



PROMOTING LIFELONG
HEALTHY EATING HABITS



A NEW **deal** FOR
school gardens



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Foreword



As environmental concerns broaden and diet-related health and nutrition problems increase, governments and development partners are increasingly interested in the potential of school gardens.

School gardens are cultivated areas around or near to schools, tended at least partly by learners. Mainly they produce vegetables and fruits; activities may include small-scale animal husbandry and fishery, beekeeping, ornamental plants and shading, and small-scale staple food production.

School gardens are run for a variety of reasons. Some that are gaining prominence in all parts of the world are the promotion of good diet, nutrition education, and the development of livelihood skills, together with the power to extend this learning beyond the school itself in a variety of ways. This educational focus can be an important long-term contributor to national health and food security.

This document suggests what governments and their development partners can do to promote school gardens as a seed ground for the nation's good nutrition and better health.



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Introduction

School gardens: why, what and how?

New needs, new roles

Governments and international development partners are increasingly interested in school gardens. These have traditionally been used for science education, agricultural training or generating school income. Today, given the urgent need for increased food security, environmental protection, more secure livelihoods and better nutrition, perceptions of the potential of school gardens are changing. Some roles which are gaining prominence are the promotion of good diet, the development of livelihood skills, and environmental awareness. The belief is that school gardens can become a seed ground for a nation's health and security; this idea is increasingly backed up by experience and research. The questions are: how much can be achieved, and how best to go about the task?

The potential

School-age children need a good diet in order to develop and grow well, to study, to be protected from disease, and to have the energy to get through the day. For the sake of their futures and their own children's futures, they need not only to eat well, but also to learn how to eat well, and how to grow their own food if necessary. Schools are well placed to show children how to go about this, because at this age children are open to new ideas and young enough to pick up good habits and new skills easily. With the right conditions and support, school gardens can do all of these things:

- show children how to grow a variety of foods – vegetables, fruits, legumes, small animals – and do this *with a good diet in mind*;
- demonstrate to children and families how to extend and improve a diet with home-grown foods;
- increase children's preference for and consumption of vegetables and fruits;
- enhance school meals with micronutrient-rich vegetables and fruits;
- promote, or re-establish, horticultural skills in agriculture-dependent economies;
- foster entrepreneurial skills in the area of market gardening;



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School-age children need a good diet in order to develop and grow well, to study, to be protected from disease, and to have the energy to get through the day.

- raise awareness of the need for environmental protection and soil conservation.

Putting learning first

The garden curriculum: School gardens cannot single-handedly raise the level of children's health or substitute for school meals – but they can contribute to them. Above all, they must be an educational instrument targeting not only children, but also their families, the community, and the school itself. Hence, garden activities should support and be supported by classroom lessons. The curriculum is multidisciplinary:

- The core garden curriculum consists of learning how to grow food, how to harvest it, how to preserve it and how to prepare it, and to do so with due respect for the environment. Curriculum areas are horticulture, environmental studies and home economics.
- This process must be led by conscious choices about what to grow to improve diets (nutrition education), or about what to grow to sell (market gardening / business studies).
- Experiential learning should be mixed with social learning and life skills, to move learning into real-life practice, motivate lifestyle change and broadcast the message. For example:
 - learners must manage, observe, record, evaluate and celebrate the whole process;
 - the skills of disseminating and publicizing garden learning are part of the curriculum.

Challenges and secrets of success

School garden learning is different from most other learning programmes: it is multi-sectoral and multidisciplinary; it relates closely to school food; it is usually partly extra-curricular; it may require equipment and infrastructural support, especially water supply; gardens may need attention out of the school term.

Other important issues are: the need for expertise and training in garden management and horticulture; issues of curriculum integration; monitoring and evaluation; and support and encouragement for hard-

working school staff. All these suggest the need for careful planning and long-term support, rather than quick fixes.

Many secrets of success are local: having clear, shared aims; paying attention to attitudes; giving the garden visible value in the eyes of the community, with clear links to good health and school food; building support from families and school management; whole-school participation; some ownership and control by children; committed garden managers and interested school cooks. Some well-documented success stories suggest that the most sustainable programmes often grow organically: they start small, take little for granted and expect slow progress; they allow schools to opt in and later to 'graduate' and help others; they offer small incentives and long-term coordination.

All of these factors should be taken into account when deciding the best way forward and how far the process of setting up, reviving or re-orienting school gardens should be divided between top-down facilitation and bottom-up initiative. Government can take the lead with appropriate resources, inputs, training, educational materials, advice and encouragement, and can help to establish a strong educational profile based on the food cycle and linked to the mainstream curriculum. It may also need to explore ways of helping schools to help themselves.

Research support

There is clear and growing evidence that:

- consuming specific vegetables can have a marked effect on children's health;
- growing and preparing garden food at school increases children's preferences for healthy fruit and vegetables;
- food gardening, combined with nutrition education, results in voluntary changes in diet;
- gardening activities, especially with organic approaches, improve children's understanding of and attitudes to the natural environment;
- hands-on learning and learning by doing induce a much higher retention rate than 'chalk and talk'.



A little history, and some examples

School gardens have a long history

The story is one of diverse aims, changing practices, fluctuating commitment and, today, renewed relevance. In different historical contexts, school gardens have had different priorities. Such differences in background experience will inevitably affect each government's policies and programmes.

In the North, 'garden-based learning' has predominated, using gardens as laboratories for hands-on learning of science, environmental studies, and other subjects such as art and language. More recently, garden enthusiasts have been especially concerned at the growing alienation of urban youth – not only from nature but also from the sources of the food they eat – and have rekindled an interest in food gardening and nutrition: the 'edible school yard'. Much has been done to promote school gardens and to integrate them into the existing curriculum, but the battle for recognition of their educational value continues.

In the South, educational use has been mainly for vocational agricultural training, which has sometimes proved to be a resilient curriculum element (e.g. in Swaziland, Botswana and Uganda) in spite of resistance to 'ruralisation' of the curriculum. Otherwise, the main orientation of school gardens has been food production for consumption or cash, often with the hope that the

gardens might help to supply the school meals which make such a difference to children's health, attendance and educational success. Such initiatives have often proved unsustainable through lack of resources, motivation or expertise. However, some countries (e.g. Costa Rica) have long-established policies of associating school gardens with school food and improving children's nutrition and eating habits; many shining examples of individual schools and projects demonstrate that the potential is there.

