Agronomic Assessment Report

Prepared by UWSP small garden systems team
Global Environmental Management Education Center
University of Wisconsin-Stevens Point

Team members:
Arlen Albrecht
Anna Haines
Milo Harpstead
Mai Phillips
Victor Phillips

Introduction

The Global Environmental Management Education Center (GEM) in the College of Natural Resources at the University of Wisconsin-Stevens Point spearheads the food security and agricultural component of a USAID-funded project, Dietetics and Small Garden Systems (SGS) to Support Antiretroviral Treatment for Families Impacted by HIV/AIDS in Kenya, administered by the Marquette University College of Nursing. This agronomic assessment report summarizes the UWSP-GEM Small Garden Systems team’s observations and recommendations on augmenting nutrition via small garden systems to HIV/AIDS families served in the project, including a proposed budget for implementing a 3-year plan of work to build capacity for sustaining food production by Kenyans in their communities.

Kenya is experiencing the ravages of HIV/AIDS, which is impacting the work force, family and social structure and culture of society there. While official estimates are that 7% of the nation’s population is infected with HIV/AIDS, an estimate of 25% or more is probably realistic (most of whom are in the age range of 15-40 years, the middle parental generation of primary wage-earners and care-providers). It has been recognized that HIV/AIDS treatment with antiretroviral therapy is compromised by malnutrition and lack of safe drinking water and sanitation. On the other hand, with adequate nutrition and environmental health, HIV-infected individuals under antiretroviral treatment can live long and productive lives. Nutritious food is a key to hope.
A Nairobi urban slum community with high HIV/AIDS infection rates.

A rural community outside of Nairobi

Background on small garden systems to augment nutrition for HIV/AIDS treatment.

The Kenyan diet (and food availability linked to personal income).

Maize is the staple food of most Kenyan families, and protein is the most critical dietary limitation due to its expense in the form of animal products such as milk, eggs, fish, or meat. Appendix 1 provides a list of fresh produce observed in open-air markets in Kenya. While these fruits and vegetables are readily available, they are beyond the financial means of most of Kenya’s impoverished families. So, affordable access to nutritious food by poor families via garden systems that they tend and harvest holds promise for improved health and wellbeing.
Locally available carbohydrates include maize (either dried or green), potatoes, cassava, green bananas, ripe bananas, maize flour, rice, wheat flour, millet and mtama. As mentioned above, proteins are available as meat, fish, yoghurt, eggs, and milk, but these are expensive. More affordable vegetable proteins are available—varieties of beans and peas. Vitamin and mineral foods are available seasonally and the prices vary significantly. These include green vegetables, such as kale, spinach, green beans, carrots, tomatoes, pumpkin leaves, pumpkins and fruits such as mangoes, oranges, papaya, pineapple, etc.

**Small garden systems**

‘Kitchen gardens’, ‘sack gardens’, ‘tire gardens’, ‘pot or wall container gardens’, ‘hanging gardens’, ‘conventional double dug organic gardens’, ‘square foot gardens’, and other such small-plot production units are examples of small garden systems (SGS). These methodologies are low cost and locally available for the convenience of the smallholder or family. They are readily integrated with livestock production and agroforestry applications, and are therefore appropriate for providing nutrient augmentation to individual families, farmer cooperatives, and local communities. More than just new methods of planning and planting a garden, SGS are a whole different psychological approach to gardening, and they are low-cost and efficient.

The UWSP-GEM Small Garden Systems team has compiled a number of gardening methods that can be incorporated in the diverse living conditions of both urban and rural HIV/AIDS families, as well as those with or without gardening space. These SGS can be adapted so that gardeners of all ages and levels of experience can understand, tend, and harvest easily. The systems are simple, yet versatile, and can be adapted to fit all kinds of gardening situations. Whether a family needs to grow all its own food, earn income via commercial production, or just enough for a few salads each week, whether a person lives alone or has a large family, whether in the city or the country, with a lot of land or a little, SGS principals are adaptable to meet needs.

The SGS gardens are located just outside the back door. This allows one to tend the garden easily during those brief breaks in daily chores—caring for children, cooking, washing cloths, and house cleaning. There is no need to walk 10 minutes to the garden. The SGS processes can be taught efficiently—philosophy and methods along with making compost, constructing the beds, sacks, pots, double digging and planting, etc. as hands-on experiential learning—in a week or less for most people.

Because SGS are grown in pure compost, they require very little maintenance and less watering. All plant nutrients are provided in abundance so the produce grows vigorously and can overcome many diseases, insects or drought conditions. Compost is a mix of organic matter and manure, maintained with proper moisture and turned weekly so it heats up to 145 degrees F to kill fungus, insect eggs, and weed seeds. Compost material will also absorb water so it requires less watering than a soil garden, which is very important if water is scarce, is purchased, or needs to be hauled long distances. A high-quality compost mix includes dry matter (leaves, grass, husks), green matter (old fruit, grass, leaves or plant matter), and manure (hog, cattle, goats, chicken, rabbit, horse), essentially all materials that are found in abundance in both the country and city, (include market wastes). Homestead or community mapping exercises can be performed to help identify all the resources in the area or on the home site.
The **Square Foot Garden** (SFG) in grown in raised beds of pure compost so local soil types are not important, and no chemical fertilizers are required. The basic unit is 3 feet by 3 feet divided into 9 square foot sections with sticks. Nine plant species can be planted to provide for plant diversity as an organic method against diseases. Each square foot is treated uniquely with a set number of seeds for each species, i.e., 16 carrots, 9 beets, 4 kales, or 1 tomato plant. Vine plants like pumpkins are grown vertically on trestles. If managed properly, enough vegetables can be grown in this garden size for one person for a year. So, if space is available, the family just adds more sections for each person in the family. Because the plots are small, the preparation, tending and harvesting tasks are not overwhelming, and the plots can be covered during heavy rains or extreme sun and easily fenced form chickens or goats. The SFG approach employs efficient, intensive gardening that uses 80% less space, water, work and seed, while yielding a great bounty.

![Square Foot Garden with trellis for climbing vines](image)

**Sack Gardens** (SG) are grown in large gunnysacks (now made of plastic but are breathable). These sacks are filled with compost material with a PVC pipe with small holes drilled in to serve as a slow water release reservoir. Starter plants are transplanted into the sack by making small holes in the side every 6 inches around the whole sack. Additional plants can be put in the top as well. If managed properly, enough vegetables can be grown in this garden size for one person for a year, so just add more sacks for each person in the family if space is available. Because SG’s are in a sack container, the preparation, tending and harvesting job is not overwhelming. The sacks can be covered during heavy rains or extreme sun, fenced to keep out chickens or animals, take up little space, and no weeding is necessary. The SG approach employs efficient, intensive gardening techniques that uses less space, water, work and seed; and produces an impressive yield in a limited space.

![Sack garden at KIOF, Juga](image)

![Sack garden at HAARTS for Harvest farm, Eldoret](image)
Pot or Wall Container Gardens (PWCG) can work in densely populated urban slum areas. Pot containers of approximately 4 or 5 liters in size are filled with compost material, then directly seeded or starter plants are transplanted. The pots are then hung on an outside wall where they get 6 hours of sun if possible—on the east or west side of the building. Vine plants should be trained to grow on the roofs of the structure. PWCG will not grow sufficient vegetables for one person unless approximately 10 pots are grown and maintained (wall space can be an issue). Because PWCG are in pots, the preparation, tending and harvesting job is not difficult; the pots are positioned under rooflines so are covered during heavy rains or extreme sun. They are out of reach of chickens or goats. They take up little space and no weeding is necessary. The PWCG approach employs efficient, intensive gardening techniques that uses less space, water, work and seed, and produces nutritious dietary supplements in a limited space.

