school gardens, 136 community group gardens, and 50 institutional gardens—in 23 urban centres across Ethiopia. The program reached more than 122,000 orphans and vulnerable children (OVC) via school gardens and more than 10,000 adult people living with HIV (PLHIV) in community and institutional group gardens. Program beneficiaries received support in garden development as well as agronomic best practices utilising state-of-the-art drip irrigation technology, backyard poultry production, post-harvest handling, and local marketing.

1.2 Summary of Literature Review

Prior to the site visit portion of this review, a brief literature review was conducted. UGP annual reports from 2010, 2011, and 2012, as well as UGP-generated manuals, reports, and success stories from the field, were reviewed.

Being the first and only purely agricultural program funded by PEPFAR anywhere in the world, UGP is an important source of knowledge, with the potential to gain additional insights from its development and implementation. The initial project design had ambitious targets in terms of the number of expected beneficiaries. In addition to the more than 122,000 OVC and 10,000 adult HIV-affected beneficiaries, hundreds of school, government, and local nongovernmental organisation (NGO) officials in Ethiopia were directly affected through the creation and on-going support of the gardens.

The agricultural methods chosen for UGP followed a field agriculture model rather than a small-scale garden model, with the goal of effectively reaching the most people with the greatest yield in the least time in this drought-prone country. This paradigm called for the establishment of drip irrigation systems in all UGP gardens across Ethiopia. UGP later noted that these systems were not economically sustainable nor were they entirely applicable to the economic and environmental realities faced by most urban and peri-urban gardeners, especially at the school garden level. However, these systems were maintained through the project period and were on track to provide good results among well-trained adults that, with support from the UGP intervention, were able to access larger tracts of urban land that were formerly waste areas, such as dump sites, for community group gardens. With regard to the school gardens, the annual reports note that these drip irrigation systems allowed students to achieve quick results in terms of vegetable production, but upon further reflection the students did not learn important lessons in soil health, waste management, or small-scale, high-yield approaches that would help them apply learned skills in their urban reality.

A key finding from the literature comes from a 2011 Tufts University study (Shroff et al. 2011) that found that while urban gardening in Ethiopia resulted in respectable gains under the direction of the UGP in terms of increased short-term income and food production, by far the greatest impact on

individual gardeners was stigma reduction, a growing sense of self-worth, confidence, and feeling good about being a contributor to their families and communities rather than being a burden. The authors noted that this social impact of urban gardening is a key reason for urban gardening projects in Ethiopia to be continued.

Manuals and reports generated by UGP over the project years have provided a strong foundation for similar urban gardening work. The *Urban Garden Dialogue* manual (UGP 2011b), developed by Development Alternatives Inc. (DAI) through the UGP, has gone through a number of revisions and in its final form provides a solid framework for lateral, neighbour-to-neighbour, skill and information sharing. Adding solid action steps at the end of each series of dialogue-inspiring questions will greatly enhance the impact of this manual. The *Tips and Tricks Handbook* (UGP 2011a), highlighting ideas from gardeners around the country, needs to include far greater detail on the 'how to' aspects of gardening, to be an effective resource. Similarly, agronomic manuals produced by UGP could benefit from specific, tangible 'how to' steps that are easy for children and adults to follow.

2 Objectives of the Review

The aim of this review was to identify options for transitioning and sustaining activities initiated by UGP. The review covers program acceptability and ownership, as well as project outcomes as they relate to the following domains:

- **Economic variables:** Asset accumulation/stabilisation and purchasing power
- **Social variables:** Changes in stigma (perceived and actual), empowerment/self-efficacy, and social capital
- **Nutritional and productive behaviours:** Perceived changes in nutritional status, improved agricultural production, and perceived dietary diversity
- **Health linkages:** Based on self-reported health-seeking and engagement behaviours

This review supports USAID in its efforts to determine options for transitioning activities to NGOs currently implementing USAID-supported projects that are working with beneficiaries in similar circumstances (HIV-affected and marginalised urban poor mothers and children). The review work was conducted in collaboration with the UGP project technical manager from the Food and Nutrition Technical Assistance III Project (FANTA) (managed by FHI 360), USAID country managers, former DAI/UGP area coordinators, and local implementing partners (IPs) and government counterparts. Specific objectives are to:

- Review UGP in terms of beneficiary acceptability and ownership, and sustainability of project deliverables beyond the implementation of project activities
- Establish the status of gardens by determining the number of garden sites developed, the relative productivity of the plots, the ability of beneficiaries to maintain the gardens and their outputs, the implementation costs to beneficiaries, and the feasibility of sustaining the gardens beyond inputs from the project
- Identify characteristics and modalities that contribute to and hinder the sustainability of the gardens by carrying out a strengths, weaknesses, opportunities, threats (SWOT) analysis of UGP gardens, to determine how to promote their sustainability in the future

Recommendations are made on how to address the identified weaknesses and challenges in the context of sustaining the gardens, with clear roles and responsibilities of the stakeholders, including government institutions, local partners and school staff, and beneficiaries.

3 Methods Used

3.1 Site Sampling Method

With input from USAID, former UGP staff, and current program coordinators implementing the FHI 360/PACT Yekokeb Berhan project, FANTA engaged a consultant with a background in urban and small-scale garden programming across eastern and southern Africa to conduct site visits and analysis of the school and community group gardens in three key urban centres in Ethiopia. These three areas—Addis Ababa, Bahir Dar, and Adama—had the greatest number of both school and community group gardens and ample IPs to visit, and the distances between the sites were easily travelled. The sites were visited in October and November 2012, several months after UGP activities ended. Within each urban centre, the consultant visited the sites over 5 days. He contacted former UGP area coordinators (ACs) and engaged them to assist with site visit scheduling and coordination during the weeks leading up to the site visits. The ACs also provided feedback and comments during visits to garden sites and IP offices.

3.2 Scheduled Meetings

Within each urban centre, informal meetings were organised with school officials, teachers, IP staff, and government officials relevant to the site's urban agriculture programming. Each meeting lasted 30 minutes and generated the majority of the background information found in Section 4 of this report.

3.3 Plans for Data Collection, Management, and Analysis

The consultant collected data via informal individual and group interviews and garden site visits; meetings with school, IP, and government officials; and discussions with former UGP ACs and headquarters-based DAI staff. He then analysed and categorised the data to form the basis for recommendations intended to be used by like-minded urban gardening/family nutrition and food security programs in Ethiopia.

4 Review Findings

The following review findings were identified as potential factors for strengthening the ability of urban gardening interventions to improve food and livelihood security among PLHIV living in urban settings in Ethiopia. Specific recommendations for follow-on programs that aim to build on or strengthen the reach of successes experienced in UGP are found in Section 5 of this report.

Following the literature review and garden site visits, several key areas for improvement were identified:

- Urban gardening skills building
- Land acquisition and management
- Water management and irrigation
- Knowledge of environmental practices and techniques
- Quality and management of school gardens
- Access to group savings and loan (GSL) associations
- Understanding of market dynamics
- Backyard poultry production
- Health referral networks for gardeners
- Health and nutrition education opportunities
- Capacity of local IPs for institutional sustainability

The following subsections include related background and findings organized by these key areas. This information will be most valuable to those who are contemplating implementing similar urban gardening programming in Ethiopia and elsewhere.

4.1 Urban Gardening Skills Building

Despite the prominent role agriculture plays in the national economy, food security in Ethiopia remains a problem for many. As subsistence farmers—living on less than US$1 per day—expand their crops into ever more marginal lands, soil and environmental degradation intensifies. Further stressed by economic and environmental shocks, these rural farmers often migrate to urban centres in search of employment, income, and support from basic social safety net programs to survive.

UGP and other development programs have found that rural-to-urban migrants are often the poorest sub-sector of a country's urban households, unable to meet their basic needs and chronically food insecure. In addition, many of these migrant populations include people affected by HIV/AIDS, including women who often struggle to produce enough food to meet their family's daily requirements.

While the majority of these new city dwellers have at least some experience in agriculture and growing crops, it tends to be mostly with cereal production on large acreage, and their skills are often not helpful in their new urban environment. The urban poor have little education or training on effective small-scale, intensive gardening/agriculture techniques, such as container gardening, mulching, composting, and fertilising with locally available waste resources.