Today, perceptions of school gardens are changing in response to increasingly urgent needs for greater food security, environmental protection, more secure livelihoods and better nutrition. School gardens have new multiple roles to play.

Some examples

Banareng Primary School in Pretoria, South Africa

has transformed an urban desert into a flourishing herb and vegetable garden. The garden depends on hard work, sales of food, recycling, and the occasional donation. See www.lu.se/o.o.i.s/8527

Sligoville School in central Jamaica has a large organic garden worked by children, staff and the community. It provides food for meals, to take home, and to sell,



Some countries have long-established policies of associating school gardens with school food and improving children's nutrition and eating habits.

and inspires many educational projects. See www.farmradio.org/english/radio-scripts/48-7script_en.asp

Hikmet Ulubay Boarding School in Turkey has agriculture classes and two large greenhouses where children grow fruit and vegetables for meals in the cafeteria. See www.fao.org/getinvolved/telefood/telefood-projects



The White House food garden in Washington D.C., started by children from Bancroft Elementary School, will provide food for the President and his family, but, says Michelle Obama, its most important role will be to educate children about healthful, locally grown fruit and vegetables. "My hope," the First Lady told Marian Burros of *The New York Times**, "is that through children, they will begin to educate their families, and that will, in turn, begin to educate our communities."

Marian Burros, Obamas to plant vegetable garden at White House, *New York Times*, March 19, 2009



The Edible School Yard in Berkeley, California, introduces children to healthy food. They grow food organically, rear chickens, taste and compare food, prepare it and eat it. Garden learning is integrated across the curriculum. See www.edibleschoolyard.org/



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Needs and approaches

Needs

Urgent needs are dictating a worldwide re-appraisal of the potential of school gardens.

Basic food security is under threat from climate change, increased demand for food, rising food prices, higher input costs and loss of agricultural skills and human resources. Governments are reconsidering agricultural policy and the role to be played by a knowledgeable and skilled population in feeding themselves and others.

Environmental protection is now an imperative, forcing attention onto fuel and water conservation, soil enrichment, reforestation and organic approaches to horticulture, even at the micro level of the school back yard and the home food garden.

Livelihoods are threatened by the global financial crisis and resulting economic downturn, as well as by climate change, and young people are particularly vulnerable. In agriculture-dependent economies it makes sense for them to develop their horticultural and entrepreneurship skills.

Nutrition needs remain huge: about one person in seven is undernourished and more than one-third of infant mortality is attributable to undernutrition. Diets deficient in energy and low in protein quality and micronutrients impede schoolchildren's growth, make them vulnerable to illness, stunt their learning capacity and decrease their life expectancy.

School gardens, food insecurity and climate change

"Floods and droughts are getting steadily worse in Nsanje, Malawi. Harvests are suffering badly. Families are not getting enough to eat and children often go to school hungry ... Flooding has damaged school buildings, and desks and books have been swept away. It has also contaminated water sources, making pupils vulnerable to malaria and diarrhoea. To provide school meals, Action Aid is helping communities to establish kitchen gardens in four primary schools."

Source: www.actionaid.org.uk/101660/malawi_school_gardens_and_education.html

Livelihoods are threatened by the global financial crisis and resulting economic downturn, as well as by climate change, and young people are particularly vulnerable.

The plague of obesity, with its attendant health risks, is spreading from the developed to the developing world and striking children who are unable to resist the lures of junk food and a sedentary life in front of the TV or computer.

Approaches

What can school gardens contribute to meeting the needs outlined above? Experience is growing of feasible, economical and sustainable approaches to meeting these fundamental human needs, in which school gardens can play an important role.

Food solutions A better diet means, among other things, more fruit, vegetables and legumes, greater variety (especially in the hungry season), enriched complementary feeding for infants and young children, iodised salt, and clean safe water. These are not beyond the bounds of possibility for most families. Natural food solutions are cheap, create long-term dietary habits, put dietary control into the hands of the consumer, improve the local economy, and develop agriculture. They can all be demonstrated and practised through school gardens, and will have a real effect on diet provided that garden activities are reinforced by nutrition education and are carried through to healthy eating.

Models for home food gardens and home eating

A number of school garden projects have been successful in inspiring imitative home food gardens and good eating in the family. Some of the secrets of success are to respect local expertise, provide familiar produce, propose small acceptable changes, and show clear links to children's health and food preferences.

School meals Although the garden cannot feed the whole school, it can make a difference by contributing essential health-preserving fruit and vegetables, and sometimes poultry, meat or fish, to basic rations of cereals, legumes and oil. If the school is a model for home food gardens and home meals, a healthy diet can be extended beyond school hours and through the holidays. The educational



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Model gardens

A Malawi school garden / home garden project used school gardens to good effect: through demonstrations, cascade training, field days, demonstration plots, messages taken home by pupils, and discussion, the number of backyard gardens rose considerably.

Source: www.fao.org/docrep/010/a1432e/a1432e00.htm

potential is paramount: *learners, families, cooks, school staff and the community must make the connection between growing food and good eating, and the school garden must show this connection.*

Environment Garden activities have been shown to improve children's attitudes to the natural environment, especially with organic approaches which generate practical understanding of the environment and its ecosystems.

The food garden should be seen as only one part of the whole "school environment project" This would



The combination of nutrition education and vegetable gardening has a proven impact on diet.

include paths, rough ground, weed patches, water supply, ponds, environmental planting of decorative flowers, living fences, lawns, woodlots, shade trees and other amenities. Practical responses to the natural environment need to be reinforced in the core curriculum, with subjects such as biology and environmental science taking the garden as their laboratory and showcase.