Hanging pot or wall container garden in Nairobi slum

Double Dug Organic Gardens (DDOG) are conventional organic gardens. The soil is dug to a depth of 16 inches with organic material and compost intermixed while digging. Intensive seed plantings can be done in 3-foot wide beds much like the SFG system. It is recommended that inter-plantings three feet apart of different species be installed to provide diversity for insect and disease control. Rural HIV/AIDS families can use the DDOG system for larger production and potential commercial markets.

Double digging technique in demonstration gardens at Egerton University

In considering the role of agroforestry, i.e., the sequential or simultaneous combination of woody plants, annual crops and possibly livestock, in a food security project for HIV/AIDS patients and their attendant families, the following are major considerations: Careful siting of the food plots with respect to hydration, soil fertility, and erosion potential, i.e., the physical environment must be made, as well as proximity to the HIV/AIDS clinic for practicality. Avoidance or management of crop raiders (human; domestic and wild vertebrates; invertebrates;
phytopathogens), i.e., the biotic environment, must be planned and implemented. Local institutions, incentives, traditional crops and indigenous knowledge, i.e., the social environment, must be incorporated into the small garden systems for acceptance.

Potential for underrated or unknown experimental crops, i.e., the research or innovation environment to provide multi-purpose trees, that will not only address food needs, but assure sustainable soil benefits, provide shade for humans, livestock and crops, encourage cottage industries in wood manufacturing and charcoal production, as well as home-made pesticides, medicines and other non-wood forest products should be considered. Prime candidates for such work include the horseradish or drumstick tree (*Moringa oleifera*) and the neem tree (*Azadirachta indica*). Both of these trees are fast-growing, adapted to semiarid environments and can provide multiple benefits. The horseradish tree is virtually edible from root to fruit, and its crushed seed serves as a water purifier on par with alum. The neem tree is grown for shade, for fuel wood and its seed yields among the strongest plant-based pesticides known, with extraction easily accomplished by farmers.

Also, consideration of small-scale garden projects should include the production vegetable protein sources such as legumes, endameba soybeans and possibly high lysine maize (now called Quality Protein Maize or QPM).

**Purpose and Objectives**

The purpose of the UWSP-GEM Small Garden Systems component in Year 1 of this project is to assess the feasibility of small garden systems to provide dietary nutritional support for improved HIV/AIDS prevention and treatment of patients and families in selected communities of Nairobi, Mombasa and Voi, Kenya. The project concept is to provide real-world practical products and educational services to enhanced nutrition and sustainable health and agriculture by training HIV/AIDS families and health care providers to install and manage small garden systems (SGS) to provide requisite nutrients to support medical treatment.

**Agronomic feasibility of small garden systems at project sites**

*General observations/assessment of agricultural infrastructure.*

Small-scale commercial agriculture as well as family garden plots and individual roadside or alleyway plantings of fruit and vegetable crops are common in Kenya and contribute to food security and access to food. Kenyan farmers are resourceful and knowledgeable in producing a variety of culturally desirable foods—they are competent farmers. We were impressed with the organic farming methods and outcomes evident in rural areas as well as urban produce markets and kiosks in the ability and enterprise of Kenyan farmers and cooperatives to provide nourishing foods to their families and for income generation. While drought, limited access to financing, and other obstacles contribute to the national challenge of meeting food security needs of the public, Kenya’s agricultural system is productive and progressive.

In Kenya, there is a strong, competent infrastructure of agricultural research and development capability through national, international and university institutions, adequate formal and informal agricultural training, and excellent agricultural extension/outreach especially through effective NGO’s. *We find that the technology, methodology, training infrastructure for outreach*
and dissemination of small garden systems readily exists in Kenya. Our partnering with this existing capacity will expedite and enhance the success of the project.

The UWSP-GEM small garden systems team visited numerous NGO’s and other organizations to learn what research or capacity in small scale organic vegetable production currently exists in Kenya. Training sites and total program assessments were made with: Kenya Institute of Organic Farming (KIOF), Sustainable Agriculture and Community Development Program (SACDEP), Egerton University, Kenya Agricultural Research Institute (KARI), and HAARTS (Highly Active Antiretroviral Therapies) For Harvest/ Appropriate Grassroots Intervention (AGRI), Forum for Organic Resource Management and Agricultural Technologies (FORMAT), World Agroforestry Centre (formerly International Centre for Agroforestry Research, ICRAF).

We found their work in this field to be very advanced in theory, hands on practice, teaching techniques, and were very practical and successful. KIOF and SACDEP each have excellent “Extension Outreach Programs” that employ highly talented personnel to not only provide technical support to institute graduates but also to work with the larger community in incorporating sustainable small scale farming techniques and rural living enterprises. They are also experimenting with and introducing new varieties of vegetables within their communities (high lysine corn and soy beans in particular).

We met with representatives of the International Centre for Improvement of Maize and Wheat (CIMMYT-Africa), who have pre-commercial tests of Quality Protein Maize in progress for scale-up in Kenyan agriculture soon. The World Agroforestry Centre and Egerton University, as well as many other African universities and institutions, are active members in a capacity building network called the African Network for Agroforestry Education (ANAFE). This overarching objective of ANAFE is to strengthen multi-disciplinary approaches to land use education, especially by incorporating agroforestry into teaching programmes and curricula.
Goat and rabbit rearing for protein source

Roof rain catchment and cistern system

Rural community outside of Nairobi

Site-specific observations/assessment of potential of small garden system implementation.

- Voi agronomic status and challenges.

This project functions under the Sisters of St. Joseph who are part of the Mombasa Diocese. Like Mombasa the nurses and counselors identify and work with patients through a network of community health workers (wahaduma). The Voi area is arid and has suffered from a recent drought. As a result, access to water is the biggest challenge to the people living in Voi and to gardening. Voi town is fairly dense and the Tanzania-Bondeni neighborhood, which close to Voi town is akin to the densest part of Mombasa’s project areas. Many patients that are seen by the health workers live outside of Voi town. Unlike the dense neighborhoods where access to land is a major constraint, most people have enough land to create at least one square foot garden if not extend it for each member of the household. However, outside of Voi town proper, access to water is a severe constraint. Local rivers are intermittent. During the dry season, people dig into the riverbed to create shallow ponds. The purchase and delivery of water is costly (about five times more expensive than buying water from a tap in Mombasa). The primary challenge to gardening in the Voi area is access to and availability of water.

Shamba near Voi

Smallholder farm near Voi
The Mombasa Diocese consists of a number of parishes. Six parishes presently are working on delivering health care to suspected and identified HIV/AIDS patients. An additional parish is set to begin this work in the near future. Health care provision through the Diocese uses a grass roots approach by using volunteer community health workers or ‘wahaduma’ living in these communities. The wahaduma are identified by the small Christian community of which they are a part. Each wahaduma volunteer sees approximately 25-30 patients regularly. The wahaduma provide information to and accompany counselors, social workers, and nurses to patients’ homes. Many of these health care workers (counselors and nurses) are nuns. Nurses, for example, see
from 25 to 30 patients per day with one wahaduma, and one nurse will work with about five or six wahaduma. Depending on a patient’s health, a nurse may see someone from once per week to about once per month.

