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Students Grow Their Own Vegetables in School Yards

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Abstract. The Centre for Environment Education (CEE), Andhra Pradesh State Cell, implemented the project ‘Student Amateurs in School Yard Agriculture (SASYA)’ with support from UNICEF Hyderabad and the Department of Education (Sarva Siksha Abhiyan) in 150 schools in the Medak district of Andhra Pradesh, India. The Medak district is a semi-arid district with an average annual rainfall of 80 cm. Agricultural activities are dependent mainly on rainfall. The aim of the project was to provide chemical-free, nutrient-rich vegetables to the children and to provide an opportunity to learn by doing. Schools were selected based on the available space, water, fence. A small start-up kit was provided with a manual with guidelines, vegetable seeds and other requirements like sample bio-fertilizers, bio-pesticides and equipment like hand sprayers.

A resource group was formed for every 10 schools with a teacher, the Mandal Educational Officer, and a field coordinator from a Non-Governmental Organisation (NGO). The resource group was trained at the district level that acted as trainers for the other 9 schools of their mandal (administrative district) and provided continuous support.

The gardens were initiated with support from the village community who were part of the garden lay out plan, and operations like land preparation, and sowing. Contributions from the villagers also came in the form of implements, farm yard manure and seeds. Gardens were maintained by the student committees formed for the purpose under guidance of teachers. Suggestions regarding the cultural operations were provided by the community, field coordinators and CEE.

The produce was utilised for the mid-day meals served in the school. At times they were also shared by the community and teachers. Preparations (collection of seed from the garden and community) were under progress for the next season.

This project was implemented successfully in 136 schools where the students had benefited through experiential learning. This has established strong relationships between the school and the community. The gardens have also supplied some of the vegetables, which were chemical free and nutrient rich.

Keywords. Education, India, children, nutrition, environment, sustainable development.

1 Introduction

Children of age groups between 6-11 years in rural areas of Andhra Pradesh have varying degrees of malnutrition¹. The children are also deficient in the three micro-nutrients that generally affect school performance, i.e. iodine, iron and vitamin A. The National Institute of Nutrition (NIN) has revealed that some 50 per cent of schoolchildren from middle-income families suffer from multiple micronutrient deficiency.

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¹The findings of the survey conducted by National Nutrition Monitoring Bureau on the nutrition status of rural children in the eight states including Andhra Pradesh says that only 5.57 % have normal nutritional status.

To bridge the nutrition gap and to improve student enrollment, the Mid-Day Meals (MDM) programme is being implemented, where afternoon meals are cooked and served in the school itself by a female Self Help Group member of the village. The general menu includes rice and a pulse for a curry usually mixed with green leaf vegetables which are limited to 2-3 varieties. While the rice and pulse are supplied by the Government, the vegetables are purchased from the outside.

In Andhra Pradesh² the use of chemicals is used especially for vegetables and the desired waiting period between pesticide spray and harvest is not regularly followed. This leads to degradation of human health and the environment as well. The need to shift towards organic cultivation is being

²Andhra Pradesh state ranks first in utilization of pesticides and second in utilization of fertilizers (TERI 2006) in India.

emphasized by the agricultural experts, and the Government of Andhra Pradesh is working towards this through several rural livelihood programmes. As schools are one of the main institutions in the village, there is the possibility for reaching the community through schools as well. In addition, schools serve as platforms for targeting future citizens.

The problems of nutritional gap and intake of chemical residues can be addressed to some extent by growing the varieties of vegetables that supply the required nutrients without using the chemicals. Many of the schools do have facilities such as land and water which can be put to efficient use in order to raise organic vegetable gardens. This will provide the students an opportunity to be involved in extracurricular activities such as gardening and at the same time will meet a part of vegetable requirement for the mid-day meals. As community involvement will be necessary for this kind of programme, it can reinforce effective partnerships between the school and community.