4.1.1 UGP's Training Structures

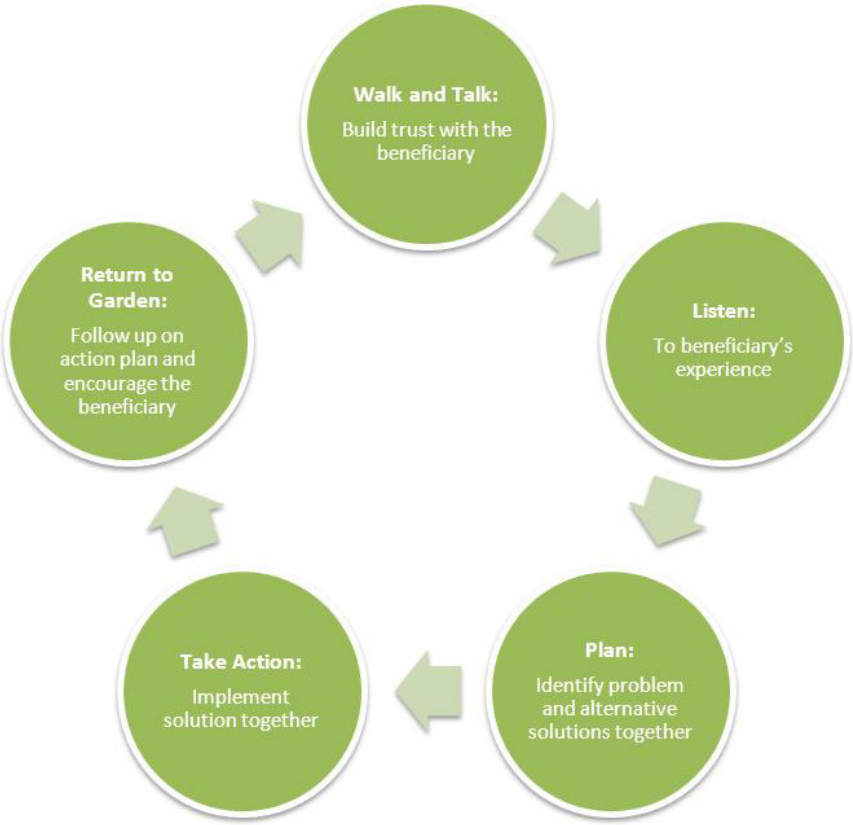
In UGP's Phase I, agricultural capacity was taught from the top down by UGP staff and university-trained agriculture extension officers (AEOs). UGP sub-contracted a training institute to train its ACs, who in turn trained AEOs, who trained garden leaders, who in turn trained the project beneficiaries.

A number of issues arose that limited the effectiveness of this approach. For instance, while program designers felt that this progression was logical, the trainings were predominantly structured in a classroom setting, focusing on theoretical knowledge, with little hands-on, experiential practice. In addition, beneficiaries reported that because of a lack of personal attention from garden leaders and few locally appropriate and practical hands-on exercises, they felt limited in their capacity to create successful gardens and address problems that might occur in their garden beds.

UGP program staff quickly recognised this deficiency and made changes in the training design and method to correct it. Thus, in Phase II, UGP's team of technical staff and AEOs shifted its training approach to include hands-on, practical training focusing on a 'lateral, peer-based, dialogue approach'. This training resulted in the development of the *Weekly Garden Dialogue* tool (UGP 2010), which was further improved upon with the *Urban Garden Dialogue* manual (UGP 2011b).

Program staff also recognised that most urban gardeners were not full-time farmers, especially among families with OVC. Adult UGP beneficiaries typically worked one and sometimes two other jobs, varying from daily labourer to domestic worker, and the training had to be adapted to meet their specific needs. As a result, UGP changed the training mechanism used in Phase I and began following the 'community conversations' model (**Figure 1**) in Phase II, to transfer gardening skills to beneficiaries.

Figure 1. The Community Conversations Model



In the second year of Phase II, UGP created its first training guide developed in line with the Farmer Field School approach created by the Food and Agriculture Organization of the United Nations, adapted to an urban setting. That same year, UGP made micro-gardening techniques a focus, as micro-gardens require less water and can be placed in small areas, often vertically. UGP used the school gardens as a platform to exhibit the advantages of these micro-gardens.

In the third year of Phase II, UGP prioritised a shift in behaviour change methods to promote a lateral knowledge transfer among UGP technical experts, gardeners, and members of the community through the *Urban Garden Dialogue*. Using this peer-based approach for transferring knowledge about gardening, a more sustainable approach to learning at the household, school, and community levels was promoted.

Building on existing agricultural knowledge and skills, the *Urban Garden Dialogue* stresses critical thinking and problem solving within the context of on-site training in the garden. UGP staff carried out one-on-one dialogues as often as necessary to handle a variety of problems that arose in the gardens. UGP technical input decreased once a gardener or gardening group showed independence in critical problem solving, garden maintenance, and harvesting.

The participatory methods employed by UGP promoted knowledge and skills sharing among beneficiaries and improved overall garden performance and outputs. For example, well-managed nursery sites were established and gardener beneficiaries reported sharing new skills and knowledge on soil management with other gardeners. The effective use of manure, compost, and green manure (i.e., the use of leguminous plants tilled into the soil while still green to provide organic nitrogen and organic matter to improve soil fertility and structure) also emerged in some of the school and community group gardens.

4.2 Land Acquisition and Management

All land in Ethiopia is owned by the federal government, and responsibility for administration of the land is delegated to county and city governments that divide the land into units known as *woredas* and *kebeles*, respectively. For every community group garden, the *kebele* has the final word on how much land and, in many instances, how much water members of a group garden may use. Lack of water and one of the highest rates of soil nutrient depletion in sub-Saharan Africa limit the availability of arable land in Ethiopia. Additionally, many rural- and urban-based poor are reliant on animal dung as a resource for fuel rather than as a resource for fertiliser. This practice, coupled with limited land management practices, will further compound the loss of the soil's organic matter, beneficial microbes, phosphorus, and nitrogen.

When Phase II of UGP began, no Ethiopian government body had created a policy that addressed 'urban agriculture'. The DAI urban agriculture officer in Bahir Dar noted, 'While there is no law against urban gardening, neither is there a law in support of it. As a result, gardeners have no security that the land they have managed for several years along the roadside will not someday simply be ripped up to make a new sidewalk'. The lack of a clear urban agriculture policy made it difficult for IPs and beneficiaries to identify sustainable sources of land and water for community group gardens. Further stressed by constraints of working in an urban area, UGP and its IPs depended on the support of a variety of local leaders—support that was contingent on their individual attitudes and personalities.

Many *kebele* administrations in major cities became familiar with UGP through interaction with Phase I, which established a number of urban gardens in schools and on public land in many cities throughout Ethiopia. As a result, many *kebeles* granted leases for additional school and community group gardens in Phase II, ranging in duration between 1 and 5 years. Typically, UGP staff and IPs counted the number of identified potential beneficiaries and subsequently calculated the size of the land needed before soliciting *kebele* and school leaders for the required parcel of land. Under UGP policy, every beneficiary was to receive at least 24 m^2 of land (although 50 m^2 was deemed more suitable by original UGP planners to meet family needs). When UGP was unable to meet this land allocation, UGP distributed grow bags and simply encouraged gardeners to create micro-gardens in their homes.

Despite the significant disadvantages and cultural stigma faced by vulnerable populations, such as widows, OVC caretakers, and women affected by HIV/AIDS, these groups demonstrated their ambition to work and be productive through PLHIV groups, gradually attracting the attention and empathy of *kebele* leaders over the years. *Kebele* leaders conceded to the granting of land to these groups, highlighting the importance of historically disadvantaged groups forming collectives to advocate for access to limited resources.

These gender-related dynamics made it critical for UGP beneficiaries to demonstrate that high levels of productivity could be achieved. In situations where a vulnerable population group gained access to land, there was a risk that urban areas with high population density and inappropriate agricultural techniques (resulting in low agricultural yields) threatened the sustainability of the adopted gardening intervention. As Ethiopia's urban farmers tended to follow the practices of their rural counterparts (agriculture based on low-input/low-output crop cycles and rain-fed irrigation), government leaders saw little progress, and land repossession by the *kebele* leadership was likely to occur within the year. Therefore, a gardening intervention that focuses on growing more on less land by using sound urban gardening techniques would be logical to adopt.

In Phase II, UGP continued to secure new urban gardening sites and create strong relationships with local governments, which provided more than 38 parcels of land, water, and, in some cases, electricity for beneficiaries.

Involving local government officials in UGP's core activities gave them, along with program beneficiaries, a sense of ownership of the community group and school gardens. Field fairs, a micro-garden contest, and bi-annual stakeholder meetings often featured officials from a variety of government offices, including city and *kebele* administrators, local agriculture, and water and livestock offices. These events gave government officials a chance to demonstrate their appreciation for UGP and to share the benefits of a sustainable agriculture project for PLHIV with their colleagues.

For the project's school gardens, UGP sought to establish strong relationships with school principals and administrators. At the outset of creating a school garden, UGP created school committees to grant adult leaders with more ownership and to foster closer relationships with OVC gardeners. Because of these relationships, OVC gardeners could access their garden plots on holidays and in the evenings when the schools were usually closed.

4.3 Water Management and Irrigation

The primary concern in the majority of UGP gardens reported by former staff and beneficiaries was long-term, dependable access to quality water sources and solutions.

Resource-poor urban gardeners depend on seasonal water fluctuations, and the majority of them cannot afford to irrigate their gardens with municipal water. As a result, urban gardeners end up relying on seasonal rains as well as water from any nearby rivers and lakes, often having to carry it by hand in buckets back to their gardens from potentially polluted sources, making vegetable consumption a risky proposition. While most urban and peri-urban dwellers rely on nearby wells for drinking water, many desperate gardeners will tap the local polluted waste disposal routes to irrigate plants and vegetables.

Many schoolyards in Ethiopia have no municipal water line to meet the needs of the student population. Those without a water line frequently rely on nearby rivers that may contain pollutants. Based on interviews with school officials, OVC gardeners in schools with no water were at a higher risk of dropping out and abandoning gardening activities, while other school gardens could function only in the rainy season.

Drip-kit irrigation was in many ways the key focal technology employed by UGP. By providing drip-kit technology, the program intended to give gardeners a safe and practical way to irrigate a garden patch while conserving water in drought-prone areas. However, this strategy was highly dependent on project funds being available to pay water bills. This dependence on outside capital for project success limited long-term sustainability.