Livelihood skills In agricultural societies, these are renewed and extended by practice in horticulture and small animal husbandry. Food processing and marketing can be practised by older learners, developing important entrepreneurial skills. Household skills such as food preserving, meal planning, nutrient-saving food preparation, food hygiene and energy-saving cooking are

re-examined and revalued, and build a base for food-related jobs (e.g. catering), as well as for good family living.

Education The crucial importance of education to remedy ignorance, mistaken attitudes, poor practices and skills gaps, is becoming clear through both success stories and failures. It is evident, for example, that in both rich and poor urban environments direct experience of food production is being lost. It is also the case that the majority of people (including the educated) simply do not recognize the connection between good diet and good health. Many mistaken social convictions about food values influence daily practices and can be tackled most directly through food education via garden produce.

Gardening and nutrition education: a winning combination Research suggests a strong synergy between gardening and nutrition education.

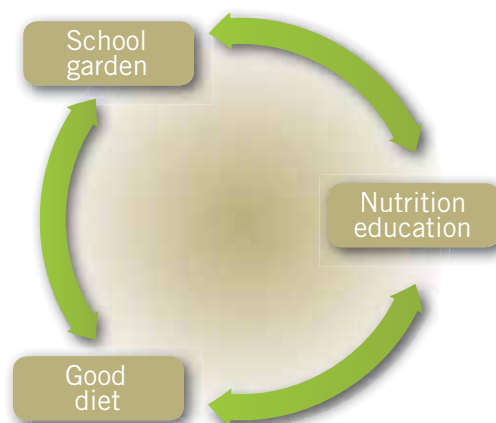
- There is growing evidence that food production alone makes little impact on dietary practices unless it is backed by nutrition education. Conversely, the combination of nutrition education and vegetable gardening has a proven impact on diet.

A learning opportunity missed

A major project successfully produced micronutrient-rich foods in the school garden and incorporated them in school meals. The project evaluation found that the children were eating better, but that neither they nor their parents knew it. What was lost here?



- In the same way, it has been frequently demonstrated that nutrition education which focuses only on knowledge seldom transfers to practice. On the other hand, direct gardening experience can increase children's preference for vegetables and demonstrably result in behavioural change.



Beliefs and attitudes which affect health negatively

- Meat is food for men.
- Fried chicken and chips is a super-meal, a luxury to aspire to.
- Indigenous vegetables and fruits are poor people's food, only to be eaten in hard times.
- Children do not like green leafy vegetables.
- It is shameful to take a sweet potato or maize cob to school as a snack.
- Imported or shop-bought foods are best.
- Girls must not eat eggs.
- Breastmilk must be supplemented with other foods as soon as possible.
- Young babies thrive on thin porridge alone.
- Cola is a status drink.
- The staple food is 'real food' and cannot be varied.



The new school garden

A model of the school garden is emerging which is more widely relevant to today's needs. Aiming at ecoliteracy, livelihoods, better eating, nutrition education and life skills, it prioritizes experiential education, integrates several subject areas, and extends its influence to the whole school, the family and the community.

Putting learning first

The first challenge is to establish the learning agenda.

Most existing gardens have both educational and non-educational objectives, and schools will not wish to give up the material benefits of income, food, improved diet, and environmental comfort. Many of these are also essential to educational goals since children cannot *learn* to grow food without actually growing food.

However, schoolchildren cannot realistically or ethically be expected to produce significant income, feed the entire school, or make a marked impact on their own health, just through school gardening. A first policy decision is therefore to *prioritize educational goals for children's garden activities*. Learning is

the business of schools, and only learning can help individuals to cope with future life, empower society to protect itself, and reduce dependence on aid.

Putting learning first raises some challenges. For example:

- Schools may find themselves torn between practical and educational objectives.
- Time is an issue: making garden activities fully educational doubles the time required.
- A place in the curriculum is generally seen as important to the success of a garden programme and to nutrition education, its essential companion. Yet the curriculum is always overcrowded and under pressure.

A multidisciplinary curriculum

Garden-based learning (GBL) is "an instructional strategy that utilizes the garden as a teaching tool" (Wikipedia). This wide definition covers everything from mathematics to art. But *food gardens have their own essential core curriculum*. What are its components?

The core learning agenda is common to both rich and poor communities, linked by their shared concerns for agriculture, the environment, health and livelihoods.



Gardens are the right place, sometimes the only place, to learn how to:

- cultivate food successfully;
- respect the environment in direct practice (e.g. conserving water, replacing trees);
- see the bond between gardening and good nutrition, and learn to grow a healthy diet;
- value fresh vegetables, fruits and legumes, including indigenous foods;
- store and preserve foods and prepare them safely;
- appreciate the links between diet and health;
- apply concepts of good diet and healthy lifestyle to one's own practices;
- resist junk food;
- market and sell food;
- explain and demonstrate one's learning and understanding to others.

This core learning agenda is common to both rich and poor communities, linked by their shared

concerns for agriculture, the environment, health and livelihoods. This makes for fruitful joint efforts and exchanges of experience and ideas.

How does this garden curriculum link to the mainstream curriculum?

- *At the core are the basic horticultural practices of the growing cycle.* If **Agriculture** is in the curriculum it will guide this programme. **Science** can be called on at all points to illuminate these practices and explore them experimentally.
- *Garden practices must respond to environmental concerns* and are therefore informed and guided at all points by **Environmental Studies**.
- If gardening is to have a real long-term effect on children's diets, then *nutritional needs must provide the overall rationale for garden activities*, governing decisions about what to plant and what to do with the produce. Educationally, garden activities should be framed, motivated, explained and extended by **Nutrition and Health Education**.
- If learners take on the marketing and sale of garden produce, **Business Studies** will also become relevant, generating decisions about what to grow and how to handle the produce.

Thus *the garden learning framework is multi-disciplinary*, bringing together several curriculum

Core subjects for the school garden



Goals and educational purposes

One conclusion of a workshop on garden-based learning held in Zimbabwe in 2007: "School gardens should be primarily for educational purposes. The garden should be linked to good nutrition, putting education first. The long-term goals ... should be food security and healthier lives for children and society. Other objectives ... should be income generation, practical life skills, and entrepreneurship. All these ... need to be balanced in a principled way."

