

# **Improving child nutrition and agricultural education through the promotion of School Garden Programs**

*First draft Concept Note on School Gardens*

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In 1998 in Zambia, while other children work nearby, a boy tills the soil in the garden at the Linda Community School outside the southern town of Livingstone.

Source: UNICEF: [http://www.unicefusa.org/s\\_africa/gallery06.html](http://www.unicefusa.org/s_africa/gallery06.html)

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## 1. Introduction

School gardens are cultivation areas or ‘school laboratories’ around or near to schools, and may include small scale animal husbandry and fishery, bee keeping, fruit tree planting, greening, ‘flowering’ and shading, sometimes also staple food production.

The renaissance of gardens, including school gardens and community gardens can currently be observed mainly in developed countries. While home and community gardens are widely accepted as being of great importance for food security, there is a broad skepticism of major donors towards school gardens. Nevertheless, there is reason to believe that the subject *can* provide agricultural knowledge and skills, and make the teaching of Science and Environmental Education more relevant and effective. It also *may* benefit pupils, and especially girls as the future food producers and provide some nutritional support to pupils (Riedmiller, 1994).

The promotion of school gardens aims towards different objectives, i.e.:

- **Educational objectives:** Giving pupils knowledge and skills for better agricultural productivity and sustainable agricultural practices, giving environmental education a sustainable and practical dimension, change attitudes towards agriculture and rural life, and increase school attendance;
- **Economic objectives:** Lowering the costs of schooling and school feeding and create income;
- **Nutritional objectives:** Improving food diversity to combat micro-nutrient deficiencies among school children and improve overall food security.

Under the drastically changed conditions of the African economies since the fifties, agriculture may become the only realistic occupation for the majority of the nowadays schoolchildren (Riedmiller, 1994), both in rural and urban areas. Employment in agriculture is, in fact, the most realistic job opportunity in most developing countries. Increasingly, urban youth is getting involved in food production in urban and peri-urban areas.

In Africa, at the elementary level, the study of agriculture is severely limited. In some instances, school gardens have been promoted, but in general agriculture is not taught as a subject at the elementary level. Rural students drop out of school at a very high rate. In many cases, as many as 90 percent do not go beyond elementary school. If they are to study agriculture in a school setting, it will have to be at the elementary level.

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## 2. Context

Most schools, both in urban and rural areas, have access to arable land that is not currently used to its full potential. At the same time, school students often suffer from inadequate nutrition, both in terms of amount and quality. An initiative to promote small-scale, community-based projects in support of school and hospital gardens could have a great impact on the food security of these vulnerable populations (FAO, 2002). In March of 2000, FAO began executing the "School gardens in support of the Special Programme for Food Security (SPFS)" project, which aims to increase production and consumption of horticultural food crops to improve diet and ensure food security to school children through the establishment of sustainable, low-input school gardens (UNICEF, 2000).

Ensuring a meal for children attending school, preferably in a sustainable way through the production of school gardens, improves the rate of school attendance, and therefore the right to education. It also enhances the level of nutrition of the children, and therefore the right to health. Thus fulfilling the right to food also facilitates the fulfilment of other rights (Diouf, 2002).

FAO (1997) states: “School-based gardening programmes can be an excellent means of introducing new ideas about gardening and a useful channel for reaching others in the community, as children tend to be more open than adults to the adoption of new ideas. School-based programmes can reduce micronutrient malnutrition and improve food security by”:

- promoting consumption of fruits and green leafy vegetables,
- teaching students how to establish and maintain home gardens,
- teaching students how to grow safe and without using pesticides
- introducing students to food preparation and storage techniques,
- providing nutrition information and encouraging adolescent girls to adopt more healthful dietary habits before their first pregnancy and
- enhancing the status of and students' interest in agriculture and nutrition as future occupations
- providing students with a tool for survival at times of food shortages

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## **2.1 Facts about school children and education in developing countries**

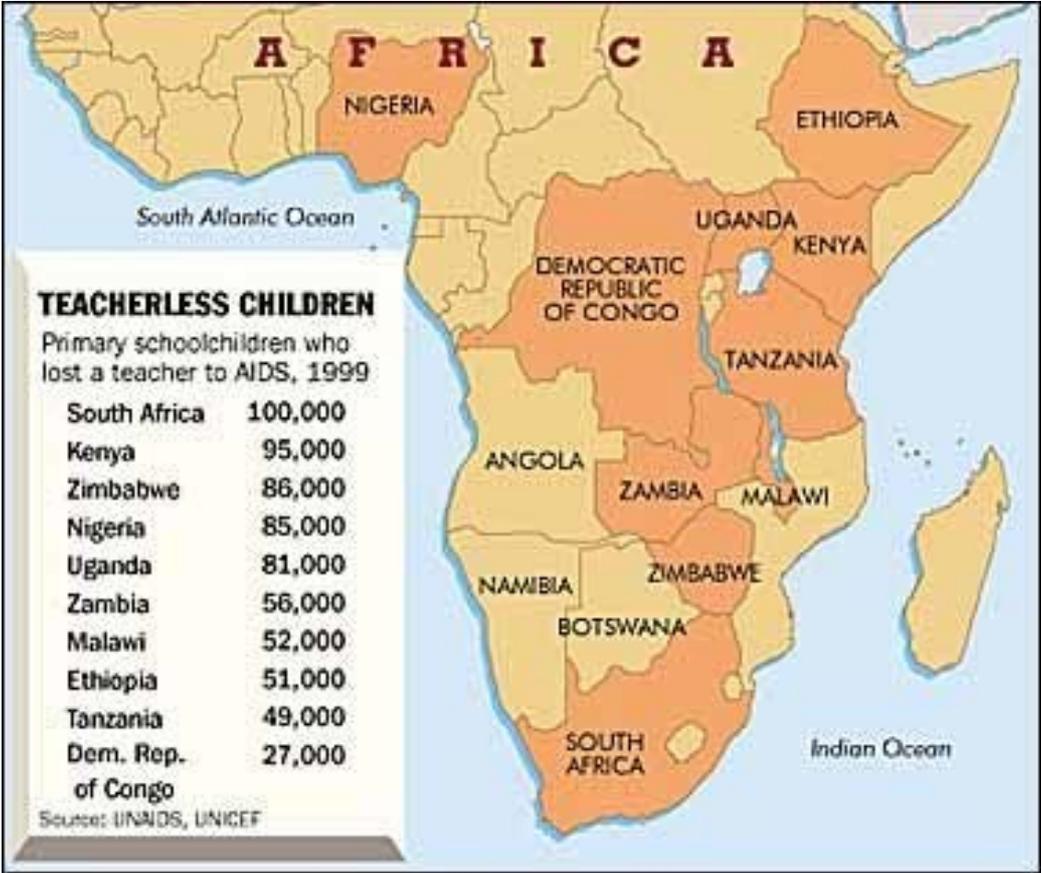
Under-nutrition is widespread among school children (particularly in South Asia and Africa), and their nutritional status often deteriorates during their school years (WFP, 2002). Iron deficiency anaemia (IDA) affects 10% - 48% of preschool and school-age children in developing countries (WHO-WPR, 1998). According to the UN (2002), cross-sectional data from large samples of school children in Ghana, Tanzania, India, Indonesia, and Viet Nam showed that:

- about 50% of children in all countries were stunted;
- in all countries height-for-age increasingly departed from reference values, especially among boys, indicating that children were becoming more stunted with age;
- in all countries more boys were classified as underweight than girls but this may be confounded by female drop-out from school;
- children in Tanzania and Ghana who enrolled late in school were more stunted than children who enrolled closer to the right age;
- there was little evidence for an adolescent growth spurt.

A survey of anaemia in 8 - 9 year old school children in those countries showed a wide range in the prevalence of anaemia from around 12% in Viet Nam to about 60% in Tanzania. These data show that the nutritional problems of school age children may be greater and more

widespread than previously thought, and indicate that school health and nutrition programmes have a clear potential to improve the nutrition and growth of school-age children (UN, 2002).

In *sub-Saharan Africa*, four out of every ten primary-age children in do not go to school according to a new report from UNESCO’s Institute for Statistics. Of those who do go to school, the report finds that only a small proportion reach a basic level of skills. Based on these figures, it is estimated that some 38-million primary-age children were out-of-school in sub-Saharan Africa in 1998, about 60 percent of them in the countries of Central and Western Africa. The data also show that many more boys than girls are enrolled in secondary schools across the region. In countries such as Benin, Chad, Guinea-Bissau and Togo, more than twice as many boys as girls attend secondary classes. There are however exceptions to this pattern with girls outnumbering boys in secondary schools in Botswana, Lesotho and Namibia. (UNESCO, 2002). HIV/AIDS affects dramatically the educational systems in sub-Saharan Africa, resulting in nearly one million teacherless children in 1999 (Figure1).



*Figure 1: Teacherless Primary School Children in Southern Africa (1999)*  
Source: *Christian Science Monitor* (2000), based on UNAIDS, UNICEF.

In West Africa, rural students drop out of school at a very high rate. In many cases, as many as 90 percent do not go beyond elementary school. If they are to study agriculture in a school setting, it will have to be at the elementary level. The farming population comes from rural youth and Africa's food security depends on those farmers. The school age population is expected to double in the 20 years between 1990 and 2010. Currently, average primary school

enrolment in the region is approximately 40 percent, and that low figure is compounded by a drop-out rate of 40 percent. The risk of increasing the current illiteracy rate of 70 percent seems very great indeed (FAO, 1996).

In **India**, Shramik Vidyapeeth (SV), an organization set up under the Ministry of Human Resource Development, promotes education for India's underprivileged groups. In Sri Nagar, SV's two 'classrooms' are dirt clearings shaded by trees. In one clearing, 60 students aged 8 to 14 sit cross-legged in tidy rows taking a test (UNICEF, 1996).

Across **Central Asia** enrolment in primary schools is falling. Before independence, the level of school attendance was almost 100 percent. Today, it is less than 70 percent in Tajikistan and around 80 percent in the rest of the region, according to data from the United Nations Children's Fund. Education experts say the decline in education in Central Asia is simply a part of larger socio-political and economic troubles facing the region. They believe that without fundamental reforms, improvements will not happen (Eshanova, 2002).

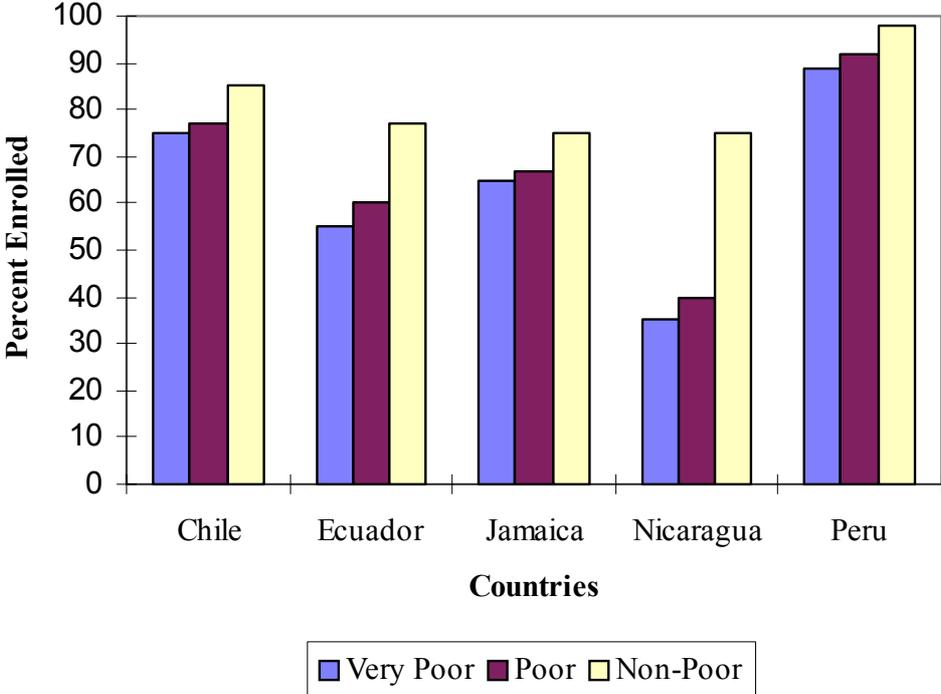


Figure 2: School Enrollment Rate for the 12–17 Age Group in Selected Countries, by Poverty Level

Source: Van der Gaag and Winkler (1996)

In the **LAC region**, an estimated 10 million pre-school children suffer from moderate to severe levels of malnutrition. The greatest incidence of child malnutrition in the region is found in a small number of countries with large populations. Brazil and Mexico together contain two-thirds of the malnourished children in the region, which is an estimated 6,000,000. Bolivia, Colombia, and Guatemala account for another significant share of the

region's malnourished children, which is an additional 1,750,000. Nutritional deficiencies and poor health in primary school children are frequent causes of poor enrolment, absenteeism, and early dropout. Malnutrition is also a serious detrimental factor against cognitive and educational achievement of school children. Its consequences vary from among such conditions as stunted growth, frequent and more severe illness, irreversible mental retardation, and different degrees of cognitive deficit. (World Bank/PHAO, 1998). School enrolment is lowest in the group of very poor families and presently extremely low in Nicaragua (Figure 2).