During the first 2 years of Phase I, drip kits were provided to every gardener in all community group and school gardens. An impact study and on-going project monitoring by UGP identified that, due to Ethiopia's varied terrain, climate, and rainfall, many operational areas did not need drip kits and that drip kits, coupled with use of municipal water, often created costly water bills and hard work for beneficiaries.

When UGP reviewed the school and community group gardens following Phase I, more than 50 percent of the drip kits provided had been abandoned and gardeners had adopted other forms of irrigation (UGP 2008). Many of the drip kits were damaged and needed replacement parts, while other gardeners preferred to water their plots with watering cans. At that time, UGP did not use peer-based training to assist in the proper use of the drip kits, in part due to the large number of gardeners and the limited number of UGP staff. Also, because beneficiaries were not involved in the initial set-up of the drip kits, their capacity to repair or replace the irrigation systems was limited, leading to a lack of ownership and problem-solving ability.

At least in part as a result of the problems with the drip kits, by the end of the program, all schools had stopped paying their water bills, and the cost was often absorbed by the local IP or, in some cases, by the gardeners themselves. In addition, only a few of the visited community group gardens were relying on drip irrigation for water delivery. (There were a few community group gardens that were connected to the municipal water supply. In these cases, the garden committees pooled their money to cover the water bills.)

Thus, during the program's Phase II, UGP began to look at more permanent water security solutions, such as wells, water conservation techniques, and waste water filtration. To better utilise drip kits, UGP trained beneficiaries on the technology and made better assessments of school and community group gardens, in terms of their water needs.

In the first year of Phase II, UGP focused its energy on drip-kit distribution and instalment under the principle that drip technology would automatically lead to water conservation and less energy expenditure. However, by the end of the year, UGP abandoned this blanket approach for more site-specific and thorough water assessments. This change increased UGP's budget for a variety of watering systems and reduced the budget for drip kits and accessories.

The following year, UGP started to draw on natural bodies of water, such as nearby rivers and lakes, for irrigation and created an environmental officer position to test water sources and new wastewater irrigation techniques. School leaders continued to pay water bills for UGP's school gardens, but pointed out the importance of finding reliable and sustainable water solutions.

In part thanks to better water assessments, UGP created 27 hand-dug wells in community group and school gardens in Gondar, Bahir Dar, Finote Selam, Debre Marqos, Jimma, Waliso, Mojo, Ziway, and Awasa. Among the hand-dug wells, 20 were fitted with hand pumps, while the other 7 used a rope and washer pump. In addition to hand-dug wells, UGP financed the drilling of five boreholes (30–75 m deep) in the third year of Phase II. These wells were deep enough to penetrate aquifers and the water table, thereby virtually guaranteeing water for many years to come.

Once UGP located and dug new wells, water delivery often became an issue, as UGP strived to avoid forcing gardeners to carry heavy watering cans for long distances. To remedy this, UGP placed large water tankers in community group and school gardens to provide a central water storage area for

gardeners. UGP funded six electric and fuel-powered water pumps for community group and school gardens, and distributed 10 hand pumps, accessories, and fuel. To better store water and decrease the gardeners' workload, UGP distributed nearly 340 water tankers with capacities that ranged from 80 L to 4,000 L.

4.4 Knowledge of Environmental Practices and Techniques

Although Ethiopia's economy is based on agriculture, many cities are home to factories and manufacturers that put dangerous pollutants into the country's rivers and soils that farmers rely on for water. The resulting natural resource degradation is often cited as a major reason for urban migration among the rural poor. Ironically, many rural farmers come to urban areas to find jobs in the very factories that are causing this environmental degradation. In urban areas, these problems are exacerbated by poorly implemented land and water management policies. Few urban gardeners have knowledge about techniques to mitigate this environmental damage.

Poor sanitation presents risks, but it also provides opportunities, especially for urban and peri-urban gardeners. While market waste (e.g., char, ash, vegetable waste, manure) can become a significant health hazard, it is also a tremendous source of fertiliser and organic matter that, if controlled before being co-mingled with common trash, could form the basis for highly beneficial organic soil amendments. Ethiopia's urban gardeners will often accept these potential hazards when accessing land, water, and other resources that are rich in nutrients but that are most likely also heavily contaminated.

For school gardens, being located near latrines was perhaps UGP's most common environmental problem. Flies originating from latrines are a significant vector of disease and present significant health hazards to above-ground vegetables by depositing human waste on leaves and stems. To address these problems, UGP encouraged school committees to move the gardens away from the latrines whenever possible. In other cases, UGP staff and gardeners planted border shrubbery like elephant grass and *Sesbania* trees between the latrine and the garden. These plants provide a natural line of defence against latrine flies. Finally, as a last resort, student gardeners planted tubers and root vegetables like carrots and onions instead of leafy vegetables that attract flies.

UGP also encouraged urban gardeners to use household wastewater for garden irrigation by sorting and filtrating. Using water used to wash hands promotes water conservation while supplementing gardens in water-scarce areas; this is a practice that can be easily applied at home.

To assist beneficiaries in dealing with sanitation issues, UGP initiated a thorough examination of the relationship between agriculture, community group and school gardens, and sanitation, and worked closely with government environmental protection agencies and USAID to ensure that urban garden sites were safe for beneficiaries to plant, irrigate, and harvest, and that their yields were safe to eat.

In the first year of Phase I, UGP hired a consultant to help conduct the first initial environmental examination (IEE) to better identify and select usable water and land resources. Following the recommendations of the IEE, UGP created the position of environmental resource advisor, whose first task was to oversee the development of an environmental monitoring checklist for garden visits and the Environment Mitigation and Monitoring Plan (EMMP), a locally appropriate, comprehensive approach to land and water management. The gardeners and AEOs worked together to create the EMMP to address any potential contamination issues. The locally created EMMP led to a campaign to encourage gardeners to keep their sites free of litter and the water safe from contaminants using bio-sand filters.

UGP recognised the ability to make environmental management a knowledge-sharing and capacity-development opportunity for beneficiaries, as gardeners were more willing to adopt environmental

mitigations measures after seeing evidence that the quality of their produce was reduced when planted in contaminated soils or irrigated with polluted water.

In the second year of Phase I, UGP tested 38 water sources from newly constructed wells as well as rivers. Although some wells provided irrigation that was suitable for gardening, the water was not potable. (UGP placed 'not potable' signs around these wells.) In addition, UGP gardeners abandoned several wastewater sources in response to laboratory testing.

Also that year, UGP published and distributed its *Child Friendly School Gardens: A Handbook for OVC Care in School Garden Settings* that included a section about environmental protection in the school compound. UGP frequently integrated environmental groups into the school committees linked to the school gardens. Environmental groups assisted UGP and IPs in supporting environmental mitigation plans and advocating for a cleaner work environment and more sanitary gardens.

4.5 Quality and Management of School Gardens

Before the current Ethiopian government came into power in 1991, the national education curriculum included courses in farming and agriculture in both primary and secondary school. In an attempt to industrialise the economy in the early 1990s, the Ministry of Education removed agriculture classes from the curriculum. In recent years, many universities have strengthened the curriculums of the agriculture departments, but as only a small percentage of Ethiopians have access to universities, this is not sufficient to support interventions for urban agriculture/gardening education.

A significant need exists for hands-on learning within the current biology, chemistry, economics, and math curricula. The creation of UGP school gardens presented the possibility of filling this gap in the education of urban dwellers, with OVC beneficiaries bringing what they learned in the school garden program to the community gardens later in life (although this expectation turned out to be somewhat misguided), while also benefitting OVC and providing the schools with a reliable and sustainable garden plot. In addition, many OVC often depend on other jobs for income. By creating an alternative source of income, school gardens encouraged student gardeners to remain closer to the school environment. However, schoolyard gardens presented serious challenges, and UGP worked with schools to ensure that gardens and gardeners were properly managed, that the water costs were shared, and that the wider community provided support, such as guards to oversee the gardens during holidays.

In the beginning of Phase II of UGP, school gardens took many forms and employed many operating methods, each depending on what school principals would allow and provide. Some school gardens allowed the beneficiaries' caretakers to garden side-by-side with the children, while other schools took a more didactic approach and utilised the school gardens as a demonstration area for biology and other subjects. Some OVC savings and loan funds were directed to pay for school fees, uniforms, and other school-related materials, while other OVC groups had the freedom to spend their money on whatever they chose.

During the first 2 years of Phase II, relationships between school principals and administrators and UGP were strengthened as the two groups discussed securing land for the creation of school gardens. However, due to a lack of foresight and sensitisation by UGP staff, school officials often came away from these discussions with unrealistic expectations; when the gardens failed to live up to these expectations, some school principals became disengaged from the project.

In the last 2 years of Phase II, UGP IPs recognised the time burden these gardens often placed on school teachers and increased their level of involvement in the program beyond training at the outset. This improved relationship with school leaders allowed for the standardisation of garden management. UGP placed greater emphasis on development of five-member school committees that were to incorporate the wider community and build ownership of the gardens. School committees

helped UGP staff follow up on gardening activities, create clubs, screen and identify OVC, run OVC savings groups, and lead discussion groups among the students. Thanks to these school committees, UGP's school gardens flourished, and thousands of economically disadvantaged students were able to benefit. In addition, with the involvement of OVC school advisors, UGP ACs and AEOs were able to improve OVC service standards and strategies to enhance the overall impact of agriculture in the schoolyards. Since project closure, however, most of these school committees have ceased to function.

