



## Technical Note #74

# Agriculture Components for Small Institutions

Realistic Expectations and Best Practices

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Across Asia, small institutions such as children's homes play an essential role in caring for orphans and other young people at risk. Likewise, hostels (i.e., boarding facilities) provide disadvantaged students with safe places to stay in order to further their studies. And small, faith-based educational institutions, including Bible schools, strive to offer low cost educational opportunities.

Unfortunately, providing quality services for young people and students is not cheap. As non-profit institutions operating under limited budgets, children's homes, hostels and schools are often forced to seek at least partial self-sufficiency. As a result, many small institutions turn to agriculture in an attempt to reduce costs.

The ECHO Asia Regional Office receives frequent inquiries from small organizations seeking input and other assistance related to their agricultural initiatives, including questions such as the following:

How many acres would it take to grow enough food (other than rice) to feed 38 people year round?

What crops are most likely to be grown for that purpose?

How would you quantify the amount of labor that such an endeavor would require?

Essentially, many inquirers are asking, "How realistic is it to combine agricultural components into small institutions, and are there any examples of effective efforts?"

### **An Effective Farm for Children**

Approximately 25 acres (10.12 ha) of property are managed by a children's home near Yangon, Myanmar. This farm offers some useful insights into how effective management of adequate land and water resources, as well as labor, can yield a significant degree of savings and food security for children.

The operation is divided into three main components. A one-acre (0.40 ha) plot, where the primary residence for the children is located, also contains a vegetable patch, pig pens, a rice mill, a small pond and a few milk cows. Adjacent to this site is 20 acres (8.09 ha) of rice paddy. Another 2.5 acre (1.01 ha) plot, a few miles away, is where most of the vegetables are raised along with a few more pigs and approximately 15 goats.

Importantly, all of these farm components are interlinked, so that each one supports another in some fashion. For example, the rice field produces a considerable amount of grain for the children's home; about five months' worth, after a major portion is taken out to compensate outside labor needed to tend the crop. But in addition to providing their staple food, the rice farm also produces straw that feeds the farm's milk cows, especially when other forage is scarce during the dry season. The farm's four cows, with occasional contributions from the goats, reportedly provide all of the milk needed to nourish the home's 47 children.



The cow, pig and goat manure produced at the farm is composted and applied to the vegetable plots planted over almost three acres. A continuous yield of homegrown vegetables is the farm component's biggest contribution to the children's diets.

During our March visit, we encountered well-tended plots of water spinach (*Ipomoea aquatica*) and leaf amaranth in addition to trellised bottle gourd yielding edible shoots and fruit. The farm also makes use of a few types of indigenous perennial vegetables such as *su pout ywet* (*Acacia pennata*) and a species of *Clerodendrum*. Additionally, fruits such as guava, banana, papaya and pineapple are grown.

Water conservation measures, such as mulching and careful hand watering are employed during the dry months. But according to the director of the children's home and farm, the dry season—with a corresponding low disease pressure—is the easiest time to produce vegetables, despite the challenge of keeping crops watered.

Asked whether he thinks it might be possible to widen agricultural operations, the director replies that apart from the possible addition of a fish pond (to provide both protein and water storage), the farm is operating at near capacity. He is concerned that expanding the farm work load might have a negative impact on priorities related to educating and caring for the children.

The children help out on the farm; the director explains that the young people are allowed to engage in farm chores for about one hour per day after school in addition to involvement on Saturdays and school holidays. They reportedly enjoy participating in appropriate outdoor work activities, and most are from farm communities. Since half of the children will probably return to agricultural communities, the director believes that farm experience gained at the home will better prepare them to become food producers themselves.

How much does the farm operation actually benefit the ministry budget? The director estimates that without the supplemental food produced at the farm, monthly costs would be at least 25 percent higher.

## Realistic Expectations at Suan Aden



What about similar institutions with less access to land, water and other resources? Can small agricultural components, though unable to provide sizeable savings or food sufficiency, offer any benefits?

On the outskirts of Chiang Mai, a small children's home being established by H.E.L.P. Thailand is situated on 23 rai (3.68 ha or 9.09 acres) of level, well watered land. Work began in early 2009, and the home currently houses 16 girls with a total of 28 expected to be in residence within the next few months.