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### 3. The history of school garden programs

Historically, stakeholders with different priorities have developed school gardening along differing lines: in the North, *garden-based learning* is prevalent whereas in the South, *school-based production* has been the orientation. In a new initiative there is an opportunity to bridge the gap between these approaches in order to draw in broad-based multi-stakeholder support and build strong partnerships towards the ultimate aim of achieving greater and lasting impact on food security in needy regions.

***The objective of teaching gardening in the public schools are manifold. The primary aim, and the one with which the public schools of the Philippine Islands are most deeply concerned, is to bring about a higher standard of living by providing (1) a more abundant food supply; (2) a greater variety of food ; and (3) food of better quality.***

***(Government of the Philippine Islands 1929).***

School gardens have a long history going back in colonial times. Especially many missions had very successful, sustainable school garden programs. School gardens are also not new in the history of FAO. In 1957 FAO started a joint venture with UNICEF, the so-called: 'Applied Nutrition Projects', which aimed to better nutrition through school- and community gardens, poultry- and rabbit raising, with fish ponds in some projects (FAO, 1966). In 1966 the program was operational in over 40 countries. A number of publications on this program are available in FAO's library (see ANNEX 1). It is not clear why this program stopped in the middle of the 1970<sup>th</sup>, changes of political programs and priorities might be one reason (Riedmiller, 1994), failure of the effort another. Between 1983 and 1985, FAO carried out a school garden project in Southern Sudan (TCP/SUD/2315), to reduce malnutrition and infant mortality. The project managed to establish gardens in 73 schools (about 23% of all schools), and in 1985 good foundation has been laid to expand the project to other schools. The direct use of school gardens as resource centers for nutrition education of local mothers was a strategy endorsed by the centrally funded FAO/WHO/UNICEF joint Nutrition Support Programme (FAO, 1985).

### 3.1 Examples of Successful School Gardening Projects

#### *Brazil*

Likewise many other countries, Brazil has a long tradition of school gardens. For quite sometime, however, this tradition has been put in disuse for reasons ranging from lack of support by the authorities to a kind of prejudice against agricultural jobs by the children. More recently, there has been a re-birth of school gardens all around.

In Botucatu, a town of 110,000 people, 230 Km from São Paulo City, São Paulo State, the local Campus of the São Paulo State University/UNESP is dealing with a growing demand for both school and community based gardens. In the past, a system of grants allowed the allocation of students from the Faculty of Agricultural Sciences to give technical assistance to primary and secondary schools. Today, as an effort to rescue the program and answering to a demand by the children, there is a pilot scheme running in a voluntary basis in two state-owned schools. Two university students offer at least four hours per week labor, the schools give tools and land, and the University offers seeds, seedlings and support to the program. The University is now producing compost, which will be used in the beds. The vegetables produced enrich the daily meal given to the students at school. Every exceeding production is given to the student's families and to the schools' employees.

*Source: Rodrigues & Lopez-Real (1999)*



*Children in school vegetable garden tending lettuce in the Chimborazo area, Ecuador:  
Source: FAO/16299/G. Bizzarri*

### *Ecuador*

In one of the sandy street of Villa El Salvador lies a school for disabled students. From outside, it looks like any other school, its high gate blocking the unwanted visitor. Inside the walls, though, children are running between rows of lettuce, beets, carrots and broccoli, laughing and hugging their teachers. Their excitement is palpable as they harvest the little school garden they started less than a year ago. "We started by creating the beds," explains Ramiro Ramos, a 21-year-old student from the carpenter's workshop, who is deaf. His hands move quickly while the teacher translates from sign language. "Then we dug holes for the seeds and planted them, along with some fertilizer. Little by little, the plants started growing. Now they're ready to be eaten!"

*Source: FAO (2002b)*

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### *"New Schools of Colombia"*

A "kitchen garden" is a most common adjunct to the New Schools. Children commonly keep small gardens at home in which the parent, usually the father, assists in preparing the bed and planting, while the mother assists in managing the garden with the children, i.e. watering and harvesting. In spite of these gender differences at home, the boys and girls are insistent that at school they carry out all the same gardening tasks as one another. Another interesting feature of these gardens is that they are managed by all grades together, not separate gardens for different grades. There is a committee as with all projects. This committee, elected from all grade levels, takes special responsibility in planning the gardens and managing the work schedule. In addition to using food from the garden in the school restaurant, the students take produce to the market for sale. The treasurer for the garden committee handles the finances for this and all of the income is used for projects in the school.

*Source: UNICEF (2001)*

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### *The Philippines*

"...community gardening or gardening by private individuals who have the motivation should be seriously encouraged (with incentives) considered by city administrators as an efficient combination for urban agriculture such as allocating and subdividing suitable areas within the city limits to promote urban greening, improving social structures and be part of ready available food supply. The same is true for school gardening which can become an efficient way of educating early-on pupils in elementary school to grow fruits and vegetables, improving their eating habits and integrating such school gardening operations into family interactions for educating whole communities for food supply and healthy nutrition. Ninety six percent (75 out of 78) of public elementary schools in Cagayan de Oro maintain a school garden. This activity is pursued by pupils as part of the school curriculum and supervised by principals and teachers. The size allotted for garden ranges from 500 -1,000 square meters. The pupils usually plant leafy vegetables, fruits and ornamentals as well as herbal plants. In some schools, parents are involved in maintaining and safeguarding these gardens. School administrators adopted bio-intensive gardening, designed for pupils to learn urban agriculture in both formal and informal education approaches.

*Source: Holmer (2001)*

### *Africa and Asia*

The International Care & Relief's (ICR) Child Sponsorship Program (CSP) works with communities in Cambodia, Kenya, Thailand, the Philippines and Uganda to make primary education accessible to as many children as possible, helping with contributions to school fees, providing access to medical care or establishing vocational training. In each of the schools in which we work, school gardens are established using crops such as maize, coffee, bananas and cassava. The gardens serve as a rich source of agricultural training for pupils as well as providing a food source for the pupils and teachers. Produce sold from the gardens to provide an income for the school. A good harvest and stable market prices can potentially generate 150 £ for each CSP school. Some CSP schools are involved in pig and rabbit rearing, as well as dairy farming where possible. This provides invaluable training in animal husbandry.