Source: www.fao.org/docrep/010/a1432e/a1432e00.htm



Nutrition leads the way

“When the purpose of gardening is to increase micronutrient intake in the diet of vulnerable groups, nutrition and local food habits should be predominant considerations in the selection of crops.”

Source: Preventing micronutrient malnutrition. www.fao.org/docrep/x0245e/x0245e00.htm

areas (see the Garden Curriculum diagram on page 18). A single focus, for example on horticulture alone, sacrifices many learning possibilities, while without a nutrition education framework the primary meaning of the school food garden is lost.

Intersectoral responsibilities

At the policy level, *this multidisciplinary needs to be reflected in some intersectoral commitment*. Government initiatives tend to be housed in the Education Ministry, with support from Agriculture. Health and Nutrition services and environmental agencies should also be represented. NGO activities focusing on food production or horticulture also need to make sure that nutritional, educational and environmental aspects are not neglected. *The balance needs to be redressed, especially in favour of nutrition, nutrition education and the environment.*

The multidisciplinary view also underlines the need to build capacity across the board. It is not only children and teachers who must learn: nutritionists and agriculturists need to learn about education;

agriculturists need to learn about nutrition and nutritionists about agriculture; educators need to learn about both; everyone needs to learn about the teachers, the children and their families. *Time must be allowed for this.*

Partnership

NGOs, Junior Farmer Field and Life Schools, charities, and local organizations with relevant field experience have access to funds and often have considerable expertise, both technical and practical. There are also possibilities for partnership with commerce, industry and the media: for example, firms sponsor schools and garden competitions; companies train teachers; supermarkets buy school garden produce; universities include school garden prizes in their award ceremonies; radio and newspapers adapt farming programmes for schools and publicize school garden events and achievements.

The wider scene

A strong education focus can extend the impact of school gardens to other places and participants. Within the school, learning can move to informal settings such as the cafeteria, school kitchen, school snack stall or tuck shop. Other players have learning/teaching roles: cooks request nutritious ingredients for school meals, school boards formulate policy and

Food gardens have their own essential core curriculum.

Bringing sectors and partners together

- In South Africa, the National School Nutrition Programme (NSNP) within the Department of Education unites school gardens, school feeding and nutrition education.
- A garden-based learning project in the Bahamas is located in the Ministry of Education, which provides a curriculum specialist but has a project coordinator from Agriculture and a nutritionist seconded from the Health Ministry.
- In 2008, a large-scale initiative in Jamaica to resuscitate school gardens and improve school meals in collaboration with the 4H Clubs was spearheaded by the Ministry of Agriculture, supported by the Ministry of Education.
- The Ghana Organic School Project, which links school gardens and local organic farming to school meals, is mounted by Oxfam in collaboration with Farmer Field Schools and the Dutch AgroEco Foundation.
- The Growing Connection is a grassroots project developed by FAO which campaigns to introduce low-cost water-efficient food-growing innovations in school gardens and community gardens. It is supported by a coalition of private and public sector partners.



muster support, the Parent Teacher Association (PTA) discusses inputs and budget, school staff plan harvest festivals, caretakers advise on fencing and security, food vendors sell garden produce. An area cluster of schools can share experience and expert staff, and hold local competitions.

The semi-public position of the school garden in the 'community backyard' extends its educational value beyond the school. Visitors can see what is being done and learners can show off their learning. As the garden grows so does the confidence of learners, who can begin to promote its activities and

products and publicize its achievements through local media. The school garden can be shared with a community garden, so children and adults work side by side. Links can be made with local businesses, farmers and community organizations.

Often there is no need for extra resources: all that is needed is the time, the will, a fruitful concept, and a realistic idea of the practical possibilities. *However, schools must have the choice of where to start, what to undertake and how much to do. They also need ongoing help, support and encouragement.*



Garden learning

Effective garden learning entails an experiential learning approach linking action and understanding, a strong element of social learning to transfer learning into practice, and a dimension of personal development and life skills giving learners control over what they do.

Action and understanding

Traditionally, garden learning has been seen as open-air and hands-on, while nutrition education and environmental studies have been mainly confined to the classroom. This distinction has robbed all three learning areas of their potential. They can all benefit from the experiential learning cycle where action is backed by understanding and reflection, and understanding emerges from direct experience and is, in turn, translated into action. Gardens are particularly able to link abstract and concrete concepts, theory and practice, verbal and visual learning, reflection and action, behaviour and attitude, bringing learning to life and making it memorable. *In practical terms, a minimum requirement is that garden activities are supported by classroom lessons, and that classroom concepts of*

nutrition, the environment, and business are put into real-life practice in the garden.

Social learning

The social attitudes and practices that children bring to school are the real starting points for their learning. This is one reason why the ongoing dialogue between teachers and children and their families is so important.

Learning by doing

I hear and I forget
I see and I remember
I do and I understand

Attributed to the
philosopher
Confucius
(551–479 BC)

“It has indeed been demonstrated experimentally that ‘learning by doing’ can produce a much higher retention rate than ‘chalk and talk’, rising even higher when students also teach other students.” Source: Revisiting garden-based learning in basic education. www.fao.org/sd/erp/revisiting.pdf



The social attitudes and practices that children bring to school are the real starting points for their learning.

Learning opportunities found

- The school installs a water tank for rainwater harvesting: learners make observations and drawings and report at home.
- Surplus mangoes are juiced and sold by learners in the school snack stall. Learners keep accounts and produce a leaflet explaining the value of vitamin A.
- Learners make an analysis of school meals over two weeks and suggest improvements.
- Garden cabbages are infested by caterpillars: learners identify them, seek causes and try out remedies.
- Learners plant trees, tend them, and find out how to reduce their own 'carbon footprint'.

For example, here are some well-attested negative attitudes relating to school gardens:

- School gardens are designed to keep people in poorly-paid agricultural jobs.
- Garden work does not help to pass exams!
- Garden work is a punishment; it is not for enjoyment, learning or reward.
- Our children are being exploited.
- Home-grown vegetables are not valuable food.
- Gardening is dirty.
- Someone is creaming off the profits from the garden!