The project uses two goats that are reducing excessive vegetation on portions of the land. At least one hectare will soon be grazed by a couple of manure-producing, potentially income-generating cows.

Other agricultural assets include four pigs being raised on rice husk bedding. After several months, the nutrient-rich bedding material can be used as mulch and natural fertilizer on several raised vegetable beds, as well as around dispersed

plantings of fruit trees. The pigs, fed on homegrown banana stalks supplemented with commercial feed, will eventually be sold or slaughtered for special events. Soon a batch of 100 chickens will be included for future egg and meat production.

Besides producing occasional fish protein for the girls, two ponds store water for use in the gardens. Below the ponds, a small area of rice paddy has already produced one crop of supplemental grain for the house parents.

Bud Jones, a full-time H.E.L.P. Thailand volunteer whose focus is to develop the Suan Aden facilities, does not expect the cows, chickens, pigs, fish and vegetables to pay all of the bills. However, he believes the small operation will eventually produce a steady, supplemental supply of protein, fruit and vegetables to feed the children, as well as useful by-products such as natural fertilizer. It is hoped that the farm component will at least help extend the operating budget

Another anticipated benefit is an experiential learning opportunity for the girls. By participating in farm chores, the young women will gain critical life skills. Additionally, according to Bud, the bond that forms between the farm animals and girls offers “a healing effect” for past hardships.

## Good Management – Clear Priorities

The most crucial aspect of the agricultural component of a small institution—more important than an excellent climate, access to abundant and fertile land, unlimited water or adequate labor—is competent farm management. Institutions generally make every effort to hire quality administrators, house parents and teachers. Unfortunately, farm components are sometimes added without the involvement of knowledgeable managers.

Two years ago, a church-affiliated school staffed almost entirely by teachers purchased 0.64 hectares (1.58 acres) of irrigated land. The institution’s plan was to produce enough rice to supplement the large amount being consumed by its 50 students. Without dedicated farm management, the paddy fields are becoming overgrown with aquatic sedges, grasses and other noxious weeds. The school’s farm seems to be operated as more of an afterthought than a priority, and is in danger of becoming a liability.



Donors contributing money to small institutions are likely to expect eventual institutional self sufficiency. Agricultural components are often recommended as at least a partial means of developing long-term sustainability. However, agricultural side-operations that exist primarily to satisfy donor expectations will be merely superficial and hardly effective.

## Lessons Learned

What lessons might be gleaned from the farm of the children’s ministry outside of Yangon, the initial efforts of the Suan Aden home or numerous other small institutions reporting varying degrees of agricultural success?

Positive examples such as these serve to validate the concept that small institutions can benefit from well-managed agricultural components. But expectations must be realistic. Experienced managers generally caution that small institutions hoping to benefit from agricultural components are unlikely to reach complete food or financial sufficiency.

However, partial levels of food sufficiency and/or financial savings are possible given the following criteria:

- **Good management** - At least one person with farm experience and good management skills is necessary to direct institutional agricultural operations.
- **Adequate land** – The amount of land needed for supplemental food production for the institution will depend upon various factors including the climate, the number of persons being supported and the amount of labor that is available to work the operation. For comparison purposes, keep in mind that the operation outside of Yangon requires approximately three acres to grow enough vegetables for 47 children.
- **Adequate water** – Due to less disease pressure, maximum vegetable production at the Yangon farm occurs during the dry season when crops must be watered. A reliable source of water and an adequate delivery system are critical.
- **Adequate non-child labor** – Both managers of the homes outside of Yangon and Chiang Mai affirm the fact that children need time to study and play. While including children in appropriate and safe types of farm work offers stimulation, exercise and acquisition of livelihood skills, their involvement should only be supplemental and legal.<sup>1</sup> Adult involvement will be needed both to supervise and to carry out key day-to-day and seasonal farm tasks.