*Source: Habari (2002)*

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### *Taiwan*

A model school garden project in Taiwan developed a 10 x 18 m school garden that provided half a cup of vegetables per day for each of 142 children throughout the school year, using indigenous plants. Each garden consisted of 12 raised beds that over the course of the year contained four or five vegetables. Garden produce provided an estimated 58% of the daily vitamin A requirement and 285% of the daily vitamin C requirement for a 10-year-old child.

*Source: FAO (1997a)*

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### *South Africa*

“But the absolute highlight of my visit to South Africa was a visit to Banareng Primary School in Atteridgeville Township in Pretoria. There I met an outstanding and inspirational head teacher – Pauline Sethole - who has almost single handedly turned around school attendance by creating an "edible curriculum" as she calls it. In this extremely poor area, the hot meal provided by the school – grown by the children in the school garden – is often the only meal they get”.

*Source: Comment of the Scottish First Minister Jack McConnell to his visit to the Johannesburg Summit 2002*

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### *Senegal*

“In 1993, our school, Louly Bentegne in the Department of M’Bour, Senegal, started its first garden project. We wanted to make sure that both students and teachers were involved, that the garden would be included in school lessons, and that we created a team of people to manage, tend to, and monitor the garden. Our school took into consideration the available local resources, which are mostly based on agriculture and livestock. The population in our area is very poor, because of poor soil quality due to over-use, and several years of drought. By creating an educational gardening project in the school that would involve the whole community, everyone would benefit. Our school decided to raise cows, to create an organic garden, and to reforest the area. Parents, students, teachers, and other people helped build stables, buy a few cows, build a compost site, create a plant nursery, and plant an organic vegetable garden”.

*Source: Djibril (2002)*

### 3.2 Critical voices

When first introduced, it was hoped that gardens would not only serve as a practical means of farming and nutrition information, but would provide schools with extra income and food. Unfortunately, as reported by CRS (1996) “gardens have rarely been successful, either in providing children with nutrition education, or in generating sufficient food or income for schools. This is true for a number of reasons. First, schools rarely have access to sufficient land, tools or labor to produce the quantity of food necessary. Second, gardens are subject to abuse by teachers or other school officials, who may ask children to work long hours instead of spending time in the classroom, then sell or steal produce for their own gain. Third, nutrition education is rarely included in the daily curriculum. Although school gardens have generally not been successful, there have been cases where, due to sound management, gardens have proved useful both in generating supplemental food and income and in providing a basis for educational activities” (CRS, 1996). The key question to be asked here is: What is meant with sound management? Unfortunately most of the reports available do not explain in detail why efforts to establish school gardens failed, and what lessons can be learned from these experiences.

Past experience shows failures of school gardens also in West Africa. To help assess the value of continuing WFP support for school canteen programs in West Africa, four country assessments - Mauritania, Gambia, Cape Verde, Niger - were undertaken. The report states that finally, vegetable gardens have not significantly contributed to School Feeding Programmes (SFPs). Also in the Gambia, an effort was made to produce local foods in school gardens as a way to increase supplies, however, these efforts have not been wholly successful, the same report states (PCD, 1999).

In the United States, in 1995, California's State School Superintendent mandated "a garden in every school" to create opportunities for children to discover fresh food, make healthier food choices, and become better nourished. But after the initial “burst of enthusiasm, gardens would often languish and die because they had not become an integral part of the curriculum” (Environmental News Network, 2001).

A number of countries include an introduction to agriculture at the primary school level, particularly in English-speaking Africa. The practice of school gardens is widely practised in rural areas, but generally without technical support from extension officers or agriculturally trained teachers. This fragmentary approach is rarely sufficient because of a lack of resources and the inadequate training of teachers. It also does not meet the full need for a 'ruralization' of basic education in those countries or areas where there is a large rural population that has different educational needs from those of urban residents (FAO, 1997).

“In the reality of most rural schools, economic concern often counteracts the basic pedagogical objectives, as the poorly paid and unmotivated teachers are tempted to use the proceeds of the school farm as an additional income for themselves. This situation, coupled with an authoritarian school climate where pupils have no participation in the management of their produce, easily generates a teacher pupil relationship of mutual mistrust and resentment, where pupils feel exploited as cheap labour for the teachers' benefit” (Riedmiller, 1994).

FAO (1985) reports of project failures in Southern Sudan, due to school staff transfers, and therefore recommended not to transfer staff responsible for gardening programmes. Often

funding difficulties; management problems; and lack of access to relevant technical advice endanger the success of school gardens programs (FAO, 2000a).

The lack of water is reported to be a major constraint for example in semi-arid areas of the Senegal. As UNU (1980) reports, school canteens were conceived of in combination with school gardens; i.e., the gardens were to provide an opportunity for training the children to grow vegetables, which, in turn, would be used in the school lunch. The idea was very appealing, but those who planned did not realize that lack of water is a very serious problem, and the school gardens were doomed to failure from the start. During this mission, school gardens were not seen anymore, although gardening tools were still available in some schools (UNU, 1980).

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#### **4. Key partners in the development of a school garden program and their involvement**

School garden programmes have been promoted by various actors (UN, International agencies, NGO's, churches etc.) over the years.

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##### **4.1 FAO Departments and their activities**

The key-players in current school gardens activities in-house are SPFS/TeleFood, SDRE (extension and education, linked in the FAO/UNESCO flagship "Education for Rural People"), AGPC (seeds, IPP methods, crop selection, small scale horticulture, micro gardens, hydroponics), and AGPP (IPM, farmers field schools). Forestry is involved in school tree-planting projects, an important environmental education function for numerous school group projects over the years, for example in Ecuador (FAO, 1997b). In the Thad and Nigeria, the Forestry Department supports schools in maintaining trees nurseries to be used for shading, fencing and for home gardens (GCP/CHD7024/n3t and NER/89/004).

TeleFood supports school gardens and school orchards in Cap Verde, Burundi, Jamaica, Lebanon, Brazil, Armenia, Mongolia, India, Uganda and Namibia (FAO, 2002).

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##### **4.2 Other UN Agencies**

Outside FAO, the WFP School Feeding Program, IFPRI, the International Center for Child Health, the World Bank (pre-school activities), UNICEF (clean water, tools and inputs for school gardens, funds for writers' workshops on teaching material for agriculture, health and nutrition under the "*Child Survival and Development Programme*"), and the United Nations University are, among others, involved in school programs.