The poverty of the project sites (the communities nearby the six parishes) is diverse. One wahaduma we visited, Hannah, lives in a concrete block structure that her family owns. They occupy three rooms and additional rooms are rented to other people – at least one of which is a patient. Her family owns a small shop (duka) where they sell a variety of goods. She lives in a neighborhood that is densely built with only narrow pathways between buildings. The buildings house more than one family or household, are primarily concrete walls and floors with tin (mabati) roofs. Each “apartment” structure we visited had an open air court yard where a water tap was located. People used this space communally. Most court yards had potted plants set out in this area, although the plants were mostly ornamental.

As we progressed into this area, the house quality declined from all concrete to partial concrete. In this area the houses had concrete walls, but dirt floors. The roadways were wider with piles of trash, stagnant pools of water, and plants growing (again mostly ornamental). From partial concrete structures, the area begins to slope downward and the structures became mud with wood/stick frames. There were areas around these homes – possibly empty lots that were used as dumping grounds, but also contained many plants and trees. The furthest neighborhood from one parish was essentially rural, despite its location in Mombasa. The homes were all made from mud and wood/stick frames. Access to water was a problem as there were no taps. However, these households had ample space and were growing food in fairly extensive gardens. Many gardens had maize, beans, papaya, kale and chard, although planted haphazardly. In addition, many households had chickens, goats, and ducks.

Mombasa’s diversity provides many opportunities and challenges. In the neighborhood with largely concrete structures, land or space is a severe constraint. In addition, given that many people rent their room, it is likely that permission from a landlord would be necessary to grow any sort of garden. In the neighborhood with largely concrete/mud structures, more land is available, but it is unlikely the residents own the open space, know who it belongs to, or how to get permission to use it. In the neighborhood characterized as peri-urban, land is in abundance, but it is likely that all residents are squatters, which may account for the more temporary structures. However, if issues of land tenure can be overcome, and possibly even if they are not, a variety of garden systems may be possible in this area. The greatest challenge in this area is access to water.

The challenges in Mombasa are multi-fold. In any particular slum neighborhood, land, water, and/or tenure may be the greatest challenge and will call for a different solution.
- Nairobi agronomic status and challenges

The Nairobi Eastern Deanery AIDS Relief Program (EDARP), like the Mombasa Diocese, has a number of parishes with which it works throughout the east side of Nairobi. Health workers operate out of Volunteer Counseling and Training (VCT) clinic sites that are run largely by nuns. Like Mombasa and Voi, wahaduma are the best way for the nurses and counselors to enter these communities and identify people in need. The slums served by EDARP outreach are among the worst in the country. They house thousands of people in very dense conditions. Space between housing structures is largely only a few feet, although there are areas where the roadway becomes wider. The housing quality is very poor. They are largely made of mud and whatever materials are available. Access to water and sanitation is very low. For the most part open sewers run down the middle of the path or alley ways.

For the small gardening element of this project, Nairobi presents the greatest challenges and constraints. There is no available land to grow anything. The space between housing structures is too narrow, and the open sewers create problems with toxicity. The greatest challenge in Nairobi’s slums is to identify creative gardening solutions for an area with no land availability.

Recommendations to implement site-specific actions to augment nutrition

As presented above, each project site - Voi, Mombasa, and Nairobi - presents its own challenges to organizing and implementing a small garden system approach to providing enhanced nutrition. Each site has a different climate, soil type, and local access to and availability of water and land. In addition, each household will need to be assessed to see who is interested and capable of planting and maintaining a garden system. There may be some households where no individual is identified, which may call for a different approach, such as food by prescription. In turn, if food by prescription is appropriate for some patients, the entire project team may need to work on an appropriate model. One possible model to adapt is the approach taken by Indiana University’s demonstration farm and food by prescription program (HAARTS for Harvest).

Each of the three project sites presents a distinct variety of challenges. Not only does each project site have overall agronomic challenges, such as access to water or lack of land availability, but each neighborhood within Voi, Mombasa, or Nairobi presents its own unique set of problems. Given our overall impression of Kenya’s agricultural capacity in terms of the institutions pursuing organic farming and the agricultural capacity through national and international centers, universities, the Kenyan Ministry of Agriculture and such NGO’s as SACDEP and KIOF, we believe the challenges present at each project site can be overcome successfully. For each project site, we have compiled a list of our recommendations to
implement small garden systems. The following recommendations could begin in Year Two and continue through to the end of the project. *The capacity to augment dietary nutrition for HIV/AIDS patients and families through small garden systems in each area exists, but at different scales and in different methodologies prescribed for each project site.*

**Small garden systems for Voi—trials of family “kitchen” gardens in specific neighborhoods with emphasis on introducing novel irrigation strategies.**

1. Focus on individual family “kitchen” gardens.
2. Partner with appropriate and willing NGO (KIOF or SACDEP) to provide extension/outreach educational services on installation and maintenance of the small garden systems.

3. Establish demonstration plots with various individuals and groups that are unique for the specific neighborhoods served by community-based health care volunteers and nurses.
4. Use readily available organic raw materials, space and existing agronomic knowledge base to prepare compost for local gardens and to scale up to a micro-enterprise.
5. Explore water conservation systems like plastic mulching and drip irrigation, potential use of kitchen “gray” water, as well as roof water catchment for agronomic use in the family gardens.
6. Deploy vegetable/fruit species that are culturally acceptable, agronomically possible, and nutritionally important, given specific climatic and agronomic conditions encountered.

**Small garden systems for Mombasa—trials of three garden styles on parish compound and community health care volunteers’ homes.**
1. Establish demonstration plots at each parish that would incorporate three garden styles: square foot (SQF), sack, and hanging containers.  
2. Partner with appropriate and willing NGO (KIOF or SACDEP) to provide extension/outreach educational services on installation and maintenance of the small garden systems.  
3. Prepare compost off-site to be identified (possibly at Voi).  
4. Establish rural-urban linkage between Mombasa parishes’ HIV/AIDS patients and Voi farmers via World Vision, for example.  
5. Explore water conservation systems like plastic mulching and drip irrigation, potential use of kitchen “gray” water, as well as roof water catchment for agronomic use in the family gardens.  
6. Deploy vegetable/fruit species that are culturally acceptable, agronomically possible, and nutritionally important, given specific climatic and agronomic conditions encountered.

Square-foot garden

Small garden systems for Nairobi—hanging containers and innovative rural-urban food linkage.