## Agricultural Options for Institutions with Land Constraints

Institutions lacking significant land and water resources may need to scale back expectations. But they can still be innovative with available resources. For instance, institutions with limited space but access to sufficient water might explore the following urban/backyard agricultural activities for supplemental food and income production:

- **Rooftop gardening** – Rooftop production of vegetables might be considered where buildings have been engineered to be able to handle the additional weight of soil and plants, and where safety precautions can be met (to prevent falls and other accidents).
- **Shade gardening** – Under cramped institutional conditions, space for gardening may be limited to sun-deficient spots such as narrow alleys between buildings and walls. However, certain garden crops can be grown in locations with less than full sunlight. For example, water spinach, lettuce, mustard greens (*Brassica juncea*), cabbage, chili, basil, Chinese cabbage (*Brassica rapa*), Chinese kale (*Brassica oleracea*) and leaf amaranth tolerate varying levels of shade.
- **Edible landscapes** – Rather than squandering precious space with lawn grass and ornamentals or simply allowing weeds to take over, productivity may also be increased by planting edible landscapes. Small to



medium-sized fruit producing plants such as banana, guava and papaya, which yield year round, may fit inside less spacious locations. Also, hedges or dispersed plantings of woody perennials, like katuk (*Sauropus androgynus*) and *Acacia pennata*, or beds of herbaceous perennials, including vegetable taro (*Colocasia esculenta*) and fern (*Diplazium esculentum*), can provide supplemental sources of vegetables.

- **Container gardening** – Even with extreme land constraints, small institutions likely have enough space to set up productive and educational container gardens. For ideas check out the *ECHO Technical Note*, “[Rooftop and Urban Gardening](#)” (TN 31) by Dr. Martin Price.
- **Intensive livestock/aquaculture/insect and vermiculture systems** – With adequate water resources and good management, an impressive amount of fish, animal and even insect protein can be produced in relatively small spaces along with useful by-products, such as composted manure. Small vermiculture systems which convert kitchen wastes into vermicompost might be squeezed in as well. Compact but intensive backyard farms in Southeast Asia often incorporate combinations of the following:
  - Catfish production in small tanks, channels and ponds (or tilapia if water is oxygenated).
  - Bullfrogs and other edible amphibians.
  - Production of edible insects such as crickets.
  - Small-scale pig production (those raised on natural bedding for odor control are particularly suitable).
  - Poultry production (*Small-Scale Poultry Production*, an FAO online manual, <http://www.fao.org/docrep/008/y5169e/y5169e00.HTM#Contents>, offers useful information for small farms, including more humane free-range and semi-intensive approaches).
- **Aquaponics** – The combined production of vegetables and fish is gaining considerable attention for backyard and even rooftop application. Various aquaponic and barrelponic systems are being promoted on the internet, some of them quite elaborate. However, if you have no prior experience with aquaponics, start simply. For reference, the “Aquaponics—Integration of Hydroponics with Aquaculture” document, which provides an extensive amount of useful aquaculture information, may be downloaded from the National Sustainable Agriculture Information Service website, <http://attra.ncat.org/attra-pub/summaries/aquaponic.html>.

For additional information concerning any of the previously mentioned approaches for food production where land is limited, contact the ECHO Asia Regional office at [echoasia@echonet.org](mailto:echoasia@echonet.org).

## Outreach Potential

In addition to supplementing food and income for an institution, well managed agricultural components of a ministry can serve as training and demonstration sites. Important agricultural livelihood skills can be shared not only with institutional residents, such as hostel students, but also their families and the surrounding communities. Rather than operating as exclusive enclaves, institutions with functional agricultural components have opportunity to engage and benefit neighbors, particularly in areas of physical and economic need.

## Conclusion

There is no one-size-fits-all approach for developing successful agricultural components for small institutions. Total food and income sufficiency is unlikely, and expectations must be realistic.

Ultimately, the degree of possible supplemental production of food and income will depend upon competent management, sufficient labor, and physical factors such as the local climate, water availability and quality and quantity of available land.

The involvement of children in safe agricultural activities can be beneficial, but institutions must be careful not to violate child labor laws. The main focus should be the children’s education and welfare.

Where there are land constraints, various small-scale urban/backyard agricultural activities might be adapted to serve institutions that have adequate access to water. Beyond merely supplementing institutional food and income, agricultural components may serve to extend agricultural livelihood skills both to the residents and to surrounding families and communities.

UNICEF defines child labor as work that exceeds a minimum number of hours, depending on the age of a child and on the type of work. Such work is considered harmful to the child and should therefore be eliminated.

- Ages 5-11: No more than one hour of economic work or 28 hours of domestic work per week.
- Ages 12-14: No more than 14 hours of economic work or 28 hours of domestic work per week.
- Ages 15-17: No more than 43 hours of economic or domestic work per week.

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