In a first meeting with the Director and staff of the WFP School Feeding Program, first attempt was made on how a co-operation between WFP "School Feeding" and FAO 'school gardens' can be established.

The UNESCO *Associated School Project Network* (ASPnet), launched in 1953 is a worldwide network of schools of children, young people and teachers to actively strive to promote valuable themes such as human rights, peace, intercultural dialogue, nature conservation and cultural preservation. Schools participating in the network include all levels: nursery, primary, secondary, technical and vocational and teacher-training institutions. More than 5000 schools and 154 countries belong to the network. Through experimental and often innovative initiatives, ASPnet endeavours to bridge the gap between what is taught in the classroom and what is happening in the world today. The development of participatory teaching methods and innovative didactic material and their introduction in curricula are the long-term key objectives of the ASPnet (UNESCO, 2001).

The World Health Organization (WHO) promotes school gardens within its “*Health Promoting School program*” in cooperation with Caritas and other organizations, school gardens are promoted for example for HIV/AIDS orphans (WHO, 1998).

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#### **4.3 Inter-institutional Linkages**

The *Partnership for Child Development (PCD)* was established in 1992 to help co-ordinate global efforts to assess the developmental burden of ill health and poor nutrition at school age. It brings together a consortium of countries, donor organisations and centres of academic excellence to design and test strategies to improve the health and education of school-age children. The Partnership has international agency support from UNDP, WHO, UNICEF, The World Bank and British DFID, and is sustained through support from participating governments, the Rockefeller, Edna McConnell Clark and James S McDonnell Foundations and the Wellcome Trust. One of the tasks of the program is to examine the content, coverage, effectiveness and cost of school feeding programmes and school gardens (PCD, 1999).

One of the aims of the FAO/UNESCO-program “*Education for Rural People*” is expanding access to education and improving school attendance in rural areas by promoting or supporting, for example, initiatives that aim at improving children's health and capacity to learn. These include: school canteens and gardens; information and communication technology; distance education; education of rural girls and women; life long education; skills for life in a rural environment; and flexible school calendars to accommodate the needs of local productive cycles (FAO, 2002). Education is the major focus of the program.

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#### **4.4 Non FAO Institutions, some examples of their focus and activities**

The *Government of The Netherlands*, in cooperation with *UNDP* supports a project for Income Generation in Movsesgegh School in Armenia. The sub-project of Income Generation is aimed to support the rehabilitated rural schools to generate income to partially cover operations and maintenance costs, and to supplement the alimentation of pupils through the establishment of school gardens. The direct beneficiaries of the sub-project are 500 students and 30 teachers of the school, as well as the population of the community, around 2,000 people.

The sub-project was implemented in a framework of an agreement with the school authorities whereby commitment of both parties are set with regard to implementation of the activities and the commitment of the school to continue once the sub-project is completed. The activities of the project included commercial agricultural production (provision of seeds, fertilizers and other agricultural inputs, provision of irrigation system on 6ha, cultivation activities, provision of agricultural services and technical assistance, commercial activities); school garden exploitation; agricultural training, management training (UNDP-Armenia, 2002).

*Caritas Australia* supports school gardens in East Timor. This is one central element of the agricultural development program. Caritas Australia is providing seeds and tools for the school gardens. The project aims to teach children sustainable agricultural techniques and to introduce environmental conservation and restoration concepts to the children. The school garden is an important educational and recreational activity for the children. They have planted tomato, eggplant, onion, garlic and mustard in the garden. The produce from the school gardens will either be used to supplement the children's diets, or will be sold to provide funds to buy books and furniture for the schools (Caritas Australia, 2002).

In *Tunisia* the school garden program is a new program to be implemented in partnership between the Ministry of Environment and Land Use Planning and the Ministry of Education, with participation from NGO's. This program is aimed at promoting environmental education and focuses on education for sustainability. Here this activity is seen as part of the implementation of the local agenda 21 (Republic of Tunisia, 2001).

In *Jamaica*, the School Feeding Unit encourages and supports school gardens, which supplement school canteens. To this end there is collaboration with the Ministry of Agriculture/RADA to resuscitate old school gardens and establish new ones (Government of Jamaica, 2001).

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## 5 Linking school feeding programs with school gardens

*A school garden, farm or fish pond project cannot be started as an isolated entity. It has to be coordinated with the food and nutrition education provided in the class room, complement the school feeding programme, and be based on a good knowledge of cultural and socio-economic situations of the population around the world*

(FAO, 1974)

Historically, in 1790 a combined program of teaching and feeding hungry, vagrant children was begun in Munich, Germany. Privately funded societies for the special purpose of school feeding were organized later, the Society for Feeding Needy School Children at Dresden in 1880 being one of the first. Paris began school canteens in 1877, providing meals at public expense for children whose parents' names were on the Poor Board list (Gunderson, no year). Although the cost effectiveness of school feeding interventions in terms of improving the nutritional status of children in the long term has been increasingly discussed, it is widely accepted that school feeding

is a powerful tool to alleviate short-term hunger, prevent drop-out, and strengthen community involvement in schools (World Bank/PHAO, 1998).

Local communities can participate in school feeding programs and help cut costs by assuming the responsibility for food preparation and delivery. They also can often provide some of the food itself. Raising money through the sale of food grown in school or community gardens may be another route to making school feeding programs more affordable (Del Rosso and Marek, 1996).

According to Del Rosso and Marek (1996), several actions can boost the educational and nutritional value of school feeding programs:

- Provide the meal or snack early in the school day. The goal is to eliminate hunger so the children are more attentive in class.
- Provide the caloric quantity in each ration necessary to meet the actual needs of the children and fill the micronutrient gaps of their diet. As a general rule, feeding programs should provide from one-third to one-half of the recommended daily calorie intake of a school-age child, based on the assumption that it replaces one or two of the three daily meals.
- Offer other school-based health and nutrition interventions in addition to food. Treating children for parasites, for example, can improve both their appetites and the nutritional benefit of the food ration. Nutrition and health education aimed at improving nutrition and health practices also enhance the benefits of school feeding.