In this context, 'social learning', which deals with how behaviour and attitudes are learnt, is a useful educational model. It looks for ways to build motivation and self-efficacy, to link garden learning to personal goals, and to promote interaction with family and community. It calls on observation, direct experience, practice, examples and role models, socialization and discussion: elements to be found in

much successful garden learning. *Teacher educators and materials writers should have some experience of these approaches.*

Life skills and personal development

What matters is how learners will eventually use their skills and knowledge, whether this is to set up a home garden, use eco-friendly gardening methods, choose healthy snack foods, prepare better meals for siblings, or run a farm shop. The confidence and experience to undertake such real-life initiatives may require the development of life skills. Students must learn to make decisions about what to plant, as they do in Junior Farmer Field and Life Schools, to plan and manage the work and to make connections with their own plans and lifestyles. The increased responsibility, and improved relationships and collaboration consistently noted by garden organizers also help the garden to run itself and ease garden managers' lives. If learning is to multiply beyond the school, students also need to get the message out, which means being able to talk reasonably and persuasively about what they do. *Such life skills need to become overt educational objectives and be given practice and encouragement.*

From punishment to promise

"When I was at school they used to use the school garden as a punishment. Now I am opening a garden which will give you food, health and income."

– Dr Ebrahim Samba,
ex-director of the WHO for Africa, in a speech opening
a Telefood-funded school garden in the Gambia.
February 2009



The garden curriculum

The 'food cycle' model

In practice, the core garden curriculum is a process syllabus which runs naturally through the growing year, from PLAN to PLOT to POT to PARTY (see the Garden Curriculum diagram on page 18). Learners look at their diet and decide how to improve it; they choose what to grow; they learn how to plant, tend and harvest their crops with due respect for nature; they decide what to do with their harvest; they prepare it or preserve it; they distribute it, sell it or consume it; they evaluate what they have done; they celebrate their achievements and spread the word; they then start on the next growing cycle. Each part of the process is an education. This increasingly popular 'food cycle' curriculum model is suitable to countries at any stage of development.

Integrating garden activities into the curriculum

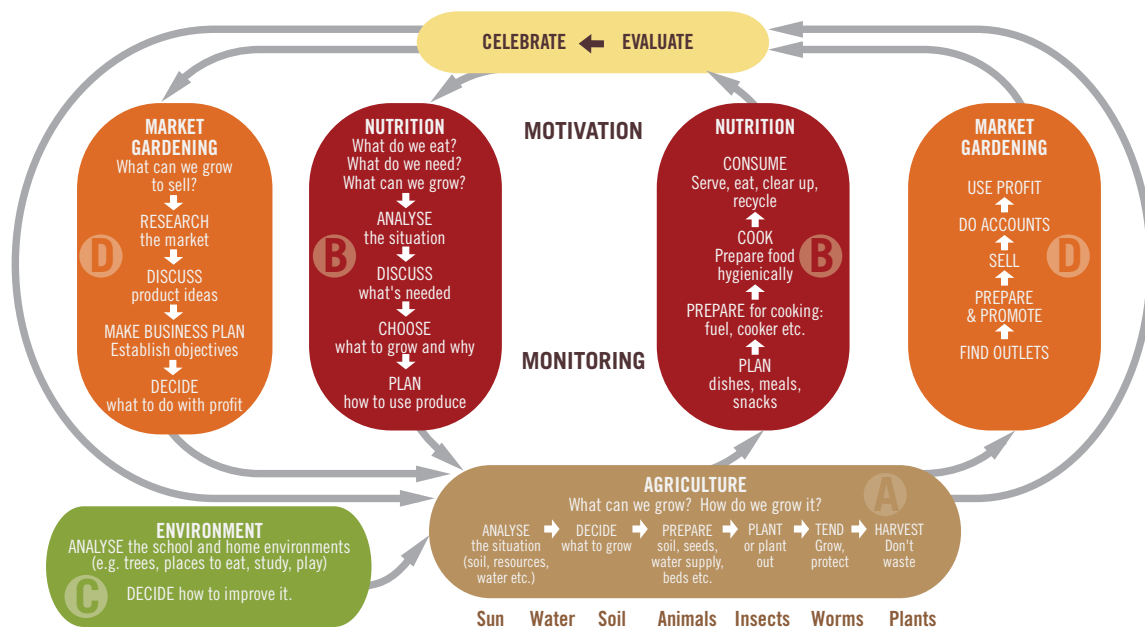
The above activities are four distinct but related programmes, each consisting of a sequence of practical activities and a series of back-up lessons.

A The core sequence of gardening activities consists of preparing the ground, growing and using the produce, evaluating the achievement, celebrating and planning the next round. Organic approaches and environmental protection are incorporated

in the activities. Back-up lessons, such as the FAO Teaching Toolkit, fit in with the garden calendar, dealing with information and concepts, demonstrations, work management, observation, recording, evaluation and publicity. www.fao.org/docrep/012/i1118e/i1118e00.htm

- B Growing food for better eating** frames the core gardening programme and provides its rationale. In lessons and practical activities, learners discuss dietary needs and food security, study indigenous local foods and their nutritional value, select crops, and plan snacks and meals for snack stalls, school meals or other school occasions. Once harvesting begins, there will be tasting sessions, preserving and food preparation, publicity and promotion, evaluation and celebration.
- C Improving the school environment** is a small high-profile project. Reviewing the school grounds, discussing options, taking action, and organizing publicity, also require a classroom component. 'School ground greening' projects in the USA have been well publicized; other countries need to share their achievements in beautifying schools and making them good 'habitats for learning'.
- D Market gardening** is a business studies project, suitable for older learners. Like healthy eating, it frames and guides garden activities. Classroom lessons and outreach activities include market

The school garden curriculum



research, developing product ideas, making business plans, keeping accounts, promoting and selling garden products.

These may all be promoted as extra-curricular activities, for example in after-school clubs and groups such as 4-H and the Cuban Youth Pioneers. Otherwise, various approaches have been adopted to integrate them into or link them with the core

curriculum. The result is often a mix of curricular and extra-curricular activities.