1. Establish demonstration plots at participating parishes and VCT clinics that would incorporate three garden styles: square foot (SQF), sack, and hanging containers; and hanging container systems only at community health care volunteers’ homes.  
2. Partner with appropriate and willing NGO to provide extension/outreach educational services on installation and maintenance of the small garden systems.  
3. Explore local sources of compost for purchase in addition to KIOF or other compost source.  
4. Focus on planting vines such as pole beans, squash, passion fruit, etc. that can utilize vertical space and roof lines efficiently.  
5. Explore rural-urban linkage between SACDEP farmer cooperatives in Kiambu District and others.  
6. Deploy vegetable/fruit species that are culturally acceptable, agronomically possible, and nutritionally important, given specific climatic and agronomic conditions encountered.
Success—local capacity to sustain community-based food production beyond life of project

Our team recommends KIOF, SACDEP, World Agroforestry Centre, and Egerton University be included as institutional partners into the project, and as such we have included them in our proposed 3-year implementing work plan and budget. By working with and through these high-quality, locally engaged institutions that already have strong capability and presence in Kenya, this project will be strengthened by:
1. Knowledge of local culture, costumes and people (it would take U.S. professionals years to acquire this knowledge);
2. Language barriers would be eliminated (limited need for translators);
3. Day-to-day presence for technical support to local clientele would be provided (this would correct failing practices, provide trouble-shooting support, and provide the encouragement needed to keep the HIV/AIDS gardeners producing);
4. Small gardens systems and their advancement will live beyond the 3-year project life cycle because Kenyan institutions will have ownership and built capacity);
5. Extension personnel living and working in the communities provide a direct and immediate link between the USAID, university and research organizations, and dissemination of knowledge-based information into the local reality of everyday life.
6. Locally respected personnel and institutions will be more successful in introducing new varieties of vegetables (e.g., endaname soybean and quality protein maize) as well as new “non-traditional” methods of gardening.

We propose sending community outreach (home visitors) to SACDEP for one-week courses four times a year, send regional personnel to the one-year course at KIOF, invite Extension personnel for graduate study at the UWSP campus, and contract with these two NGO’s for outreach extension. We propose including the World Agroforestry Centre and Egerton University for consulting services in research and development and curriculum training.
Anticipated Small Garden System Project Component Outcomes

The small garden component of this project would have a number of favorable outcomes. Under this component, we will keep track of:

- the number of in-country partners and set up a system to measure the number of individuals they train in small garden systems;
- the number of trainers trained in small garden systems;
- the number of graduates from the in-country partners that are demonstrating a small garden system;
- the number of farm cooperatives and clinics that are linked together through in-country partners;
- the number of demonstration plots;
- the number of modified demonstration plots;
- the number of volunteers who establish small gardens and follow the square foot method; and
- the number of garden kits prepared and distributed.

**A work plan overview and budget for implementation of the UWSP/GEM Small Garden Systems component of the project is provided in the Appendix.**
APPENDIX

1. Fresh produce observed in Nairobi open-air markets and backyard gardens

2. Small garden kits

3. Profiles of partners in agricultural training and outreach
   a. Kenyan Institute of Organic Farming (KIOF)
   b. Sustainable Agriculture Community Development Programme (SACDEP)
   c. Egerton University
   d. World Agroforestry Centre, formerly International Centre for Agroforestry Research (ICRAF)

4. Work plan overview and budget for implementing the UWSP/GEM Small Garden Systems component of the project
1. Fresh produce observed in Nairobi open-air markets and backyard gardens