### ***Report from Uganda***

- Studies show that only 26% of day schools have feeding programmes. In most schools the majority of school children go without a meal between 7.00 a.m. and 6.00 pm.
- Boarding schools have feeding programmes but the meals are monotonous, poor in quality and quantity, with little or no provision for animal protein, and fruits.
- Most schools do not have school garden/farms for experimental and illustration purposes
- Poor handling of food is a common feature among school feeding programmes. Food which is not hygienically prepared, stored and served can be a source of health problems.
- The majority of school children particularly rural children are malnourished and anaemic.
- The majority School children are not provided with shoes or some sort of protective footwear. As a result school children harbour heavy loads of intestinal worms which compete for the little food available in their bodies
- Schools particularly boarding institutions have dinning facilities but they are inadequate due to overcrowding in schools, as a result children eat under trees, dormitories and classrooms

*Source: Rep. of Uganda (2002)*

School gardening is considered as an important complement to school feeding programmes. Generally, school feeding programmes do not provide fresh, perishable vegetables and fruits, but rather staple, dried, and canned food. Both the learning process and the production function should receive due attention. To have an impact on micronutrient malnutrition, gardening projects must lead to increased consumption of micronutrient-rich foods. A nutrition education component should therefore be linked to such projects. For gardening projects to be sustainable, participants in the projects need to be able to sell some of their produce and save part of this money to cover future expenses (FAO, 1997)

Indeed attempts to link feeding and gardening programs have already been made. The UNESCO-ASP supports school gardens for example in Burkina Faso. Through a gardening programme at school, pupils are growing vegetables and maintaining a fruit orchard. A portion of the produce goes to improving the diet of the school lunches while the other portion is sold. The proceeds from the sale of these fruits and vegetables go to purchasing stationary and other collective classroom materials for the school (UNESCO, 2001).

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## 6. Institutional aspects

Past attempts to establish school gardens did not sufficiently take into consideration the importance of the institutional consolidation of school garden programs. Institutionalisation of school gardens seems key to sustainability of these programs. Sustainability means independence from long term external inputs, participation of all stakeholders (the ‘actors’: teachers, pupils, parents, and the ‘administrators’: school Administration, Ministries of Agriculture, Education, Health, Funding Agencies etc.). The possibility for the establishment of school garden programs will depend on the existence of national policies that support school gardens in a country and enable the development and/or implementation of a ‘garden curriculum’ in schools.

Where pupils were not involved in the planning and management of projects and where they do not share directly in either the produce or the profits of the project, their rejection of the work will be quicker (Gardner, 1985 in Riedmiller, 1994). For example: Female students had significantly more positive attitudes towards school at the conclusion of the garden program compared to males. In addition, children’s attitudes toward school were more positive in schools that offered more intensive individualized gardening (Waliczek et al., 2001).

***Pre-requisite for the establishment of school gardens programs is the existence of national policies that support school gardens in a country and enable the development and/or implementation of a ‘garden curriculum’ in schools***

The role of teachers as agricultural extensionists is controversially discussed in literature (Riedmiller 1994). Also the role of parents needs to be taken more into consideration. Establishment of school gardens without the involvement of parents creates tensions within the communities. Parents want their children to learn to read and write, and “ruralization” of the school curriculum is often rejected. The support for *parent-teacher-associations* is one way to avoid these conflicts and to work rather through the people than through the teachers. This community participation might help to overcome the well known problem of project failures due to school

vacations. Another major challenge will be to bridge the gap between garden based learning and school based production.



Source: FAO (2002)

*A proud student stacks newly harvested vegetables on a table for display*

Key elements of the institutionalisation are, according to FAO (2002):

- support from the political decision makers and government bureaucracy
- a vision and arrangements on how school garden initiatives fit into the country overall education strategies
- a plan for financial, physical and pedagogical sustainability
- democracy and consensus building (children engaged in planning, managing and monitoring the program)
- gender equity (boys and girls work together)
- children and adults work together
- tying the garden to the curriculum implemented through grade levels
- the development of appropriate teaching material
- teacher training
- training of school inspectors and extension personnel to assist teachers

Open questions regarding institutionalization are, for example, if and how the private sector could be involved in school gardens programs and what role NGOs could play. Public private partnerships need to be more explored. One option how to incorporate NGOs would be to link school gardens with NGO driven community gardens. Many such examples do exist. Women clubs or associations running vegetable gardens are perfect groups to be approached. Women with experience in gardening can take over part of the teachers role and might have some profit of the garden produce and/or the production output in general.

The institutional context of school gardens needs to be defined, and the charging of (usually over-burdened) school teachers with extra training and supervisory responsibilities needs to be carefully assessed against other possibilities involving the community and NGOs.

The modus operandi for a school garden programme needs to be defined within the realities of the local context and models should remain flexible, taking into consideration the involvement of local partners, eventually with incentives through food aid and other programmes. This implies the need to assess and eventually adopt locally available training materials to include more awareness for good agricultural practices (GAP).

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## 6.1 Linking schools with communities

*Without community involvement school garden projects will not be successful*

In Colombia, a novelty of the New School movement is the “school council”, providing practical introduction to civic and democratic life. It is made up of committees which look after the school garden, health matters, the library, discipline and sports, and encourages co-operation and leadership based on the interests and daily lives of the children.

The La Niña school has a farming committee which organizes crop growing and animal breeding. “What we want is to feel proud of being country people and to learn how to use the land in a more productive way,” says 13-year-old committee chairman David Cabal. Other principles of the New School movement are that teaching must be adapted to local conditions and lifestyles. Parents and other members of the community regularly take part in school activities, improving buildings and equipment, donating teaching materials and helping teachers during lessons. In addition, they encourage the children to be interested in their own history and traditions. The guides suggest collecting proverbs, myths, legends and accounts of how people used to live. In this way, the school becomes a living source of knowledge about the community (UNESCO, 1999)

The role of parents and teachers in the successful conduct of the school lunch programme is vital. Each teacher should evince a genuine interest in the health of his pupils. He should not be satisfied with mere serving of meals to the children but he should pay equal attention towards improving their nutritional knowledge and inculcating good food habits. Special efforts should be taken by the teachers in maintaining a profitable school garden. They should also participate in gardening work along with the children to encourage them. Children feel extremely proud and happy when the produce of their effort in the school garden is utilized for their lunch itself. Gardening also gives the group work experience, enjoyment in the outcome of the work done and knowledge in agriculture and nutrition (Government of India, 1995).

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## 7. Key elements of school garden programs

### 7.1 Food production

*There is a broad based consensus within FAO Departments to view the role of schools as being first ‘education’ and secondly ‘production’ oriented.*

The potential for food production in school gardens was often overemphasized in the past. The school farm will normally supply requirements only for a number of months or even weeks. But even this limited seasonal school lunch (or take home ration) may, if properly managed, have an impact on pupils' nutrition, and, maybe more importantly, on their motivation for primary school agriculture (Riedmiller, 1994). This statement of course depends on many factors, most importantly climatic conditions and access to water. In the seasonal tropics

access to water is limited by natural rainfall pattern. Simple adapted irrigation methods could help to overcome this shortfall. In the wet tropics production depends on proper management of plots and year round attendance by someone responsible.