While in operation, UGP's school gardens provided significant value to OVC. According to interviewed school officials and beneficiaries, in addition to being a source of income and food, UGP gardeners experienced an increase in social status, self-esteem, and general well-being. Adolescents are especially vulnerable to the negative effects of discrimination and stigma associated with poverty and HIV, and these gardens allowed students to show their peers their ability to create something, follow through, and start their own enterprise. According to one school official, these increased benefits also contributed to student gardeners' commitment to stay in school and continue their education. According to results from an analysis of school gardens carried out by Tufts University (Shroff et al. 2011), these social benefits provided the highest degree of transformation for beneficiaries, when compared to the modest financial and nutritional benefits.

In the third year of Phase II, UGP held the 'Micro Garden Contest: Innovation in Small Spaces among Student Gardeners'. Beneficiaries were organised into teams and planted micro-gardens in the school compounds. A total of 3,910 OVC from 89 schools participated in the contest. After 2 months, the teams were judged on creativity, production, and school spirit, and were honoured in an event that was heralded as a great public relations success.

4.6 Access to Group Savings and Loan Associations

A majority of urban poor in Ethiopia, including UGP beneficiaries, are highly vulnerable to economic shock. Women in particular frequently lack access to microcredit and financial services. To address these issues, many IPs linked UGP beneficiaries to savings and loan programs supported by other donors. However, many other IPs viewed the implementation of a functional savings and loan group as extra work on top of garden preparation, capacity training, and setting up discussion groups, and were therefore unwilling to take it on. As a result, with no definitive training or support from UGP, some gardeners were members of savings and loan schemes and others were not.

UGP IPs represented a wide variety of skills and experiences with savings and loan schemes, with some AEOs being well versed in these schemes and others having never worked with risk-averse beneficiaries on running a community savings fund. In response, in May 2010, UGP created the position of finance and enterprise officer (FEO) to standardise and strengthen UGP's savings and loan method and to provide close technical support for IPs and ACs.

After visits to the field, an FEO would identify which UGP beneficiaries would be good candidates for GSL programs. Together with a DAI technical expert, UGP designed a GSL method that promotes groups of 20–30 self-selected gardeners to mobilise internal financial resources as savings in a cashbox under the management of a committee formed within the group.

Despite the availability of microfinance institutions in most Ethiopian cities, UGP beneficiaries preferred depositing their money in a locally controlled cashbox, knowing that they would have easier access than they would with more distant banks. Building on the already existing discussion groups in community group and school gardens, UGP and IPs retrained the existing savings and loan groups in the GSL method and expanded the size of new groups.

Each GSL group created a management committee, developed its operating procedures, purchased a lockable cashbox, and recorded deposits and withdrawals in savings passbooks provided by UGP.

Once GSL groups mobilised enough money, some opened savings accounts with local microfinance institutions, with the aim of accessing credit and other financial services.

In the third year of Phase II, UGP issued program-wide GSL guidelines, in English and Amharic, to ACs and AEOs. UGP trained all ACs and AEOs on the GSL method and provided toolkits (including a cashbox, passbooks, and other items) to every UGP GSL group. During a November 2012 site visit, these toolkits were found to still be in use at the community group garden level.

Also in the third year of Phase II, UGP created the position of community mobiliser among its IPs. The community mobiliser was responsible for organising discussion groups as well as GSL groups. By the end of the year, UGP GSL participation had risen from 6,900 beneficiaries to nearly 8,200 beneficiaries comprising more than 350 GSL groups. The GSL component had a positive impact on the gardeners' enthusiasm and allowed gardening groups to easily cover water bills, seeds, and other costs. In addition, OVC further benefitted from the GSL scheme in that those with a savings record could access these savings to pay for school materials and fees.

In the program's final year, UGP produced the second edition of its GSL guidelines (UGP 2012d) and gave several refresher trainings on GSL to UGP ACs and AEOs. As part of the program's efforts to encourage on-going sustainability, UGP focused resources on linking 51 GSL groups to already existing local microfinance institutions. With this change, UGP also redesigned its granting method with IPs. However, the IPs found these changes to be complicated and confusing. As a result, IPs allocated less money toward the cohesion of the GSL component. In the same year, UGP eliminated the community mobiliser position, which resulted in the placement of all GSL responsibilities on the already overextended UGP ACs and AEOs.

4.7 Understanding of Market Dynamics

In Ethiopia, more than 75 percent of the national economy is based on agriculture (International Fund for Agricultural Development [IFAD] 2011). The majority of farmers are purely rural subsistence farmers. Many other farmers living in rural areas rely on weekly markets, which are often far away from where they live or grow their crops, to sell their goods. Urban dwellers have the advantage of living near markets, outlets, and thousands of potential customers.

Ethiopians generally have good awareness about HIV and its transmission. One gardener reported that 10 years ago, nobody would even think about buying a product from a person who was open about living with HIV. Today, doing business with PLHIV is not only accepted as normal, but many communities have begun to rally around PLHIV groups, showing them support by buying their goods and services.

UGP discovered very weak levels of marketing skills among beneficiary gardeners, as well as local governments and NGOs. UGP observed that most Ethiopian gardeners lacked basic marketing capabilities, including market research to assess demands, identify buyers, and observe competitors; marketing and promotional material to gain access to new buyers, especially through intelligent branding; and creating synergies with other organisations, NGOs, and private buyers to increase sales and the customer base.

In the second year of Phase II, UGP created the position of finance and enterprise specialist to increase marketing knowledge and access for UGP community group and school gardens as well as to provide close technical support for IPs and ACs.

Following success with the 2009 field fairs (see **Section 4.3.2**), UGP continued to promote participation in regional trade fairs as important instruments to create business relationships with input suppliers, processors, value-added actors, local government officials, and consumers. In addition,

regional trade fairs increased the visibility of the UGP brand. Gardeners also organised their own field fairs on a smaller level, to showcase their gardens to members of the community.

The finance and enterprise specialist tested innovative ways of bringing updated market information to gardeners, and UGP devised a plan to put information boards at each community group and school garden to post updated market information on the price of vegetables in selected markets in the area.

To increase market opportunities, UGP created a series of basic business skill guidelines and skills training for UGP gardeners. In the third year of Phase II, more than 250 gardeners received training that encouraged the establishment of marketing groups following a micro-enterprise model.

UGP had significant success in linking community group and school gardens with hotels, supermarkets, and other businesses to deliver their produce and other products. In the third year of Phase II, UGP assessed Ethiopia's small enterprise laws and the gardeners' success in marketing the products and embarked on a mission to organise selected gardeners in vegetable marketing groups to capitalise on their experience. These relationships still exist, even after project closure and the end of support from the finance and enterprise specialist. However, many gardeners are concerned that without project-linked support, it will prove difficult to continue.

4.8 Backyard Poultry Production

The urban poor in Ethiopia often turn to poultry and small ruminant husbandry to supplement their income as daily labourers and to increase food security. UGP started development of a poultry-raising component—the Backyard Poultry Program—in the first year of Phase II and began implementing it the following year.

Many of the gardeners previously had their own poultry or saw their neighbours raise poultry, and this experience created both opportunities and challenges for UGP's Backyard Poultry Program. For example, many UGP beneficiaries who grew up with chickens in rural areas continued with traditional methods of feeding and rearing poultry (with the aim of using the meat as a high-protein food source) even after they migrated to an urban area, resulting in less-productive egg-laying hens. On the other hand, while the Backyard Poultry Program required commitment and a significant initial investment, chickens can be relatively easy to manage and their eggs can provide high-value protein without a significant amount of labour.

Proponents of urban agriculture often suggest that birds raised on a small scale are less likely to carry diseases than factory-farmed poultry. However, some public health officials are concerned that backyard chickens could elevate disease risks that can be transmitted from birds to humans, especially PLHIV that are likely to be immune-compromised. To qualify for the Backyard Poultry Program, gardeners first had to construct a chicken coop in or near their homes that met quality standards of ventilation, space, and heat, as well as human health parameters to protect the beneficiary. UGP granted six chickens to gardeners who met those standards. To transfer knowledge, UGP hired local experts in chicken farming to give beneficiaries half-day trainings on poultry husbandry and production. However, program coordinators later identified that this training was insufficient to meet the needs of the beneficiaries.

4.8.1 Distribution of Poultry and Feed

Over the course of the Backyard Poultry Program's first year of operation, UGP distributed more than 1,500 chickens and nearly 12 tons of chicken feed. Unfortunately, beneficiaries received an exotic chicken breed known as White Leghorn, and, due to the breed's incompatibility with local surroundings, the majority of the animals distributed fell victim to disease and perished. According to UGP staff, beneficiaries often complained that white chickens were also easier for predators to hunt and kill, which led to a higher death rate.

In response to these issues, UGP adjusted the chicken breed in the program's second year and began distributing Bovans Brown chickens, a breed locally favoured for its high level of adaptability, to beneficiaries. Gardeners were responsible for keeping chicken coops clean and for taking the chickens to district animal clinics for vaccinations and treatment.

UGP improved the quality and length (to up to 2 days) of the training, but failed to address the problems that came with inconsistent beneficiary targeting. That year, UGP provided 1,200 gardeners with the 2-day training on poultry raising, and distributed 7,000 chickens, vaccinations, and 6 tons of feed.

Throughout the program, UGP faced problems linked to the timing of distribution. For example, due to UGP's agreement with the chicken vendor, beneficiaries received their animals at the height of Ethiopia's rainy season (mid-June), when young chicks face the greatest risk for contracting disease.