<table>
<thead>
<tr>
<th>English Common Name</th>
<th>Scientific Name</th>
<th>Kiswahili Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Amaranth leaf</td>
<td>Amaranthus tricolor</td>
<td>Mchicha</td>
</tr>
<tr>
<td>2. Apple</td>
<td>Malus domesticas</td>
<td>Tofaa</td>
</tr>
<tr>
<td>3. Avocado</td>
<td>Persea americana</td>
<td>Parachidi</td>
</tr>
<tr>
<td>4. Banana</td>
<td>Musa acuminata</td>
<td>Ndizi</td>
</tr>
<tr>
<td>5. Bean, black/black gram</td>
<td>Phaseolus mungo</td>
<td>Cheroko nyeusi</td>
</tr>
<tr>
<td>6. Bean, green</td>
<td>Phaseolus vulgaris</td>
<td>-</td>
</tr>
<tr>
<td>7. Bean, mung</td>
<td>Phaseolus aureus</td>
<td>Choroko</td>
</tr>
<tr>
<td>8. Bean, kidney</td>
<td>Phaseolus vulgaris</td>
<td>Maharagwe</td>
</tr>
<tr>
<td>9. Bean, red</td>
<td>Phaseolus vulgaris</td>
<td>-</td>
</tr>
<tr>
<td>10. Bean, soy</td>
<td>Glycine max</td>
<td>Soya</td>
</tr>
<tr>
<td>11. Beet, red</td>
<td>Beta vulgaris</td>
<td>-</td>
</tr>
<tr>
<td>12. Bittermelon</td>
<td>Momordica charantia</td>
<td>Karela</td>
</tr>
<tr>
<td>13. Breadfruit</td>
<td>Artocapus communis</td>
<td>Mafenesi</td>
</tr>
<tr>
<td>14. Cabbage</td>
<td>Brassica oleracea var. capitata</td>
<td>Mboga</td>
</tr>
<tr>
<td>15. Carrot</td>
<td>Daucus carota</td>
<td>Karati</td>
</tr>
<tr>
<td>16. Cassava</td>
<td>Manihot esculenta</td>
<td>Kisamvu</td>
</tr>
<tr>
<td>17. Cauliflower</td>
<td>Brassica oleracea var. botrytis</td>
<td>-</td>
</tr>
<tr>
<td>18. Celery</td>
<td>Apium graveolens dulce</td>
<td>-</td>
</tr>
<tr>
<td>19. Chayote</td>
<td>Sechium edule</td>
<td>-</td>
</tr>
<tr>
<td>20. Cilantro</td>
<td>Coriandrum sativum</td>
<td>Dania</td>
</tr>
<tr>
<td>21. Coconut</td>
<td>Cocos nucifera</td>
<td>Dafu</td>
</tr>
<tr>
<td>22. Corn</td>
<td>Zea mays</td>
<td>Muhindi</td>
</tr>
<tr>
<td>23. Cucumber</td>
<td>Cucumis sativus</td>
<td>Tongo</td>
</tr>
<tr>
<td>24. Curry leaf</td>
<td>Murraya koenigii</td>
<td>-</td>
</tr>
<tr>
<td>25. Eggplant</td>
<td>Solanum melongena</td>
<td>Mibilingani</td>
</tr>
<tr>
<td>26. Garlic</td>
<td>Allium sativum</td>
<td>Tumu</td>
</tr>
<tr>
<td>27. Ginger</td>
<td>Zingiber officinale</td>
<td>Mtangawisi</td>
</tr>
<tr>
<td>28. Grape</td>
<td>Vitis vinifera</td>
<td>Zabibu</td>
</tr>
<tr>
<td>29. Guava</td>
<td>Psidium guayaba</td>
<td>Mapeara</td>
</tr>
<tr>
<td>30. Kale</td>
<td>Brassica oleracea var. acephala</td>
<td>Sukuma wiki</td>
</tr>
<tr>
<td>31. Lemon</td>
<td>Citrus auranti</td>
<td>Ndimu</td>
</tr>
<tr>
<td>32. Lemon grass</td>
<td>Cymbopogon citratus</td>
<td>Mzumai</td>
</tr>
<tr>
<td>33. Lettuce</td>
<td>Lactuca sativa</td>
<td>Saladi</td>
</tr>
<tr>
<td>34. Lime</td>
<td>Citrus aurantifolia</td>
<td>Limao</td>
</tr>
<tr>
<td>35. Luffa, angled</td>
<td>Luffa acutangula</td>
<td>Mdodokii</td>
</tr>
<tr>
<td>36. Mango</td>
<td>Mangifera indica</td>
<td>Enbe</td>
</tr>
<tr>
<td>37. Mint leaves</td>
<td>Mentha arvensse</td>
<td>Nanaa</td>
</tr>
<tr>
<td>38. Muskmelon</td>
<td>Cucumis melo</td>
<td>-</td>
</tr>
<tr>
<td>39. Okra</td>
<td>Abelmoschus esculentus</td>
<td>Bamia</td>
</tr>
<tr>
<td>40. Onion</td>
<td>Allium cepa</td>
<td>Vitunguu</td>
</tr>
<tr>
<td>English Common Name</td>
<td>Scientific Name</td>
<td>Kiswahili Common Name</td>
</tr>
<tr>
<td>--------------------</td>
<td>-------------------------------</td>
<td>-----------------------</td>
</tr>
<tr>
<td>41. Orange</td>
<td><em>Citrus sinensis</em></td>
<td>Machungwa</td>
</tr>
<tr>
<td>42. Passion fruit</td>
<td><em>Passiflora edulis</em></td>
<td>Pasheni</td>
</tr>
<tr>
<td>43. Papaya</td>
<td><em>Carica papaya</em></td>
<td>Pawpaw</td>
</tr>
<tr>
<td>44. Parsley</td>
<td><em>Petroselinum crispum var. crispum</em></td>
<td>-</td>
</tr>
<tr>
<td>45. Pea, green</td>
<td><em>Pisum sativum</em></td>
<td>Njegere</td>
</tr>
<tr>
<td>46. Pea, snow</td>
<td><em>Pisum sativum</em></td>
<td>-</td>
</tr>
<tr>
<td>47. Peanut</td>
<td><em>Arachis hypogaea</em></td>
<td>Njugu karanga</td>
</tr>
<tr>
<td>48. Pepper, hot</td>
<td><em>Capsicum annuum</em></td>
<td>Pilipili kubwa</td>
</tr>
<tr>
<td>49. Pepper, bell</td>
<td><em>Capsicum frutescens</em></td>
<td>-</td>
</tr>
<tr>
<td>50. Pineapple</td>
<td><em>Ananas comossus</em></td>
<td>Nanasi</td>
</tr>
<tr>
<td>51. Plantain</td>
<td><em>Musa paradisiaca</em></td>
<td>Muzuzu</td>
</tr>
<tr>
<td>52. Potato</td>
<td><em>Solanum tuberosum</em></td>
<td>Viazi ulaya</td>
</tr>
<tr>
<td>53. Pumpkin</td>
<td><em>Cucurbita pepo</em></td>
<td>Mboga</td>
</tr>
<tr>
<td>54. Radish</td>
<td><em>Raphanus sativus</em></td>
<td>Mfigili</td>
</tr>
<tr>
<td>55. Rhubarb</td>
<td><em>Rheum rhabarbarum</em></td>
<td>-</td>
</tr>
<tr>
<td>56. Scallion</td>
<td><em>Allium fistulosum</em></td>
<td>-</td>
</tr>
<tr>
<td>57. Spinach</td>
<td><em>Spinacea oleracea</em></td>
<td>Mboga mbichi</td>
</tr>
<tr>
<td>58. Squash, summer</td>
<td><em>Cucurbita moschata</em></td>
<td>-</td>
</tr>
<tr>
<td>59. Squash, buttercup</td>
<td><em>Cucurbita maxima</em></td>
<td>-</td>
</tr>
<tr>
<td>60. Sunflower</td>
<td><em>Helianthus anuus</em></td>
<td>Mbegu za Alizeti</td>
</tr>
<tr>
<td>61. Sweet potato</td>
<td><em>Ipomoea batatas</em></td>
<td>Matembele</td>
</tr>
<tr>
<td>62. Swiss chard</td>
<td><em>Beta vulgaris var. cicla</em></td>
<td>-</td>
</tr>
<tr>
<td>63. Taro</td>
<td><em>Colocasia esculenta</em></td>
<td>Mjimbi</td>
</tr>
<tr>
<td>64. Tamarind</td>
<td><em>Tamarinda indica</em></td>
<td>Kwaju</td>
</tr>
<tr>
<td>65. Tangerine</td>
<td><em>Citrus reticulata</em></td>
<td>Chenza</td>
</tr>
<tr>
<td>66. Tomato</td>
<td><em>Lycopersicon esculentum</em></td>
<td>Nyanya</td>
</tr>
<tr>
<td>67. Turmeric, root</td>
<td><em>Cucurma longa</em></td>
<td>Manjano</td>
</tr>
<tr>
<td>68. Turnip</td>
<td><em>Brassica rapa</em></td>
<td>Majani ya Figiri</td>
</tr>
<tr>
<td>69. Watermelon</td>
<td><em>Citrullus lanatus</em></td>
<td>Tikiti</td>
</tr>
<tr>
<td>70. Zucchini</td>
<td><em>Cucurbita pepo</em></td>
<td>-</td>
</tr>
</tbody>
</table>
2. Small garden kits

Suggested list of items needed in the garden kits:

**Square foot gardens for urban areas:**
Bricks or boards—whichever is cheaper to make the 3' X 3’ framing (boards would be more transportable) and screws to assemble
1/4" X 1" slats to use for making the garden grid (quantity: 4)
1 large sack of compost material
1 20-liter water jug
1 small trowel
Seeds to plant the nine 1 foot square beds (suggest buying in bulk and distributing small quantities with each kit by local project staff)

**Sack and/or tire and climbing pole gardens for urban areas:**
2 sacks or used tires
1 small watering can with spigot ends
1 small trowel
String to tie vine plants to poles
1 sack of compost material
Seeds (or provide transplants) to be distributed by local project staff

**Hanging pot or wall container gardens for urban areas:**
Quantity of five 5-liter size plastic or tin cans with handles
5 metal hangers to attach to walls to hang the potted plants and nails or screws to secure them
1 small watering can with spigot end
1 small trowel shovel
String to tie vine plants to the roof
1/2 sack of compost material
Seeds (or provide transplants) to be distributed by local project staff

**Square foot gardens for rural/peri-urban areas:**
Same as above but include drip irrigation equipment
Bucket
PVC pipe handheld water pump
10' of soaker/drip hose
1 3-way adapter
10' of garden hose
Glue or duct tape

Recommend buying compost initially from KIOF for Nairobi area kits; buying the compost initially from Voi World Relief Farmers Coop for Voi kits; identify and hire someone in the Mombasa area to make compost or else truck it from Voi.*

*Small business opportunities could be developed by local entrepreneurs to make compost, PVC water pumps, and marketing outlets for urban gardens.
3. Profiles of partners in agricultural training and outreach—**Kenyan Institute of Organic Farming (KIOF)**, PO Box 34972, Nairobi. Tel +254-2-583383, 583194, fax +254-2-583570

KIOF is a non-governmental organization focusing on sustainable improvement of the livelihood of smallholder farmers through organic farming. Located in Juga town along the Nairobi-Thika highway, near New Ndarugu Motel, it was officially established in 1986 to train and promote organic farming methods mainly among smallholder Kenyan farmers.

The initial programmes carried out in Central and Eastern Provinces proved successful as they encouraged low cost farming methods appropriate to small-scale farming. As a result, organic farming became hugely popular leading to a demand in general information and training on organic agriculture from all over Eastern Africa.

KIOF’s vision is to achieve environmentally conscious and socially just communities of men and women empowered with knowledge and skills in organic farming for sustainable livelihood in the rural areas.