The technical aspects of food production have been illustrated in many guides and handbooks, and therefore a broad variety of school gardens guides and handbooks is already available, one of the first might be the FAO/UNICEF manual on school gardens from 1964 (FAO/UNICEF, 1964), followed by a Handbook for school gardening in West Africa (FAO, 1969) and guidelines for school and kitchen gardens for India (FAO, 1970). The technical

***“The use of school gardens in supplying food, must however not be exaggerated. Children of school age should not be expected to produce all their food, neither could they be expected to produce all their needs of fruits and vegetables from the school gardens”***

*Source: FAO (1966)*

problems do not seem to be major and crop failures are part of the experience of each farmers life that can be learned within school. Technical limitations to production are lack of primary and secondary assets such as land, water, seeds, tools etc. but also time constraints and holiday breaks. The type of crops that were produced did in the past not always correspond with the pupils food preferences. Another factor which hampers production is theft, which is frequently reported from many countries. But generally spoken, the greatest thread to production is the institutional setting of the programme.

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## 7.2 Nutrition

Monitoring findings over five years in about 300 schools in Tanga Region, Tanzania, where Primary School Agriculture was introduced, have given evidence that, whenever pupils were allowed to decide on the use of crops harvested from the school farm, they nearly always opted for direct consumption through school lunch. Where the school management arranged for school lunch, this decision was highly popular with pupils and parents and contributed to higher school attendance (Riedmiller, 1994). Conclusions for a school garden project in Sri Lanka states: “greater than 50% of the protein needs of children aged 4-9 could be satisfied by this garden. The ultimate objective would be to have school gardens as a means of locally and cheaply increasing the availability of vitamins and minerals in the school’s community” (Kailasaphathy, 1988).

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## 7.3 Education

The ‘School Garden Curriculum’ needs among other subjects to include food preservation techniques, IPM and natural pest control mechanisms, composting, natural resource management, recycling and composting, and environmental awareness raising, especially in urban areas. No toxic pesticides should be allowed and used in school gardens. Using AGPCs

IPP methods would be one alternative. Urban and peri-urban school gardens can strengthen rural – urban linkages and transport information to both areas. A choice of simple technologies for the implementation of gardens specifically in urban and peri-urban areas is available at FAO (FAO, 2001). High concentration of schools in urban and peri-urban areas enables quick access, reduces transport costs for extension services and facilitates school networks and twinning projects.

School curricula need to be demand driven, locally adapted and of practical use (one example is the AGPP project in Thailand for rice cultivation, which includes school teaching). There is a need to develop and include marketing and agro-business into curricula. Agriculture will only be of interest as a subject to study, if income opportunities are more clearly emphasized on. In fact, taken the bitter reality of HIV into consideration, learning how to produce food can orphans help to survive. In this context school based practical agricultural education can be considered as a tool for livelihood security. Environmental education can easily be linked with school garden programs, the manifold environmental aspects of small scale production units are well documented in literature.

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#### **7.4 Financial support**

Experience has shown, that large scale school garden projects tend to collapse as soon as donors pull out. In view of sustainability and as a consequence, small scale projects should be aimed to. But still this is no guarantee for success. There are several models for financial support for school gardens:

- gardens as integrated part of the school budget (as other teaching subjects are),
- the establishment of self-financing structures (like market production)
- parents contribution (cash or kind)
- arrangements with private sector and NGOs

To achieve the involvement of NGOs might require an initial incentive (seed money) to enable operation, but could eventually be organized self sustaining by allowing this respective organization to market part of the produce. Further elaboration of these possibilities are needed. In some countries, for example now in Zimbabwe and Argentina, the price levels of foods keep on going up due to inflation, scarcity, seasonal availability and demands. According to the fluctuations in price levels, school lunch menus need to be planned, choosing wisely foods which are less expensive and easily available. The food expenditure can be reduced, considerably if easily growing green leafy vegetables, drumstick, papaya, guava, gooseberry and other foods can be cultivated in the school garden and included in the lunch. Additional proteins can be obtained through small scale animal husbandry and fish ponds. This will also help to improve the quality of the diet (Government of India, 1995). Especially in urban and peri-urban areas organic waste from central markets could most efficiently support animal feed in schools. This would be of mutual benefit for both the market management and the schools.

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## 8. Implementation and multiplier effects

Many teachers nowadays might not have any skills in gardening, animal husbandry or fish ponds anymore. There is therefore a need to train teachers in these subjects. Farmers Field Schools (FFS) could play an important role here, because their program is oriented towards adult education and not for children. Working with and through NGOs, farmers field schools, farmers associations and cooperatives seems to be a more promising way of operation, than past approaches through government extension services. Observations during the past FAO/UNESCO program showed a clear multiplier effect of school gardens on the establishment of home gardens. An average of 10 home gardens can be the positive result of one school garden (FAO, 1974). Other experience, however reports of very limited spread effects of school farms in Cameroon, due to poor outlook, choice of unpopular crops, and use of unfamiliar farming techniques (Riedmiller, 1994). Diversification and modernization of school garden programmes could enhance technology transfer from schools to homes.

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### 8.1 Diversification and modernization of school garden programmes

- Taking into consideration the great variety of different levels of malnutrition, technology development and possibilities to apply modern technologies, climatic variations that determine seasonality and cultivation options in the different regions of the world, there is no single concept for the design of school gardens. In some semi-arid and arid regions best option for school production might be small animal husbandry (sheep, goats, poultry) while in others seasonal growing of vegetables is best adapted. In the wet tropics, of course a year round production of fruits and vegetables, even combined with animals could be opted for.
- Horticulture species, as opposed to other food crops, have a tremendous yield potential and can provide up to 50 kg of fresh produce per square meter per year, depending on the technology applied. As compared to other agricultural activities horticulture makes efficient use of the scarcely available land and water resources (FAO, 2001).
- More sophisticated technology like simplified hydroponics could be promoted. Under hydroponics, plants can be grown closer together than in the field, thereby increasing yields, and multiple cropping (the growing of several crops in the same tank) can be practiced. In addition to conserving space, hydroponics almost eliminates weed and pest problems (FAO, 2001). If properly organized surplus production could be marketed on a regular basis.
- The establishment of protected cultivation in greenhouses is another option to modernize school garden programmes in some countries. This offers huge opportunities for teaching modern agricultural practices, including modern irrigation and pest management, as well as water harvesting technologies.
- Linkages with environmental education (tree planting programmes), pest management etc. should be established where possible. Tree planting in school could be promoted wherever applicable and for various reasons, may it be shading, fruit tree planting or

*There is no single design of school garden programs, they must in any case be adapted to the local situation*

even planting for harvesting of natural pesticides (e.g. *neem*). Planting of fruit trees helps to save money and increases the diversification of the diet.