In the second year of Phase II, UGP analysed the chicken feed being provided to beneficiaries and learned that it was very low quality. When many gardeners complained that their chickens were not laying eggs, UGP determined that the poor quality of the provided feed was part of the problem.

In addition, beneficiaries were not economically prepared to care for chickens, raising serious concerns about the viability of the UGP Backyard Poultry Program. For example, many gardeners were unable or unwilling to sacrifice family resources to purchase grain for the animals once distributed feed ran out.

4.8.2 Training Methods

In the third year of Phase II, UGP hired a livestock expert and redesigned the poultry production training methods to be more locally appropriate and hands-on, rather than classroom- and lecture-based. The expert also updated the Backyard Poultry Program's criteria for beneficiary targeting, placing a special emphasis on having the financial resources needed to properly feed and care for chickens. This new UGP approach placed more responsibility on ACs and AEOs who received 2 years of consecutive training in both practical and theoretical material. The AEOs then trained beneficiaries in groups of 30 and incorporated poultry production, and its synergy with environmental and public health, into the community group and school garden discussion groups.

Once gardeners were selected and trained, UGP IPs and vendors coordinated the distribution of the animals. UGP and partners also invited local government representatives to the day of distribution in the third year of Phase II, to ensure transparency and to improve official linkages with UGP. Using the profits from egg sales, many OVC gardeners reported being able to purchase school uniforms and materials and to contribute to household costs.

According to ACs, OVC gardeners were often more successful with poultry production than their adult counterparts. As OVC had little or no previous experience with raising chickens and harvesting eggs, they tended to take the training more seriously and followed guidance closely. Adult gardeners, who often had experience with raising chickens outside of this intervention, frequently reverted to outdated and inappropriate methods of caring for poultry. In addition, the OVC typically had more disposable time and devoted more time to their animals than adult gardeners.

The Backyard Poultry Program, despite its many challenges, did confer a higher level of responsibility on participants, resulting in improved engagement. The program also strengthened social bonds among UGP chicken farmers and the community at large.

4.9 Health Referral Networks for Gardeners

In accordance with PEPFAR requirements, Phase I of UGP partnered with Family Health International (FHI) (now FHI 360) to cover the community health component of the program. FHI was also responsible for the program's monitoring and evaluation and data collection. At the start of Phase II, UGP created the position of the health integration officer (HIO) to provide staff and beneficiaries with a higher awareness of how to access health service referral and linkage networks, as well as to provide needed nutritional information to encourage the on-going consumption of vegetables.

The core staff in UGP's first year of Phase II came from agricultural backgrounds with little experience in HIV/AIDS treatment, care, and prevention. However, many of the operational ACs had worked on UGP Phase I and thus gained recent experience working with HIV/AIDS-affected populations. The responsibility of providing beneficiaries with referrals and linkages to local health services was delegated to FHI (which transmitted the information through the HIO), as well as to the IPs who specialised in working with HIV/AIDS populations.

UGP beneficiaries, many of whom were HIV-positive, already had some knowledge about HIV services offered in their areas thanks to local associations, media, and government agencies. According to the UGP baseline study (UGP 2011c), nearly 50 percent of the beneficiaries already knew of three methods of HIV prevention. However, only 9 percent had comprehensive knowledge about HIV/AIDS. As operational ACs and IPs worked with gardeners in both technical aspects of gardening and HIV/AIDS care and prevention, they realised that further support was needed to better address the gardeners' health. In response, FHI and the newly hired HIO created a strategy to bring basic knowledge of HIV/AIDS services to the UGP's beneficiaries.

At least 57 percent of the beneficiaries had received informational material about HIV/AIDS care and prevention in the 6 months prior to the baseline survey, the largest source being local media outlets. To build on this outreach, UGP used school and community group gardens as a distribution point for HIV-related messages.

In the first year of Phase II, UGP recruited health professionals to come to community group and school gardens and provide beneficiaries with short trainings and written material about HIV/AIDS prevention, care, and services, along with some basic nutritional training. This method, after proving costly and for the most part ineffective, was phased out later that year.

Also in the first year of Phase II, UGP began establishing a referral and health linkage system among beneficiaries and local health providers, including governmental organisations, local and international NGOs, and other associations. These linkages helped connect beneficiaries with health resources related to HIV/AIDS, nutrition, and gender-based services.

The following year, UGP hosted various meetings and trainings on health care services for its IPs, including IP directors, AEOs, and the newly created community mobilisers. UGP's core staff also became more engaged with HIV/AIDS services and the treatment of PLHIV, which strengthened bonds with the program's beneficiaries.

UGP continued to focus on streamlining a health referral system for UGP beneficiaries, while the HIO and operational ACs and AEOs spearheaded the implementation of a series of weekly group discussions similar to the *Urban Garden Dialogue* concept. Gardeners met weekly or twice per month at the garden to discuss their health, share experiences, and provide support for one another. The discussion groups were intended to supplement the health referral system and provide beneficiaries with a platform for sharing information.

4.10 Health and Nutrition Education Opportunities

The poor nutritional status of children and women has been a serious problem in Ethiopia for many years. According to the Ethiopia Demographic and Health Survey (Central Statistical Agency/ICF International 2011), 44 percent of children under 5 are stunted, and 21 percent of children are severely stunted. Over the last decade, the health sector has increased its efforts to enhance good nutritional practices through health education, treatment of extremely malnourished children, and provision of micronutrients to this most vulnerable segment of the population. In addition, the government has recognised the need to include nutrition in national programs, with its outreach strategy of targeted supplementary food, health extension programs, and community-based nutrition and micronutrient interventions. However, Ethiopia's education curriculum has not kept pace with this need and does not include comprehensive information about health and nutrition. Therefore, UGP aimed to provide this knowledge through community and school-based garden programs.

The majority of UGP gardeners were mothers and OVC caretakers that fed their children mainly grains, which were perceived to be more satiating and inexpensive when compared with other food types. This heavily grain-based diet is a problem because it does not provide growing bodies with all their nutritional requirements. However, few resources existed for sharing knowledge about what appropriate changes could be made to improve the nutritional content of home meals.

Although significant nutritional impacts will not necessarily occur simply because of the introduction of a vegetable garden, agricultural researchers accept that urban gardening programs like UGP typically result in a general increase in both calories and micronutrients among urban gardeners. By partnering with FHI at implementation, UGP intended to provide additional beneficiary training in nutrition and health as it relates to vegetable gardening to complement the agronomic technical knowledge gained.

UGP gardeners had limited access to resources and little to no access to large parcels of land for planting vegetables. Many did, however, have small spaces available where gardening in containers and stacked tires could provide good nutritional supplementation. Those gardeners who did have access to land for raising crops usually did not plant nutrient-dense vegetables, such as carrots, beet, or Swiss chard, and instead opted for cash crops, such as corn, potatoes, and onions.

A survey of UGP gardeners in the program during the first two years of Phase II (Shroff et al. 2011) showed that, along with increases in social status, gardeners also experienced increases in both the amount of food consumed and dietary diversity.

According to UGP's baseline study (UGP 2011c), nearly 20 percent of the beneficiaries reported consuming vegetables from their gardens, and 55 percent had received information about nutrition during the past 6 months. The majority of gardeners recalled receiving some information on nutrition through UGP extension workers; other sources of information included other group members and local health clinics.

UGP's HIO and the IP AEOs worked together to begin implementation of discussion groups and provided beneficiaries with guided topics covering HIV/AIDS; nutrition; hygiene; gender; and the relationships between antiretroviral therapy, nutrition, and HIV/AIDS. The group discussion also took advantage of gardeners' existing knowledge, similar to the way the *Urban Garden Dialogue* model works, by providing a venue to share this information.

Through these well-facilitated group discussions, the integration of health, nutrition, and vegetable gardening began in the first year of Phase II and continued throughout the program. Every school and community gardening group elected a group facilitator, usually the garden's de facto leader and most outspoken member. Establishing the discussion groups at the same time beneficiaries were preparing land, setting up irrigation systems, preparing to transplant seedlings, and engaging in other important

garden practices helped link the discussion groups to successful gardening and ensured the gardeners' commitment to the groups. A series of robust group discussions, led by a good facilitator, consistently led to a stronger commitment to the garden as a whole.

In the final year of the program, UGP distributed handbooks on discussion group facilitation for both facilitators and participants (UGP 2012b; UGP 2012c). To increase the participants' understanding of the material in the participant's handbook, it was printed in Amharic. The facilitator's handbook was designed to provide guidance on how to steer discussions and included topics to prompt gardeners to share their ideas. By the end of the project, the majority of these discussion groups were still meeting on a regular basis with IP support.

UGP also partnered with other organisations to strengthen the quality of health and nutrition education opportunities. Organisations such as the World Food Programme, John Hopkins University, and the U.S. Peace Corps brought important additional perspectives on the link between good health and strong gardens. Each of these partnerships placed emphasis on identifying knowledge gaps as outlined by UGP's HIO. In the end, the partnerships helped many beneficiaries learn about the advantages of vegetable consumption rather than mere production for market.

4.11 Capacity of Local Implementing Partners for Institutional Sustainability

UGP approached local NGOs working in various locales in Ethiopia with an open Request for Proposals (RFP) to work with UGP so that the project could be sustainable after UGP ended. UGP developed objective criteria and convened a panel of reviewers to assess each proposal according to those criteria. In the RFP, UGP alerted each potential NGO that it would be required to meet a certain target number of beneficiaries.