KIOF’s mission statement is that KIOF believes in food security as a vital ingredient for the self-determination of resource poor rural communities. To address this concern, KIIOF is committed to promoting organic farming as an environmental friendly approach to sustainable food production. This is accomplished through training of small-scale farmers in organic farming methods using participatory approaches with special emphasis on sensitization of our partners, collaborators, and friends.

KIOF activities and services include (1) training of grassroots farmers including arranging for farmer exchanges and educational tours; (2) training of rural youth and connecting them to potential employers; (3) training of extension workers and on-farm data collection and analysis; (4) research, outreach and consultancy services; (5) seeking and connecting producers to potential organic market outlets; and (6) information dissemination.

KIOF has successfully made impact in:

- Creating awareness and providing practical training in organic farming to the farming communities – men, women, rural youth, extension workers, trainers and rural based project managers from all over East Africa;
- Gathering and disseminating information on global organic farming;
- Undertaking on-farm trials and data analysis; and
- Stimulating formation of community based organizations (CBO’s) and non-governmental organizations (NGO’s) and networks on organic farming.
3. Profiles of partners in agricultural training and outreach—**Sustainable Agriculture Community Development Programme (SACDEP)**, PO Box 1134, Thika, Kenya. Tel +254-151-30541, fax +254-151-30055

SACDEP-Kenya, a middle-sized indigenous Kenyan non-governmental organization located in Thika, was established in 1992 by Kenyan development practitioners in response to the fast rising levels of food and agro-income insecurity among the rural and peri-urban agricultural communities. During the past ten years, the organization has facilitated dramatic livelihood improvement of about 25,000 households through training in the practical translation of the principles of sustainable agriculture.

SACDEP-Kenya is committed to responding to requests and invitations by smallholder farmers in their quest to establish self-help development programmes. SACDEP’s vision is a situation where resource poor and the marginalized members of the communities are able to realize and utilize their full potential in improving their desired levels of livelihood standards. To contribute to sustainable development of communities that continually experience low levels of natural and financial resources in order to enable them to improve their livelihoods. This is through fostering realistic and practical socio-economic and scientific linkages of food and agro-income approaches that are environmentally, economically socially and culturally sound.

The organization aims to facilitate development of sustainable and quality livelihoods through agriculture. SACDEP works as a key partner with communities, government of Kenya, and other development agencies in Kenya and abroad to accomplish two primary goals:

- **Empower communities experience small holder farming success via—**
  - Community synergy creation through Small Farmers Organizations;
  - Increasing and sustaining agricultural production through use of low-cost external and on-farm inputs;
  - Use of selected appropriate technology for farm and domestic requirements; and
  - Produce value adding through processing, packaging, and marketing;

- **Link communities with external sources of knowledge and resources to develop in the contextual dynamics of the “global village.”**

**SACDEP sustainable agriculture training curriculum features:**

- Understanding theory and practice of sustainable agriculture;
- Natural soil fertility enhancement, maintenance and management and tilling systems;
- Low-cost and environmentally sound crop protection skills;
- All crop varieties suitable to regions and being chosen by farmers’ priorities;
- Seed security technology;
- Low-cost and environmentally acceptable livestock production;
- Food processing, conservation, storage, and value adding technologies;
- Community based agricultural and naturally conserved food, feed, and fibre programmes;
- Agricultural and land-use policy reviews; and
- Farmer-to-farmer extension methods for skills development and dissemination.

Effective partnerships and networking are important to SACDEP’s impact. It is the fusing of community resources and external catalysts that has enabled SACDEP community-based projects to succeed in achieving sustainable development status over time.

Founded in 1939, Egerton University is the oldest institution of higher learning in Kenya. The institution traces its roots to the generosity of Lord Maurice Egerton of Tatton who donated 300 hectares of his estate. Lord Egerton had bought the land from Lord Delamere. Originally it was intended as a school for training white European youth for careers in agriculture and was known then as Egerton Farm School. The Agricultural College was gazetted as a constituent college of the University of Nairobi in 1986 and 1987; the University was established as a full fledged University by an Act of Parliament. The Egerton University Njoro Campus is located in Nakuru in Nakuru District-30 kilometres southwest of Nakuru town and is 200 kilometres northwest of Nairobi.

The Egerton Faculty of Agriculture comprises of seven departments, namely:

- Agricultural Economics and Agribusiness Management
- Agronomy
- Animal Health
- Animal Science
- Dairy and Food Science and Technology
- Horticulture
- Soil Science

The Faculty of Agriculture offers B.S., M.Sc., and Ph.D. degree programmes. Additionally, research and consultancy services are organized within the Agricultural Resources Institute.

Established in 1999, the Egerton Faculty of Environmental Studies and Natural Resources has three departments:

- Natural Resources
- Environmental Science
- Geography.

Currently the Faculty has 48 teaching staff and a total of 350 both undergraduate and graduate students registered under the different programmes offered. The Departments, which apply a holistic approach in training in all the programmes, embrace the vision “to achieve excellence in sustainable management of the environment and natural resources therein for the improvement of life for humankind.” The Faculty’s mission is “to train human resources in environmental and natural resource management, conduct research and disseminate information through outreach and consultancy services.” The Faculty offers a total of three undergraduate four postgraduate programmes leading to B.S., M.Sc., and Ph.D. degrees.
The International Council for Research in Agroforestry (ICRAF) was created in 1978 to promote agroforestry research in developing countries. During the 1980s ICRAF operated as an information council focused on Africa. It joined the Consultative Group on International Agricultural Research (CGIAR) in 1991 to conduct strategic research on agroforestry at a global scale, changing its name from Council to Centre. After joining the CGIAR, the Centre explicitly linked its work to the goals of the CGIAR—reducing poverty, increasing food security and improving the environment—through two means: overcoming land depletion in smallholder farms of subhumid and semi-arid Africa, and searching for alternatives to slash-and-burn agriculture at the margins of the humid tropical forests. In implementing this strategy, the Centre expanded into Latin America and Southeast Asia while strengthening its activities in Africa.

ICRAF continued the process of institutional transformation by developing a science culture, building excellent research facilities and doubling its financial and human resources by 1996. The Centre formally adopted an integrated natural resource management framework for all of its work, and institutionalized its commitment to impact by creating a Development Group dedicated to moving research results onto farmers' fields.

In 2002 the Centre changed its name to the World Agroforestry Centre. The new name reflects the fact that the Centre, along with its strategic alliances with a range of other institutional partners, is now recognized as the international leader in agroforestry research and development. The Centre and its network of partners provide scientific excellence in specific topics of relevance to agroforestry and effective delivery of research results to farmers’ fields.

The World Agroforestry Centre has developed an international reputation for its on-farm research, adoption studies and participatory monitoring and evaluation methods. Agroforestry spreads through innovation networks of farmers. The Centre seeks to accelerate the adoption process through innovative scaling-up approaches, including a variety of extension tools, training methods and networking events. Farmers learn best from other farmers. Agroforestry is a system of better land management that involves participatory analysis of problems and options. The stepwise and analytical approach of adopting agroforestry systems takes time to yield results. Farmers who have tried and succeeded are best equipped to help other farmers understand the risks, benefits and options.