Growing food for better eating: some advice from FAO

- Make nutrition the main consideration in selecting crops.
- Aim to improve existing meals and snacks, rather than to introduce completely new ones.
- Start with a few micronutrient-rich foods, such as dark green leafy vegetables (the cheapest source of vitamin A), guava, mango, berries, orange-fleshed sweet potatoes. Foods with high fat content (e.g. peanuts, avocado, seeds) enhance absorption of vitamin A.
- Grow foods favoured by children (e.g. pumpkin, papaya).
- Choose hardy crops that need little time or knowledge to grow and process.
- Dry fruits and vegetables in the sun. They keep their food value for up to 6 months this way.
- Steam vegetables instead of boiling them.
- 'Hide' dark green leaves in sauces and soups to make them more acceptable to children.
- Involve learners in all of the processes described above.

- Garden activities may be incorporated into an existing subject area such as Science. In Lesotho and Uganda, Agriculture covers school gardens; in Zimbabwe, garden activities come under Environmental Studies in the lower grades; in Cuba, they are classed as Labour Education. Market gardening projects may also be associated with Business Studies.
- The garden may be treated as a subject in its own right with an appropriate timetable allocation, like the School Garden Scheme in Swaziland Basic Schools.
- Garden activities may claim space in several curriculum areas (e.g. Environmental Studies, Science, Home Economics, Health and Nutrition). This is the norm in the United States, where classroom time is also supplemented by extra-curricular activity. The garden is, of course, available as a resource and outdoor laboratory for other subjects, but some school subjects may contribute complete units to the core garden curriculum – for example, Biology, Environmental Studies, Business Studies, Home Economics, Health Education and Life Skills. *This can sometimes be negotiated at the level of the national curriculum.*

Assessment and certification

Assessment and certification are options to be considered. They bestow status on school gardens



Developing Innovations in School Cultivation (DISC), Uganda

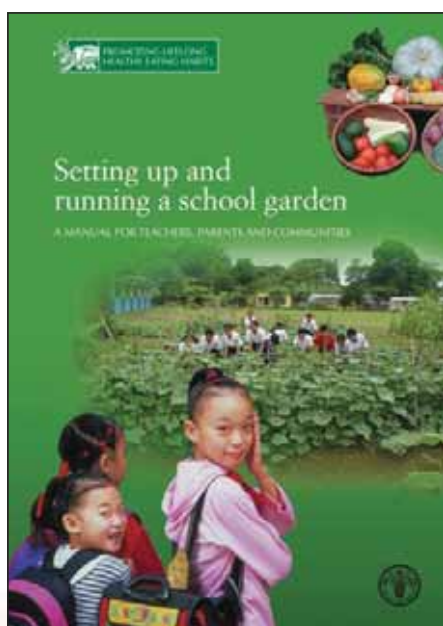
in the eyes of the school, parents and children, and can inspire hard work and pride. The disadvantages are that they can be expensive in human resources, limit the perceived values of the garden, generate anxiety, reduce the attraction of the garden for slower learners, over-individualize garden work, and be poorly constructed with a negative washback effect. Some ways of reducing the drawbacks are to:

- carry out assessment only in the last year of the programme, as with the Junior Master Gardener certificate in the USA;
- restrict assessment to secondary school studies, as with the Swaziland agriculture syllabus;
- offer a large number of small informal awards like the garden badges awarded by 4-H and the Boy Scouts;

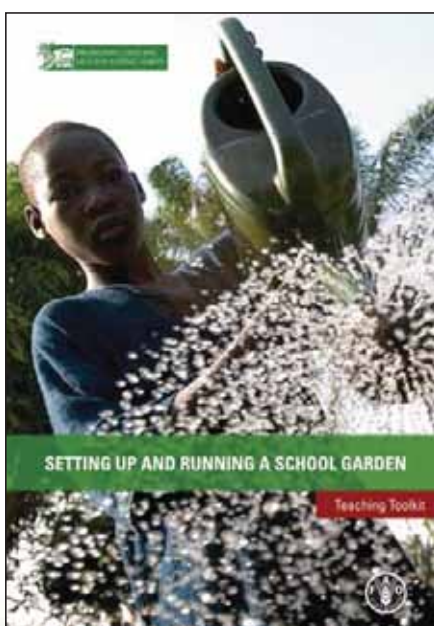
- make assessment more informal and less intimidating, e.g. by making it continuous, or optional, or entirely practical and oral;
- have certification issued by an external organization, e.g. a gardening association.

In-service teacher development

School garden learning, with its emphasis on learner independence and the educational use of a real-life environment, may require some re-skilling for teachers, just as the idea of integrating school food, nutrition education, environmental learning and food gardening may be a re-education for the school as a whole. However, in this interdisciplinary context, everyone is a novice in some respect and *there should be a policy of building up expertise gradually and associating it with success.*



The FAO School Garden Manual



The FAO School Garden Teaching Toolkit

Informal teacher development

can be encouraged in many ways. Manuals should deal not only with technical knowledge (horticultural or nutritional) but also with garden management, motivation and methodology, as in the FAO Manual *Setting up and running a school garden*. Lesson notes should expand teachers' knowledge and suggest easy, attractive approaches. Experienced gardeners should take on assistants and act as mentors. Schools



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A school garden competition: Toledo Primary School Gardens and Belizean Culture Contest

Participating schools must grow plants on their school compound. Points are given in 3 categories: Plants, Science and Culture.

A – PLANTS

Points are awarded for one or more of the following.

- 6 points for a plant that is native to Belize (e.g. calaloo, corn, pumpkin, pepper)
- 4 points for a plant that is not native, but plays an important role in Belize history (e.g. coconut)
- 2 points for a plant that is not native, but is commonly used today (e.g. cabbage)
- 1 point for a plant that is not commonly used, but could improve diets.

B – SCIENCE

Up to 6 points per plant. Research and display (reports, posters, etc) on 1. Where the plant comes from 2. How it grows 3. How to propagate the plant 4. What its needs are 5. What nutrition it provides 6. How to save its seeds.