Due to the nature of UGP and its funding from PEPFAR, the majority of the responding local partners specialised in HIV/AIDS support and services. Very few staff members of the NGOs and AEOs had any significant experience in agriculture or urban gardening and needed significant training to provide such assistance. Nevertheless, UGP selected various NGOs that met the criteria to provide the requested services.

Once the NGOs begin implementing work on the project, UGP noticed that, in many cases, partner employees were spending time on other projects despite being paid by UGP, as employees of Ethiopian NGOs were often overburdened with responsibilities to other organisations.

Some NGOs, although meeting the criteria in terms of capacity, were poorly funded and could not stand alone without the UGP financial grant to carry out services.

Many partner NGOs felt that the UGP grant was too small and frequently complained about workload, and many NGO leaders resisted meeting with UGP staff to plan the gardens. In several cases, AEOs remained loyal to their NGO employers and ignored direction and guidance from UGP staff, which slowed project activities and outreach considerably. Perhaps as a result of the high demand for local outreach workers, there was a high turnover of local partner extension officers. Many moved on after just 1 year under UGP, resulting in UGP staff needing to train new recruits at the beginning of each project period.

Community group and school gardens were often spread out over a large area, and transportation to and from the gardens was a problem for partner staff. Many NGOs requested motorbikes for AEOs, but delays in the procurement process lasted several months and hampered the participation of AEOs and ultimately their support to beneficiaries.

UGP adopted a multipronged approach to transfer knowledge and skills to its IPs. In addition to periodic trainings with wider scopes, UGP operational ACs met monthly with IP AEOs for refresher training on urban gardening and UGP training methods. Together, the operational ACs and AEOs reviewed garden and training problems monthly to try to reach amenable solutions.

In addition to agriculture-oriented training, UGP staff aimed to build the skill delivery capacity of all IPs through a variety of locally provided and relevant training sessions on group discussion and facilitation, monitoring, evaluation, and reporting, as well as referral service and beneficiary mapping. IPs that received these trainings would be good candidates for continued support to on-going programs and projects of similar nature.

In addition, each area of operation held bi-annual stakeholder meetings with IPs, government officials, and other key stakeholders. The meetings provided the opportunity for IPs to meet with influential community leaders while building linkages and synergy that would ultimately benefit UGP beneficiaries.

In the first 2 years of Phase II, UGP trained 32 IPs and their AEOs on small-scale urban gardening techniques to better assist beneficiaries working in newly established community group and school gardens. Unfortunately, these trainings followed a field agriculture doctrine rather than a small-scale, high-yield approach, and did not cover important and practical soil health or local resource management techniques.

Also in the second year of Phase II, UGP provided the first in a series of trainings related to grants and procurement, with the aim of providing IPs that continue to work with USAID-funded projects with skills to prepare better grant proposals and to comply with grants.

The following year, UGP expanded and partnered with more than 50 local NGOs, and added the position of community mobiliser to complement AEOs. UGP provided guidance and training in urban agriculture, garden management, and health, and began training on backyard poultry raising.

That same year, UGP rolled out the *Urban Garden Dialogue* tools, a peer-based learning tool designed to empower gardeners to turn to each other first for solutions and to promote the use of local resources. UGP provided training on these methods to selected AEOs and IPs. UGP also provided training and support on the preparation, processing, and finalising of EMMPs for every garden. Environmental training gave partners a stronger grasp on how to select sustainable land and water sources. UGP also trained select partners on basic business skills and on savings and loan and financial management.

In its final year, UGP continued to place emphasis on its participatory approach to gardener training and produced new tools and publications to train AEOs. UGP introduced the positive behaviour checklist as a tool to improve performance and efficacy of the *Urban Garden Dialogue* method.

5 Discussion/Conclusions

5.1 Summary of Key Points

UGP did excellent work in facilitating a dialogue on improved urban horticulture and its role in empowering PLHIV and improving food and economic security among vulnerable populations and key organisations in Ethiopia. UGP brought forward the notion that there are more reasons to tend urban gardens than food and income, as gardening can enhance gardeners' emotional well-being and sense of worth.

A great many lessons have been learned through the creation of school and community group gardens. To be successfully adopted and adapted, any intervention must stem from local resources and be socially, economically, and environmentally acceptable. To achieve the vision of a resilient, empowered urban gardener, beneficiaries must be taught tangible, practical ways to develop soils that will result in resilient, diverse plants that can be eaten as well as sold, to enhance livelihoods and children's nutritional status. The current paradigm, that one must have a lot of space to grow enough vegetables to make a difference, must be changed to fit the urban reality of limited land availability. Big results can be achieved from small, very well managed areas, which can lead to a new paradigm: 'grow more with less'.

UGP community group gardens targeting adult PLHIV, HIV-affected women, and OVC caretakers have been well established and can continue on their own. Continuing agronomic training in bio-intensive production and water conservation will help ensure continuing sustainable outcomes of increased food and income, and possibly an improvement in childhood nutrition.

School gardens will struggle to continue now that UGP has ended, but teachers and school committees are still in place and eager to learn new and better ways to involve children in learning and income generation. This is the time to modify the UGP intervention's approach to fit the new paradigm of 'grow more with less', which will be far more relevant to the students' home and future reality.

Manuals and tools developed by UGP are excellent resources for future projects to adapt and carry on. Further revision is required to make the manuals more explicit in their instruction and more action-oriented in their outcomes. With adaptations to provide beneficiaries with more in-depth, concrete action steps, the *Urban Garden Dialogue* method, which encourages lateral learning and decreases dependency on outside experts, should become the accepted 'best practice' for developing self-empowered neighbourhood networks of learners and teachers. Local IPs have received extensive training in organisational management as well as agronomic skills and are ready to assist projects and organisations in their efforts to reduce extreme poverty and childhood stunting.

5.2 Next Steps

A number of opportunities for continuing support have been made possible by UGP's excellent beginnings. The following actions are recommended to support the continuation and strengthening of specific interventions in community group and school gardens, reinforcing the new proposed 'grow more with less' paradigm.

5.2.1 Overall Recommendations for Both Community Group and School Gardens

Urban Gardening Skills Building

- The blending of local experience in agriculture practice with textbook agricultural theory greatly enhanced the training curriculum and should be continued. Opportunities exist to

strengthen the training material further, in terms of updating key agronomic practices and identifying and documenting additional promising local practices.

- More hands-on, skills-based beneficiary training is critical to building the individual and group resiliency that any future project will endeavour to achieve. Limited capacity of trained AEOs and UGP staff to support beneficiaries was a barrier to allowing the *Urban Garden Dialogue* to effectively foster independence, empowerment, and confidence at local problem solving. Many UGP staff reported that the 1-year project participation period was far too short to produce significant results in beneficiaries' confidence in their newly acquired skills. Some of the gardens did not begin planting seedlings until the end of the second quarter of any given project year, due to unforeseen obstacles, such as handling land leases and securing sustainable water. Extending the active group garden support period to at least 2 years could greatly improve beneficiaries' gardening skills and overall agricultural knowledge.
- A paradigm shift, away from the perception that large land areas are needed to grow abundant produce, must be undertaken by those programs following in the steps of UGP. Beneficiaries could benefit from a more intensive, holistic training in horticulture that focuses on local resource management and evidence-based, bio-intensive agronomic practices. This would allow gardeners to realise higher yields per unit area within the confines of a land-poor but market- and resource-rich urban environment.
- To achieve a successful two-way skills and knowledge transfer, program staff must cut through class, gender, and cultural differences, and adopt the lateral dialogue approach with its participatory learning method. UGP program staff found it imperative to focus time and energy to the sensitisation of its field staff to the needs and challenges of the urban poor, to better understand how to effectively communicate with beneficiaries. Switching from a top-down, lecture-based learning model to a peer-based, interactive model proved difficult for many UGP staff accustomed to traditionally accepted methods of teaching and learning in the context of Ethiopian society.

Land Acquisition and Management

- Shifting to a 'grow more with less' paradigm will help follow-on urban gardening programs and partners provide sustainable and profitable garden plots for beneficiaries without the risk of overcrowding or perceived lack of resources.
- Advocating for longer leases on public land, in both school and community settings, would help ensure the future of the gardens and increase gardeners' sense of security and confidence.
- Building on past successes, *kebele,* school, and *eder* leaders can be more easily sensitised to the importance and integrity of urban gardening programs through timely feedback about the value of community group and school gardens. Open, consistent communication will help prevent and lessen feelings of mistrust by community leaders resulting from a history of perceived mismanagement and misuse of funds by local partners guiding international development agencies.
- Beneficiary groups should be highly organised in terms of leadership and overall planning, as many *kebele* leaders indicated that they were less willing to help if the members were not organised.
- At the outset of securing land, programs should put in place mechanisms to ensure that beneficiaries will be given access to other plots if the original land is repossessed, or encourage city governments to outline new policies providing compensation for dispossessed gardeners. The repossession of land is often times inevitable, especially in high-density cities like Addis Ababa, Adama, and Bahir Dar.