Its mission statement is: “To contribute to food security and poverty eradication through research promoting sustainable agricultural development based on the environmentally sound management of natural resources. This mission will be achieved through research leadership, partnership, capacity building and policy dialogue.” The World Agroforestry Centre goes beyond the traditional research centre approach by explicitly engaging across the research-to-development continuum.

In Year 1, the UWSP/GEM Small Garden Systems Team completed assessment and feasibility analyses of SGS in Kenya. Results and recommendations of Year 1 work was presented by the UWSP/GEM Small Gardens Systems Team in a Kenya Travel Report (July 25, 2004) and an Agronomic Assessment Report (August 31 2004). To implement the recommended actions needed to augment nutrition of HIV/AIDS families for improved antiretroviral treatment, a three-year (Years 2-4) work plan overview and budget justification are described below.

**Goals and Objectives**
The overall goal of the UWSP/GEM SGS project component is to provide real-world practical products and educational services to enhance nutrition and sustainable health and agriculture by training HIV/AIDS families and health care providers to install and manage small garden systems to provide requisite nutrients to support medical treatment.

**Work Plan**
To accomplish the goal of this SGS implementing project component, the UWSP/GEM team identified five objectives for Years 2-4:

1. To design and test SGS models at project sites (Voi, Mombasa, Nairobi);
2. To build local and sustainable capacity for SGS by local trainees to augment their families’ dietary nutrition;
3. To develop and test food distribution systems (e.g., producer/consumer links);
4. To explore micro-enterprise opportunities for local communities (e.g., garden kits, trucking food from rural areas, making and distributing compost material, developing value-added products like the Nutri-mix, etc.)
5. To integrate food production and distribution with other project components, including nutrition, health care, water, and community development.

**Activities and Schedule to accomplish project objectives**
To accomplish the project objectives, the UWSP/GEM team identified the following activities for each year of the project (numbered identifiers used below refer to Objective/Year/Activity, e.g., “Activity 3.2.1” is Obj. 3, Year 2, Activity 1). While activities are presented in chronological order for each objective, we will be multi-tasking objectives concurrently.

Obj. 0. To assess the feasibility of small garden systems to provide dietary nutritional support for improved HIV/AIDS prevention and treatment of patients and families in selected communities of Nairobi, Mombasa and Voi, Kenya.

✓ In Year 1, completed assessment of SGS feasibility recommended implementation of SGS demonstrations and training in Years 2-4.

**Obj. 1. To design and test SGS models at project sites (Voi, Mombasa, Nairobi).**

**Year 2 Activities**

Activity 1.2.1: Identify KIOF and SACDEP organic agricultural program graduates who are located in the vicinity of each site, and who are willing to demonstrate SGS.
Activity 1.2.2: Establish demonstration plots where possible (e.g., at each clinic, at volunteer home sites of community health workers (wahaduma), of Ministry of Agriculture personnel, etc.).
Activity 1.2.3: Train trainers in a variety of small garden system techniques, including, but not limited to, square foot gardens, sack gardens, and hanging wall gardens. Trainers would be identified in Kenya through clinic personnel.
Activity 1.2.4: Develop and distribute SGS kits to trainees.
Activity 1.2.5: Facilitate/monitor installation of SGS by trainees.

Year 3 Activities
Activity 1.3.1: Modify installed demonstration plots at project sites, as needed.
Activity 1.3.2: Continue to establish demonstration plots where possible (e.g., at volunteer home sites of community health workers (wahaduma), of Ministry of Agriculture personnel, of other members of the community, etc.).
Activity 1.3.3: Continue to train trainers in a variety of small garden system techniques, including, but not limited to, square foot gardens, sack gardens, and hanging wall gardens. Expand the types of volunteer cooperators for SGS training.
Activity 1.3.4: Continue to distribute SGS kits to trainees.
Activity 1.3.5: Facilitate/monitor installation of SGS by trainees.

Year 4 Activities
Activity 1.4.1: Modify demonstration plots at project sites, as needed.
Activity 1.4.2: Extend SGS to other groups
Activity 1.4.3: Continue to train trainers in a variety of small garden system techniques, including, but not limited to, square foot gardens, sack gardens, and hanging wall gardens. Expand the types of volunteer cooperators for SGS training.
Activity 1.4.4: Continue to distribute SGS kits to trainees.
Activity 1.4.5: Facilitate/monitor installation of SGS by trainees.
Activity 1.4.6: Plan and host field-oriented workshop to demonstrate and celebrate successes in SGS and share information for sustaining SGS efforts by trainees.

Obj. 2. To build local and sustainable capacity for SGS by local trainees to augment their families’ dietary nutrition.

Year 2 Activities
Activity 2.2.1: Establish in-country partners, such as KIOF, SACDEP, KARI, ICRAF, and Egerton University. This activity will involve an agreement and work plan with each partner that would outline training schedules, internships, applied research, information dissemination, etc.
Activity 2.2.2: Recruit and hire in-country Sust. Ag. Specialist/SGS coordinator and project site SGS volunteers; form UWSP/GEM SGS team.
Activity 2.2.3: Recruit Kenyan CNR graduate students to work on M.S. thesis projects at UWSP and GEM student ambassadors associated with the SGS project.
Activity 2.2.4: Recruit and train community-based health care volunteers from each of the three project sites as SGS trainers for their respective communities.
Year 3 Activities

Activity 2.3.1: Maintain, expand, and implement activities with in-country partners (e.g., KIOF, SACDEP, KARI, ICRAF, Egerton University) to help with SGS training and establishment at project sites.

Activity 2.3.2: Augment professional development and on-the-job training for Sust. Ag. Specialist/SGS coordinator and project site SGS volunteers; facilitate interactions of UWSP/GEM SGS team with SGS partners and collaborators in Kenya.

Activity 2.3.3: Launch Kenyan CNR graduate students’ work on M.S. thesis projects at UWSP and GEM student ambassadors associated with the SGS project.

Activity 2.3.4: Continue to recruit and train community-based health care volunteers from each of the three project sites as SGS trainers for their respective communities.

Year 4 Activities

Activity 2.4.1: Maintain and implement activities with in-country partners (e.g., KIOF, SACDEP, KARI, ICRAF, Egerton University) to accomplish capacity building objectives.

Activity 2.4.2: Continue with professional development and on-the-job training for Sust. Ag. Specialist/SGS coordinator and project site SGS volunteers; continue facilitating interactions of UWSP/GEM SGS team with SGS partners and collaborators in Kenya.

Activity 2.4.3: Help Kenyan CNR graduate students complete their M.S. degrees at UWSP and GEM student ambassador projects associated with the SGS component.

Activity 2.4.4: Continue to train community members from each of the three project sites as SGS trainers for their respective communities.

Activity 2.4.5: Develop plans for sustaining effort in SGS capacity building and local pride of ownership and management beyond life of project (including help in job placement of trained professionals).

Obj. 3. To develop and test food distribution systems (e.g., producer/consumer links).

Year 2 Activities

Activity 3.2.1: Assess existing food distribution systems for each project site.

Year 3 Activities

Activity 3.3.1: Identify collaborating partners and activities to establish food distribution systems for each project site (dependent upon Year 2 assessment).

Year 4 Activities

Activity 3.4.1: Facilitate implementation of selected food distribution systems for each project site (ramping up Year 3 work).

Obj. 4. To explore micro-enterprise opportunities for local communities (e.g., garden kits, trucking food from rural areas, making and distributing compost material, developing value-added products like the Nutri-mix, etc.).