C – CULTURE

Up to 6 points per plant for each culture. Research and display (reports, posters, physical displays, etc) on how any Belizean cultures have traditionally used and prepared this plant (Maya, Kriol, Garifuna, Mestizo, East Indian).

Source: Adapted from Plenty Belize newsletter, January 2010

need to be in touch with other schools, and tap into the professional expertise available in their districts (e.g. from agricultural stations, health centres, NGOs, farmers' associations and local farmers). In-service education programmes should have regular and interesting garden sessions.

At the formal level, recognized teacher certification builds capacity, while salary increments or career points for garden teachers raise the status of garden learning. Crash training courses may arouse enthusiasm and get people started, but they should be only the start of a longer educational process. An in-service 'Certificate in School Garden Management' should cover horticulture and organic approaches, environmental issues, nutrition and diet, garden planning and project management (including market gardening), community relations, life skills, project-based learning, development of learning materials, and evaluation of existing materials. The Master Gardener programme in the United States is beyond the resources of many countries, but the idea of calling on self-selecting garden enthusiasts to exchange consultancy services for further training may be worth adapting to local conditions.

Long-term support is required to build up networks among schools and agencies, maintain motivation and develop capacity. Some possibilities are traditional newsletters; informal mutual advice networks using



www.fao.org/schoolgarden/

SMS; annual school garden jamborees with talks and competitions; weekly items on radio programmes; media endorsements from national personalities; and web forums for exchanging experience, good practice, advice, information and educational materials.



Frameworks for innovation

Success depends on the attitudes, motivations and understanding of the school and community, and on their capacity to sustain the innovation. School garden programmes therefore need to be more facilitative than prescriptive, and projects must look beyond the activities and enthusiasm kindled by unsustainable funding. All garden promoters are faced with these questions: What forms of intervention will have lasting results? How long will they need to take effect? What can be done from above, and what needs to grow from the grass roots? What mix will work best in our situation?

A top-down programme

There is a strong case for national facilitation. Governments – alone or with the support of development partners and national associations – can encourage the garden movement by taking the lead in changing attitudes, enabling intersectoral collaboration at all levels, making funds available, developing the national curriculum, and promoting teacher development. A full government action programme is outlined below. The process itself can be a valuable learning experience for national institutions and for that reason alone may be worth considering.

1. **Establish an intersectoral initiative**, bringing together relevant ministries and key players.
2. **Designate a lead ministry/department and a development team.**
3. **Carry out a national situation analysis** looking at (for example): home gardens; local horticulture; nutrition perceptions; children's diet and nutritional status; existing school gardens; resources; stakeholder attitudes; curriculum; capacity; challenges and risks.
4. **Develop a policy, rationale and mission statement** outlining the priority functions and goals of school gardens, their environmental role and main educational purposes.
5. **Arrange infrastructure support for school gardens**, in particular:
 - *budgetary support* for land development (e.g. fencing, irrigation) and garden operation; advice for schools and local education authorities on funding possibilities;
 - *technical support* for programme planning and implementation (e.g. from health services, agricultural extension services, NGOs and farmers' organizations);
 - *appropriate intersectoral structures* and local partnerships at local/regional level.



Success depends on the attitudes, motivations and understanding of the school and community, and on their capacity to sustain the innovation.

6. **Establish and publish regulations and administrative guidelines** for (e.g.) budgeting, inventory, safety, child labour, administration, management and staffing.
7. **Develop an educational plan** which recognizes the garden curriculum and its essential links with nutrition and nutrition education, school food and environmental education, and ties it to national education standards.
8. **Develop educational materials**, including technical manuals; outlines of projects which will fit the school year; guidelines for individual school policy and practice involving community, families and local organizations; supporting lessons and educational aids.
9. **Provide for in-service training** of teachers, school cooks and community volunteers in nutrition, environmental protection and the management of school gardens. Establish certification and mentoring schemes. Develop pre-service teacher education.

10. **Create formal and informal incentives** for schools, teachers, communities and learners, and discuss the possibility of national school garden certificates or awards for schools.

11. **Develop an information/education/communication (IEC) strategy** to: involve schools and other stakeholders on a continuing basis; provide forums for discussion; spread information, promote campaigns and share ideas and best practices.

12. **Implement, monitor and evaluate the programme.** Gather feedback from schools, local education authorities and extension services, and make use of the data generated to revise policy, address problems and disseminate best practices.

A bottom-up approach

An alternative is a participatory bottom-up approach which aims to give local institutions, schools, their partners, teachers and learners some control and ownership. If successful, this approach can change attitudes, build capacity, become self-sustaining, and relieve national institutions of constant supervision. It has a good chance of engaging local support and interest, adapting to local circumstances, bringing out local talent, generating innovations and adjusting quantity and pace to what each school feels it can manage. There is also evidence that intersectoral collaboration is easier to achieve at local than at national level.

Such an approach consists of encouraging and aiding schools, individually or in groups, to go through (in simplified form) the same process of analysis, consultation, policy development, planning, implementation, monitoring and evaluation, as outlined above for the national level, so that they and other local stakeholders 'own the process'. Guidelines for this process can be developed within nationally established principles and frameworks. A programme for individual schools is outlined in the FAO manual *Setting up and running a school garden*, www.fao.org/docrep/009/a0218e/a0218e00.htm.



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Challenges and keys to success

Starting, reviving or reorienting school gardens may face conceptual, practical and social issues. School garden promoters will be able to identify their own and add to the list below. Both developed and developing countries have stressed the importance of:

- a positive image; perception of food gardens as a source of good health and learning;
- adequate inputs; sufficient land and water; good garden security; vacation maintenance;
- enough time, help, personnel, staff continuity;
- access to information, expertise, technical support and training;
- attention to attitudes, motivation and incentives; assessment or certification for children or for teachers;
- ownership, control, independence and encouragement for children in their learning;
- enthusiasm and expertise in school staff and garden managers;
- a platform for sharing experience and ideas; good publicity and promotion;
- a well-established, multi-functional role in the school's life, and continuing support from school management;
- community and family support; intersectoral collaboration;
- strong educational aims, and agreement about these aims;
- a hands-on 'food cycle' curriculum, including food preparation and consumption;
- timetable space and integration into the mainstream curriculum;
- educational links with school food, both meals and playground snacks;
- monitoring and evaluation; transparency in accounting.