Water Management and Irrigation

- Before harnessing any garden with a particular form of irrigation system, a thorough water assessment and analysis is necessary. By implementing a feasibility study before committing to an area, the likelihood that a garden will be resilient and sustainable will increase.
- Drip-kit technology has the potential to maximise water resources if used and maintained correctly, but the technology is expensive and not always relevant to the reality of the beneficiaries, in particular OVC school gardeners. In addition, proper land/water assessment, training, and management and use of the technology is necessary, given that drip kits require technical knowledge about the parts and accessories, many of which are either unavailable or prohibitively expensive.
- Other practical methods of water storage, transfer, and management—such as drip bottles, deep soil preparation, addition of organic matter, plant spacing, and mulching—should be integrated in small-scale gardens.
- The quality of the water that is locally available should be considered when choosing the most appropriate irrigation method. Heavily silted water is not suitable for drip-kit technology because it clogs the lines and eventually damages the drip kit.
- Community group and school gardens must be transitioned from using municipal water lines that are often difficult to manage, unreliable, and costly. Additional training in water capture and saving strategies is required to limit overall water needs while maintaining plot yields. In addition, much greater emphasis should be placed on soil health and composting to increase soil water-holding capacity and limit the need for excess water.
- Overall, improved water harvesting, better soil management, smaller plots, and wells coupled with tankers remain the best ways to achieve water security for both community group and school gardens. However, due to the high costs of drilling boreholes and hand-digging wells (and the cost of associated holding tanks), follow-on programs should continue creating advantageous partnerships with local governments to give the community more ownership of the wells and encourage the spending of government funds to help the poorer zones of their cities.

Knowledge of Environmental Practices and Techniques

- Through better training and awareness, beneficiaries should be made aware that the quality of their harvest is directly related to the quality of soil and water being used. The quality of the vegetables then determines their price and the ultimate financial benefit of the garden. In addition, involving gardeners directly with remedial measures creates garden ownership as well as practical knowledge for the future.
- Community group and school gardens would benefit by giving AEOs and gardeners more experience and confidence in environmental matters. One method for achieving this is to request that gardeners and AEOs implement the EMMP at the beginning of each harvest cycle to pre-emptively address potential hazards in local water supplies, especially rivers and ponds.
- Follow-on programs should continue to target urban dumping sites for potential gardens. According to past experience, these sites are not always contaminated beyond usefulness and often present fewer difficulties in terms of land acquisition.
- Within the established framework of UGP's environmental management methods, beneficiaries can apply practices that recover water, nutrients, and energy from otherwise wasted resources, which is a priority in urban areas where resources for agricultural production are already limited.
- Looking beyond household waste to agro-industrial waste products, such as char, ash, bagasse, and spent vegetation, offers an alternative stream of highly valuable resources for crop

production, when the products can be made into stable compost. This productive reuse of waste resources should be considered a crucial and lasting service to the local ecosystem. In addition, this practice can become a compelling way to involve the citizenry in proper environmental management; what was once a nuisance waste becomes a valuable, marketable asset.

Access to Group Savings and Loan Associations

- Follow-on projects should introduce a well-thought-out GSL model, as was used by UGP, at the beginning of the program, to maximise impact. Programs should create a definitive implementation strategy at the outset among IPs by linking GSL to discussion groups and the *Urban Garden Dialogue* tools. Clear expectations from the beginning will decrease confusion and build ownership among local IPs and beneficiaries and increase commitment of program staff.
- A longer operating period for school and community group garden programs, extending them from 1 year to 2 years, is important to ensure gardens become properly established and economically viable. Garden activities often start late, sometimes 6 months after the proposed starting date, due to insecure land tenure, and gardeners cannot start saving money until they start making money from produce sales. As the current GSL method is designed to give every member a share at the end of 12 months, many GSL groups lose momentum due to the shorter project periods.
- It is important that GSL programs be perceived as an investment rather than a grant. Once garden groups are initially established with basic seeds and tools (many of which already exist at garden sites), programs should consider subsidising only a percentage of the materials, with gardeners also paying a share, to instil a sense of value for the products and reflect the true costs of production.

Understanding of Market Dynamics

- Linking active group garden members to city-sponsored business development training could improve gardeners' marketing knowledge and skills, thus giving them a better chance of securing a spot in local marketplaces as well as participating in city-wide field fairs to market their produce.
- Future projects should support vegetable marketing groups to develop skills that foster growth and business expansion, such as bookkeeping. Project design should include the development of other supporting skills, such as organisation, leadership, and management skills, among gardeners in the vegetable marketing groups.
- Developing entrepreneurial thinking across the program, among both gardeners and staff, is crucial for future success of garden cooperatives. Future income-generating initiatives should encourage gardeners' personal growth as business developers and engagement with commercial production value chains and sustainable service delivery.
- Due to the diverse crop selection in gardens supported by UGP, it was difficult to always select the correct type of vegetables to be grown and introduced into appropriate value chains. The creation of sound crop selection and timing criteria used for the selection and timing of planting to meet highest consumer demand when stocks are low (and prices high) would better orient vegetable marketing groups in crop-selection decisions. There is also room to expand into value-added processing, such as fruit or vegetable drying, to increase market outcomes.

Backyard Poultry Production

- Backyard poultry programs have the potential to make a significant contribution to household food production and income. As the demand for and the price of protein-based foods (such as

eggs) continues to increase in urban Ethiopia, the UGP Backyard Poultry Program can form a strong foundation for follow-on support, pending the resolution of issues noted below.

- A more focused beneficiary-targeting method should be developed and well understood by program staff before distributing chickens and feed. Developing management guidelines (or using those already established by UGP), and holding IPs to their obligation of following them, will increase production and overall program success. Many families simply do not yet have the resources to keep six chickens and sacrifice grains to allow them to thrive.
- A more detailed beneficiary-targeting process will potentially allow programs to avoid obstacles in distribution and poor timing of delivery of the livestock. UGP gardeners frequently had to share the chickens, creating confusion in terms of animal management. To further address distribution issues, a thorough monitoring checklist should be developed to be used by AEOs and IP staff to ensure that chickens are properly fed and cared for, which will ultimately contribute to higher production.
- Locally available and appropriate feed sources should be identified, to reduce dependency on expensive external inputs. Once gardeners have built a chicken coop, they have already made a significant investment in the venture. Giving what little feed is available to the chickens, and not to the family, places further financial obstacles to the beneficiaries and poses a significant risk for the program to achieve its intended goals.
- Beneficiary training on poultry husbandry should include local, small-scale, urban-based egg producers as mentor/teachers. This sort of peer-to-peer training would likely be more relevant to the economic and environmental realities faced by beneficiaries than classroom-based training held at poultry farms. Hands-on, practical activities in coop making, feed sourcing, and disease prevention (using the participatory dialogue approach, which is used in the *Urban Gardening Dialogue* process) will empower interested new egg growers with real solutions to real problems. This will instil a greater sense of resilience and problem solving for long-term sustainability to be achieved.

Health Referral Networks for Gardeners

- Understanding the health needs and challenges of PLHIV enables operational ACs and AEOs to better relate to gardeners in creating more valuable community group and school gardens. In lessons learned from Phase I of UGP, program staff identified that more education in HIV/AIDS, nutrition, and basic HIV health services leads to improved health and vitality of the gardeners and, in turn, improved experience and productivity in the garden.
- The group discussion model should be continued and should place more concentrated focus on nutrition and its role in HIV and other disease prevention and care. Ensuring attendance is crucial to making the discussion groups work, and regular attendance also instils a greater sense of unity among gardeners in both the school and community group gardens.
- Core project staff should have sufficient experience in dealing with HIV-affected women and children, at the outset. When creating a health training component, all technical staff should be included in the training. Finding local staff with experience in both the agriculture and health fields may prove difficult, but a balance between the two fields would likely suffice.
- When selecting IPs, projects should ensure potential AEOs have good knowledge about the area's health care service provider network, as well as knowledge of HIV/AIDS prevention and care. In addition, working with fewer local partners would potentially contribute to a lower AEO turnover rate.
- Community mobilisers proved to be helpful in the creation of a resource map within UGP's areas of operation, and keeping the community mobilisers employed through UGP was very beneficial to gardeners. When identifying community mobilisers, projects should consider peer-based gardeners with a solid understanding and links to the local health system. This potentially

would encourage other gardeners to seek out and engage with health services for themselves and their families.

Health and Nutrition Education Opportunities

- The group discussion model of learning, coupled with UGP's *Urban Garden Dialogue* tools, should be continued as a means of disseminating information about nutrition among beneficiaries.
- Group facilitation training should be continued to ensure that facilitators use proper dialogue facilitation skills, that lessons learned are well understood by beneficiaries, and that positive changes are long-lasting.
- Continue to time the discussion groups on nutrition and health to align with garden preparation and during key soil and plant management times, to firmly reinforce these links among project beneficiaries.

Capacity of Local Implementing Partners for Institutional Sustainability

- Working with fewer and more experienced local partners would simplify not only the grant and financial management of the project, but also the training of the AEOs and the gardeners. The high number of local partners created complications for UGP staff, leading to the delay in grant submissions and poor garden management.
- Following the previously noted recommendation to emphasise smaller, better-managed plots of land for beneficiaries would also positively influence the capacity of local partners. Because UGP's goals were focused on the number of beneficiaries reached, many IPs found themselves struggling to acquire large parcels of land to provide a 50 m^2 garden plot for each beneficiary. As a result, local partners resorted to adding more beneficiaries to already existing community group and school gardens, which led to a high density of gardeners without necessary intensive gardening skills. This reduced the collective produce and profits, which then hampered positive behaviour change.
- Local IPs that work in collaboration with future urban garden projects must be properly trained in small-scale, high-yield bio-intensive and container gardening techniques. These techniques will continue to allow large numbers of beneficiaries to participate in urban gardening programs while also providing valuable experience in managing resilient gardens on very small plots of land.
- Ideally, local partners should have experience in both health and horticulture, rather than large-scale farming/agriculture. With good, hands-on training, however, well-organised IPs without this knowledge can become well versed in both community health and gardening.
- All future programs would benefit from requesting a simple but robust monitoring and evaluation system to better assess local partners' capacity to implement and integrate community group and school gardens. A comprehensive method to monitor the program would allow for greater responsiveness in the activity implementation and for more accountability on the part of the local partner, ultimately resulting in a smoother transfer of skills.