- The inclusion of training courses in bookkeeping into teaching related to school gardens, will increase skills and knowledge, greater trading skills and higher returns, and improved understanding of economic values of small scale agriculture.
- School garden programmes could be linked in a useful way with composting and household based waste management – which also would be a means to get more community involvement in some societies. The use of organic waste as compost is already quite spread in urban agriculture. Of particular note in the current contexts is its common use in the cultivation of fruit trees and tree seedlings.

#### ***An example from Indonesia***

The Public Senior High School No. 34-SMUN 34, Jakarta South has also participated in the project by starting a waste management activity as an effort to enhance the environmental awareness of young generations in Indonesia. The activity started on September 1996. All students worked together to clean the school yard and the surrounding area from garbage and litters. Those were separated by the kinds i.e. organic and non-organic. As a follow-up action and assisted by UNESCO, the Youth Science Club of SMUN 34, has initiated programmes for paper recycling and vermi composting utilizing the organic waste. The recycled paper is well accepted by the students. The product might even be sold outside the school. Since the product of compost activity is still very limited, it is only used for the school garden.

*Source: UNESCO-Jakarta*

For the implementation of school garden programs the following preliminary recommendations are made:

- learn lessons for past and present projects
- examine ongoing successful projects
- study past experience (successes and failures)
- include outside FAO activities and experiences
- explore possibilities for a pilot study in several countries to be determined
- link these pilot studies with SPFS program and ongoing interagency programs like for example the ***Child Survival and Development Programme***, the WFP ***School Feeding Program*** or the UNESCO ***Associated School Project Network***
- choose a “flexible approach” for the promotion of school gardens
- link with Farmers Field Schools and south-south cooperation where possible
- search for a broad consensus on the program
- provide a general guide for the implementation of school garden programs, that considers all necessary factors to be taken into consideration.
- establish procedures for project application, review and monitoring

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## 8.2 Twinning projects

Twinning projects between schools in developing countries and developed countries can be useful for awareness creating – especially in view of an increasing demand for nutrition education in the North. With this regard, twinning could assist in a better understanding of the regional food habits, the global food system, and sensitize pupils in the North for poverty and food shortages in the South. Nevertheless, taking into consideration the poor infrastructure especially of communication systems in all LIFDC's, the implementation of information exchange through email and internet is questionable. If twinning is understood as well in the formation of regional networks of schools, it might contribute to more sustainability of such programs.

Twinning schools in developing and developed countries could provide an entry-point for progressively expanding and mutually enriching relationships between the schools and communities involved.

Specifically:

- funding will allow the developing country school to start or expand school garden activities;
- pupils and teachers at both schools will develop a better understanding of each others' lives and food habits, an understanding which could be further reinforced by student exchanges;
- teachers and management staff of schools will be able to exchange information on professional approaches and methods;
- many schools in developed countries—often through parents' associations—already collect money for development projects of various sorts. Twinning will help them to sharpen the focus of those efforts and provide transparency on the use of funds (FAO, 2002).

***Twinning projects could assist in a better understanding of the regional food habits, the global food system, and sensitize pupils in the North for poverty and food shortages in the South. The increasing demand for nutrition education in the North could be well linked with such projects.***

The idea of school twinning within Europe has recently being supported by the European Commission through the “European Schoolnet”, and is a mainly internet-based initiative. Information and Communication Technologies (ICT) have become a driving force in both the industrialised and in many developing countries. The new emerging telelearning-systems linked to the existing traditional education and training institutions offer great opportunities for information transfer and sharing. In order to facilitate this trend further the World Bank just launched the "Global Distance Learning Network" and the "Global Development Learning Network" and among those the for example the African Virtual University (<http://www.avu.org/>) (GDLN, 2002). It would be useful to start thinking on how to make efficient use of these existing structures for the purpose of school twinning projects.. Radio, television, Internet and E-mail are instruments to be used in this kind of learning and information sharing process. Thinking in terms of twinning schools between the South and the North, for many reasons, the use of new technology fails.

Access to the Internet is still restricted in developing countries, especially in Africa with a total of only 4.15 million people having access in 2001 (NUA, 2001).

Urban areas often offer better opportunities for the use new technologies than rural areas. Of course, if Ministries of Education and Ministries of Agriculture would jointly support twinning projects, access to ICT could be improved and used for better communication in the South (South-South Cooperation) and with the North (South-North Cooperation). Nevertheless, current projects show, that conventional ways of communication are still valid.

***“The success of the 2001 Harvest Festival Appeal helped create 270 primary school gardens in Africa”***

*Seeds of Africa*

By “Seeds for Africa”, during its 2001 Harvest Festival Appeal, schools were offered the chance to be twinned with schools in Africa where Seeds For Africa had established a garden project. As a result, schools in 12 different countries are now twinned with schools in the UK<sup>1</sup>. All those schools involved in helping have been given the opportunity to take part in the twinning project. This means everyone can learn more about how other people live. Lots of the schools both here and in Africa have sent each other letters, and some have included photos and local maps (Seeds for Africa, 2002).

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## 9. Conclusions

With the promotion of School garden Programmes a great number of malnourished children can be reached with relatively simple and cost effective means. Past experience shows, that failures of such projects are mainly caused by initial planning faults, or by institutional mismanagement. School garden programmes cannot be created in isolation but have to be linked with education, and health and nutrition interventions. Therefore best program design seems to link school gardens with other programs related to nutrition, health and environment. School garden programs must be well adapted to the local habits, needs and to the specific climatic and environmental situation. Community involvement is a basic requirement for the success of these programmes. The main actors themselves, the school children must be approached in a participatory way to insure their commitment to the programme. This implies assisted self-management, participation in planning, decision making on the use of the produce, testing and experimenting.

Twinning schools between the North and the South can be useful, if used for a better understanding of the global food system, the regional food habits, and sensitize pupils in the North for poverty and food shortages in the South. The increasing demand for nutrition education in the North could be well linked with such projects.

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<sup>1</sup> A list of the twinning partner schools is available under: <http://www.seedsforafrica.org/harvest-appeal/twinning/index.html>

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