Year 2 Activities

Activity 4.2.1: Compile annotated list of current micro-enterprises operating in Kenya and assess business niche opportunities for SGS component trainees.

Activity 4.2.2: Conduct SWAT analysis of selected niche opportunities, including preliminary determination of business methods, financing, and other infrastructural factors important to Kenyan business culture for success.
Year 3 Activities
Activity 4.3.1: Assess feasibility of potential income generating micro-enterprise opportunities from Year 2 activities.
Activity 4.3.2: Select, with local community participation, several opportunities, if determined feasible, for targeted development:
Activity 4.3.3: Identify potential entrepreneurs amongst SGS component trainees and conduct survey of interests and capacity for participation in selected micro-enterprise ventures.

Year 4 Activities
Activity 4.4.1: Provide training on business plan development and basic business management, including risk assessment, to participating trainees in the micro-enterprise ventures.
Activity 4.4.2: Facilitate/advise local entrepreneurs in finalizing their business plans to approach financing institutions and other elements launch the ventures the following year.

Obj. 5. To integrate food production and distribution with other project components, including nutrition, health care, water, and community development.

Year 2 Activities
Activity 5.2.1: Integrate SGS activities with other project components.

Year 3 Activities
Activity 5.3.1: Assess and evaluate the SGS component work of Year 2.
Activity 5.3.2: Integrate SGS activities with other project components.

Year 4 Activities
Activity 5.4.1: Assess and evaluate the SGS component work of Year 3.
Activity 5.4.2: Integrate SGS activities with other project components.
Activity 5.4.3: Complete comprehensive (Years 1-4) assessment and evaluation of SGS project component utility and capacity building success within the integrated project.

Partners/Clients
See Appendix for profiles of KIOF, SACDEP, World Agroforestry Centre, and Edgerton University partners. The targeted clientele served in impoverished and underprivileged communities with high incidence of HIV/AIDS in Voi, Mombasa and Nairobi are those in which the Marquette University College of Nursing has been working to provide community-based health care and nurse training. These communities are administered by and located in the St. Joseph’s Shelter of Hope (Voi), Archdiocese of Mombasa Community-based Health Care and AIDS Relief Project (Mombasa), and Archdiocese of Nairobi Eastern Deanery AIDS Relief Program (Nairobi).

UWSP/GEM Small Garden Systems component budget for implementation

The SGS component budget consists of five major areas: personnel, in-country partner stipends and services, supplies and equipment, travel, and UWSP/GEM indirect and administrative costs.

The personnel category has three categories of funding: the small garden systems team, student workers and faculty advisors. To carry out the activities in this work plan, the team will need the
expertise identified in the budget, in addition to a full-time project coordinator in Kenya. Graduate and undergraduate students and their faculty advisors have been included in this project to facilitate service learning and global educational and cultural interactions between our students and clients served in Kenya.

The in-country partner stipends and services category lists estimated costs for providing training through KIOF and SACDEP in addition to hiring Kenyan agricultural expertise from the World Agroforestry Centre (ICRAF), and Egerton University. Some translating services will be required.

The supplies and equipment category lists the cost of the small garden systems kits, cost to build the demonstration gardens, and other support equipment to carry out all work plan activities.

The travel category includes both international and in-country travel to foster communication and interaction between the SGS team at UWSP/GEM with Kenyan collaborating partners and clienteles to receive training. Because only one person on the SGS team will be physically located in Kenya on a full-time basis, the remaining team members will need to complete periodic trips to Kenya when necessary to help fulfill project objectives successfully.

Indirect and administrative costs are dictated by the UW-Stevens Point and the GEM Center.
UWSP/GEM Small Garden Systems component 3-year budget for implementation (Years 2-4): Total Cost for 3-year SGS component project—$2,614,368

Year 2 budget—UWSP/GEM Small Garden Systems component

### Personnel

- **Small Garden Systems team (salary plus 41.5% fringe):**
  - Team Leader (0.25 FTE) $36,000
  - GEM sust. ag. specialist/coordinator in Kenya (1.0 FTE) $51,000
  - Program Assistant (0.25 FTE) $11,500
  - Horticulturalist (0.50 FTE) $42,500
  - Agricultural extension/outreach specialist (0.50 FTE) $28,500
  - Small garden/agroforestry specialist (0.25 FTE) $21,500
  - Agricultural irrigation specialist (0.25 FTE) $16,000
  - Agricultural economist (0.25 FTE) $16,000
  - Land use planning specialist (0.25 FTE) $17,000
  - Soil scientist (0.25 FTE) $21,500

- **Student workers:**
  - CNR graduate students (2) @ $15,000 plus 30% fringe $39,000
  - GEM student (undergrad.) ambassadors (2) @ $10,000 plus 7.65% fringe $21,500

- **CNR faculty advisors:**
  - CNR grad. fac. (2) summer overload pay @ $12,500 plus 41.5% fringe $36,000
  - GEM stud. amb. (2) summer overload pay @ $4,000 plus 41.5% fringe $12,000

### In-country partner stipends and services

- SACDEP agricultural training specialists (3) @ $12,000 $36,000
- SACDEP training for 40 participants per quarter @ $6,000 per week session $24,000
- KIOF agricultural training specialists (3) @ $12,000 $36,000
- KIOF training for 6 community leaders @ $2,000 for 1-year course $12,000
- ICRAF consultants $12,000
- Egerton U. consultants $12,000
- Translators $2,000

### Supplies and equipment

- Kitchen garden kits (200) @ $25 $5,000
- Demonstration gardens (30) @ $500 $15,000
- R&D greenhouse/nursery/field plot facilities $12,000
- Laptop computers w/internet (4) @ $2,000 $8,000
- Incidentals (training materials, photocopies, etc.) $6,000

### Travel

- Team @ $5,000/person/trip (8 team members X 2 trips/year) $80,000
- CNR grad. stud. & GEM stud. amb. & fac. advisor travel @ $5,000/person/trip (8 persons X 1 trip/year) $40,000
- In-country coordinator travel and lodging, hosting partners, etc. $20,000
Subtotal direct costs $690,000
GEM administrative cost @ 10% of total direct costs $ 69,000
UWSP indirect cost @ 19% of personnel salary and fringe costs $ 70,300
Total Year 2 budget $829,300

Year 3 budget—UWSP/GEM Small Garden Systems component

Same as Year 2, with 5% increase for anticipated salary, fringe rate increases and inflation adjustment for other project expense categories. No new computers will be purchased; instead, a 4-wheel drive vehicle equipped with water drilling auger, winch, and front-end blade will be purchased.

Total Year 3 budget $870,765

Year 4 budget—UWSP/GEM Small Garden Systems component

Same as Year 3, with 5% increase for anticipated salary, fringe rate increases and inflation adjustment for other project expense categories. Under supplies and equipment, no computers or farm vehicle will be purchased; instead, supplies and equipment needed for proto-types and demonstrations of micro-enterprise operations will be purchased.

Total Year 4 budget $914,303

3-year total (Years 2, 3, and 4) budget $2,614,368

Contact: Dr. Victor D. Phillips, Director
Global Environmental Management Education Center (GEM)
College of Natural Resources
University of Wisconsin-Stevens Point
800 Reserve Street
Stevens Point, WI 54481, USA

Email: vphillip@uwsp.edu
Office telephone: 715.346.4935
Office facsimile: 715.346.3624