5.2.2 Recommendations Specific to Community Group Gardens

Provide more dynamic, hands-on agronomy and nutrition training to group gardeners via local IPs. Though this was not a comprehensive field assessment, the community group gardens were found to be, for the most part, still functioning. Without additional interventions, many adult beneficiaries would likely continue to be modestly successful. However, additional agronomic training would help ensure greater garden resilience and future sustainability and continuity, despite lack of outside financial support. This training should promote simple methods that do not require expensive inputs or reliance on outside financial support. The well-developed *Urban Garden*

Dialogue manual can be easily adapted to meet these on-going training needs. Training topics could include the following:

- Soil health via composting and organic manure addition
- Identification and use of local waste amendments, to help soil hold more air and water and to meet the plants' basic needs
- Mulching to reduce water evaporation and limit weed growth
- Deeper digging to allow bio-intensive plant spacing to increase plant density, health, and overall yield
- Crop rotation to break pest and disease cycles and to sustain proper soil fertility
- Improved fallow planning and implementation
- Proper plant timing to meet market demands and highest price periods
- Storage and post-harvest handling to increase access and availability
- Public education and advocacy to support local production and consumption, including a broader understanding of balanced diets to build resilient, healthy individuals and families

In addition, IPs should be properly trained in the following methods and areas.

- ***Urban Garden Dialogue* Model (UGP 2011b).** This tool can be used to draw out and empower local gardeners as teachers and to provide open dialogue to improvement and use of horticultural and environmental best practices: bio-intensive digging and planting; organic pest control using mechanical, physical, and botanical measures prior to last-resort chemical solutions; mulching, organic amendments, drip bottles, and other water-saving measures; crop rotation using the leaf-fruit-root-legume cycle; agroforestry and living fences to keep wind and animals away while fostering soil fertility; post-harvest handling and storage; and improved-fallow systems for on-going soil conservation, fertility, and resilience over the rainy season.
- **See-Do-Teach learning method.** This method encourages lateral extension and teaching among neighbours and less dependence on outside organisations to provide answers. By following this learning progression, gardeners learn new skills through hands-on practice in gardens, often taking significantly less time than what would be needed to learn similar concepts in a classroom setting.
- **Small, doable actions.** Urban gardening programs should encourage self-discovery and experimentation with new methods on small garden plots, rather than emphasizing large-scale immediate implementation. This will result in more buy-in from beneficiaries, which will lead to more sustainable behaviour change adoption.
- **Nutrition education.** Urban gardening programs should emphasise the strong linkages that exist between dietary diversity and human health, with a particular focus on the first 1,000 days (the critical time period between a woman's pregnancy and the child's 2nd birthday) to address the issue of child stunting.
- **Market dynamics and crop selection.** These are key areas for IPs to assist group gardeners in meeting consumer demand while also gaining higher prices in the market.

Support the development of land use policy. Provide legal and policy guidance to local IPs and community group garden committees on how to interact with local government officials to advocate for the creation and implementation of an official urban agriculture policy. As the Urban Agriculture Officer in Bahir Dar stated, 'There is no law against urban gardening, but neither is there a law for it'. This lack of official policy hampers continuing advocacy and outreach and discourages the urban and peri-urban population from creating small-scale, high-yield gardens. With no recourse against wanton destruction (e.g., during construction of new sidewalks, roads, buildings), there is little security to

move forward. To risk-averse populations, such as the marginalized, urban poor, this is a major barrier.

Strengthen IP capacity for institutional sustainability. Continuing on the good work started by UGP, local IPs need to receive continuing support to be effective, long-term partners as agronomic and health skill providers and facilitators for the marginalised groups supported through urban gardening programs. Specifically, follow-on programs should:

- Meet with current IPs, offering support to these groups to gauge interest and desire to continue with already established gardens. Many gardens are able to continue to operate on their own, without IP support, at this point.
- Provide hands-on, agronomic training in bio-intensive best practices to IP staff, group gardeners, government AEOs, and others to promote the new paradigm of 'grow more with less'.
- Where appropriate and sustainable water can be secured, continue with the drip-kit technology by providing maintenance and revitalisation training.
- Where sustainable water is not available, provide training on water harvest, conservation, and horticultural best practices to reduce water demand.
- Focus training on simple ways to build and sustain soil health and resiliency, which will result in resilient, vibrant plants and significant benefits for the people who consume and sell them.

5.2.3 Recommendations Specific to School Gardens

Discontinue the drip-kit system. While this technology is state-of-the-art and viable for adult gardeners and entrepreneurial market farmers, it is not reflective of the economic and environmental realities faced by urban OVC outside of the urban gardening intervention. Furthermore, children cannot participate in the set-up and maintenance of the system, because it is too complex and time-consuming. Programs should instead aim to teach these children sound agronomy using low-cost watering methods (watering cans and drip bottles) in small spaces, skills the beneficiaries could apply once the intervention ends. Water tanks can remain to hold water, but the delivery method should be changed to hand-held systems that will engage the learners in how to create simpler but still high-yielding small gardens that they can replicate in their own homes without incurring significant expense. If drip irrigation technology is to continue, then a clear policy for water bill payment must be created that states that the IP, gardeners, and school administration will share the cost of water. Making gardeners shoulder some of the expense of water diminishes the chance at profitability, but offers a more realistic lesson on the true cost of garden production.

Create 'outdoor classrooms'. School committees remain in place and seem eager to continue with school-based gardens. However, they want to see a change in perspective and orientation, with gardens changing from being an 'add-on' activity for only certain children (a limited number of OVC) to an outdoor classroom linked to the school curriculum. A good way to achieve this is to train teachers and IP staff on how to create 25 m^2 bio-intensive 'permagardens', where biology, chemistry, economics, and nature classes can be taught in a hands-on manner. This garden would extend the reach of the program to benefit more students. Completed gardens would also serve as a visual model for parents and caregivers to possibly adopt. Programs could provide hands-on training on the creation of complementary home gardens that support family nutrition and empowerment and that can be replicated at children's homes without undue cost.

Use smaller garden plots. Gardens should be small, manageable, and relevant to the urban reality. Rather than using a 600 m^2 garden area for just 24 OVC, where each child gets 25 m^2, it will be far more valuable and provide many more life skills development to engage 200 OVC, working in small groups on 400 m^2 of land, where each child has access to 2 m^2. This method would help children learn more appropriate skills, while also benefitting a great deal more of them in the process.

Adjust the length of the intervention. Most gardeners have never participated in any form of gardening, and a longer project period—2 years—would greatly benefit student beneficiaries and foster more confidence and commitment to the garden. By continuing through the rainy season, youth gardeners could also learn the value of planting an improved-fallow crop of legumes (intercropped with maize or sorghum), which would require little over-holiday management while providing copious green manure to incorporate into garden beds at the start of the next school year.

Adjust the participation cycle. If 1 year is still to be the prescribed length of intervention, altering the gardening cycle from September–June to January–December would be a potentially viable option (see **Table 1**). This change would help address reports from school committees that the September–October months were extremely hectic due to regular school duties. Shifting the start of the program to fall after the start of the school year would allow school committees the time needed to identify beneficiaries by December, when initial training could be provided for all. Small garden plots (not more than 2 m^2) would then be managed by individual student gardeners from January through June when, after final harvest, an 'improved fallow' crop of legumes would be planted to grow on its own over the rainy season (July to September). Upon returning to school, one grade higher, students would be able to immediately get back to work while school garden committees selected the next cadre of gardeners. This next group would then be mentored by the outgoing cadre, an empowering exercise that also reinforces their new skills. A gardener graduation and harvest celebration would provide an opportunity to acknowledge the achievements of the outgoing group of students and initiate the new, who would take over the garden beds in January; the cycle could then continue. Those OVC without caretakers should be assigned an adult or older teen mentor who can assist the young gardener in soil preparation, planting, irrigating, harvest, and post-harvest handling. This role could be filled by recent garden program graduates.

Table 1. Suggested Urban Gardening Program 1-Year Participation Cycle: January–December

Month	Activity
January	Experienced student gardeners mentor new incoming student gardeners.
February	
March	
April	
May	
June	After final harvest, students plant an 'improved fallow' crop of legumes to grow on its own over the rainy season. Graduating gardeners are recognized during a harvest celebration.
July	Rainy season and school holiday.
August	
September	School starts again. Returning students go back to tending their gardens.
October	
November	
December	School committees finish identifying beneficiaries for next gardening program cycle. New student gardener training begins.

Provide urban garden and extension method training for IPs. Urban garden training should incorporate small-scale, local resource-focused, bio-intensive, and container garden methods utilising the *Urban Garden Dialogue* tools and process with OVC and adult caregiver gardeners. Extension method training (using the *Urban Garden Dialogue* with its participatory 'see-do-teach' methods) should be implemented with committed local IPs as well as government agricultural extension services.

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