This list illustrates the many facets of the situation, but problems and solutions will be specific to the context of each country, region or individual school. Discussion, observation, analysis and consultation are the entry points.

Sustainable and self-supporting: long-term success stories

It is not easy to choose what to imitate from the many models of school garden that exist around the world. Many projects disappear from public view after they are launched. Mistakes and failures which could be instructive are seldom published. There is a serious



lack of evaluation of the long-term impact of projects that may have had impressive initial results. Do these gardens still exist? Are they still productive?

Some of the most demonstrably successful initiatives are long-term ‘garden movements’, characterised by slow growth over a number of years, continuity of support, and gradually increasing involvement of the community.

They often take a holistic approach, integrating gardening, nutrition, school food, education and environmental concerns. With organic approaches, inputs are low, except where irrigation infrastructure is called for. Such schemes start small, taking little for granted in terms of capacity and interest. Schools opt in, inspired by other schools or motivated by small grants, choose their own pace and measure their own progress. In most cases the gardens are seen as important contributors to self-reliance and aim eventually to be self-supporting; schools ‘graduate’ when they no longer need help. There is a long-term coordinator or a coordinating group which helps with resources and promotes mutual support and exchange of experience and information.

Belize

The GATE programme organized by the NGO Plenty Belize has a long-term programme of assisting schools in developing organic school gardens. It links to school feeding and local agriculture, and is strongly consultative and participatory. Plenty Belize helps with resources, regular visits and teacher workshops. Schools opt into the scheme and ‘graduate’ once they become self-supporting. Over seven years, the number of schools grew from 4 initially to 36 in 2009, out of 50 in total. Some schools are now processing food with solar dryers and canning equipment, installing solar pumps and see-saw pumps. The Telefood Report 2005 described the scheme as “a working model worthy of replication”. See www.plenty.org/pb22_3/belize223.html

South Africa

The EduPlant programme, mounted by Food and Trees for Africa, funded by the Woolworths Trust and endorsed by the Department of Education, helps to develop school food gardens to alleviate malnutrition and promote environmental education and sustainable natural resource management. Children learn to grow fruit and vegetables, eat some of the produce and sell the rest to raise funds. Schools are supported for two years until they can manage on their own. EduPlant organizes workshops for educators, produces education materials, and runs an annual competition for learners’ projects. See www.trees.co.za

California

The ‘Garden in Every School’ programme, launched in 1995 by the California Department of Education, covers thousands of schools. The Department established an instructional programme, publicized best practices and set up a grant programme. The programme is firmly based on research evidence that school gardens are able to improve children’s health, eating habits and academic performance. It is linked to school meals and is supported by classroom nutrition education and environmental education. It also promotes collaboration with public and private agencies for agriculture, waste management and health.

See www.cde.ca.gov/Ls/nu/he/gardenoverview.asp

Uganda

In Uganda, agriculture is part of the primary school curriculum and there is extensive vegetable gardening in schools, some supported by the NGO Seeds for Africa. School communities appreciate these activities. In a survey community members listed some of the tangible benefits:

- Pupils learn agricultural skills for the future and will be able to earn a living.
- The school can sell its surplus to the community and reduce the cost of school meals.
- Pupils’ and teachers’ nutrition and health are improved.
- Children learn to appreciate the value of vegetables in a balanced diet.
- The school’s reputation is enhanced.
- Pupils get certificates in agriculture.
- The community gets seeds and seedlings and learns how to diversify traditional crops.

Useful resources for educators

Information, advice and best practices in gardening and school gardening.

Media

The Farm Radio International web site, with scripts, is at www.farmradio.org

Books and Manuals

FAO. 2001. *Improving nutrition through home gardening: a training package for preparing field workers in Africa*. Rome. Available at www.fao.org/DOCREP/003/X3996E/X3996E00.HTM

FAO. 2005. *Setting up and running a school garden: a manual for teachers, parents and communities*. Rome. Available at www.fao.org/docrep/009/a0218e/A0218E00.htm

FAO. 2010. A teaching toolkit for school gardens: companion to the manual *Setting up and running a school garden*. Rome. Available at www.fao.org/docrep/012/i1118e/i1118e00.htm.

Guy, L., Cromell, C., & Bradley, L.K. 1996. *Success with school gardens: how to create a learning oasis in the desert*. Arizona Master Gardeners Inc.

Burgess, A., Maina, G., Harris, P. & Harris S. 1998. *How to grow a balanced diet: a handbook for community workers*. London, VSO Books

Kemple, M. & Keiffer, J. 1998. *Digging deeper: integrating youth gardens into schools and communities*. Canada, Foodworks.

Grant, T. & Littlejohn, G. 2001. *Greening school grounds: creating habitats for learning*. Toronto, Green teacher. Reports and projects on improving the school environment.

Web sites

Kidsgardening

www.kidsgardening.com

One of the main American web sites. Many of its activities, ideas, stories and facts can be used anywhere. There are also summaries of research and a section on business.

FAO School Gardens

www.fao.org/schoolgarden

Contains descriptions of successful FAO projects, FAO materials on school gardens and links to other resources.

City Farmer

www.cityfarmer.org/schgard15.html

Much useful farming information and links to other organizations.

Why hunger?

www.whyhunger.org

A user-friendly site with news, information and links to many relevant organizations.

School Garden Weekly

www.schoolgardenweekly.com/resources

An American online magazine, which also gives links to most school garden organizations in the USA.

New needs, new roles

Governments and international development partners are increasingly interested in school gardens. These have traditionally been used for science education, agricultural training or generating school income. Today, given the urgent need for increased food security, environmental protection, more secure livelihoods and better nutrition, perceptions of the potential of school gardens are changing. Some roles which are gaining prominence are the promotion of good diet, the development of livelihood skills, and environmental awareness. The belief is that school gardens can become a seed ground for a nation's health and security; this idea is increasingly backed up by experience and research. The questions are: how much can be achieved, and how best to go about the task?



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