In order to demonstrate this, the CEE Andhra Pradesh State Office has implemented the project '*Student Amateurs in School Yard Agriculture*' (Demonstration of Bio-intensive gardens in schools), with support from UNICEF Hyderabad and Sarva Siksha Abhiyan, in 150 schools in the Medak district spread over 15 mandals³ at the rate of 10 schools per mandal. The Medak district is a semi arid district with an average rainfall of 80 cm. Agriculture is the main livelihood and is mainly irrigated by rain.

The objectives of this project are:

- To provide an opportunity to students to learn by doing
- To improve nutrition standards by providing organically grown vegetables for mid-day meals
- To improve the environmental quality of schools through development of bio-intensive gardens which include development of fences, gardens and trees in semi-arid and drought-prone areas
- To teach organic cultivation to the community by utilizing the school as a demonstration plot
- To standardize the methodology for developing bio-intensive gardens which can be replicated in different areas and different situations and to develop guidelines in the form of a manual
- To involve the mandal administration and department of education in developing the bio-intensive gardens

The project was implemented during 2007 (the first crop was raised between July and December). The project is under consideration for replication in other schools in the Medak district and other districts.

2 Equipment and Methods

2.1 School selection and capacity building

The project was implemented in 150 schools that are spread across 15 mandals (i.e. 10 schools in each mandal). In order

³Mandal is an Administrative division of a district.

to ensure the proper establishment and sustenance of the garden, the project school selection was made based on the following criteria:

- Schools have sufficient space and water to raise the garden (apart from drinking and sanitation purposes)
- Schools where compound wall/protection for the compound is present
- Schools that are covered under the project 'Snehabala' by UNICEF where a tool kit of garden implements is provided
- Schools where CEE has conducted sanitation campaigns and Environment Education programmes

One resource teacher is selected per mandal (i.e. for 10 schools) and one teacher from each school is nominated as facilitator. A field coordinator per mandal is chosen from an NGO working in the Medak district for technical and monitoring support. The selected coordinators have experience working in organic farming and have worked with schools in issues related to Water and Sanitation. Thus a resource base was created within each mandal. The Mandal Education Officers were also roped in for required administrative coordination.

The training was done at the district level for the resource team, which in turn trained the teachers in their mandals. The training included technical sessions, planning exercises and field demonstrations for effective transaction. The resource team in turn met the teachers of their respective mandals and oriented the teachers about the concepts and the plan. After the orientation session by the resource team, the teachers developed the detailed plan and schedule of activities for their own schools with the help of the Field Coordinators and farmers of the village.

2.2 Start up materials

In order to facilitate the garden initiation, a start up kit was provided to each school with 15 varieties of seeds, samples of bio-fertiliser (rhizobial culture), samples of vermicompost, Neem oil, and a hand sprayer. A handout was provided briefing on the contents of the kit.

The varieties provided are:

- Vegetables: Brinjal, Tomato, Bhendi (ladies finger), Carrot, Chillies
- Leafy vegetables: Amaranthus, Hibiscus, Indian Spinach (Palak), Chukkakura
- Perennials: Moringa
- Border crop: Maize
- Creepers: Beans
- Gourds: Ridge gourd, Bitter gourd, Bottle gourd

All the vegetables provided are of the local varieties. On an average, seeds of 3 more vegetable varieties are provided by the villagers (mostly leaf varieties). During selection of

vegetables, leafy varieties were given priority, considering the nutritional requirements of the children and the existing menu. Out of 15 varieties, 5 varieties are of Greenleaf vegetables (including moringa), which supply Vitamin A and Iron.

2.3 Information, Education and Communication material

The technical guidelines for developing the gardens were provided in the form of a manual in the local language, which discussed the choice of vegetables to bridge nutrient requirements, site selection, garden lay out, and organic cultivation methods. This has acted as a reference guide for teachers and field coordinators. Required formats for conducting the planning exercise with the students and community, and formats for maintaining information on garden management aspects and produce details, were also incorporated, which facilitated the documentation and helped in analysis of outcomes.

The manual also contained educational activities such as bottle drip irrigation and compost pits, which may help the teachers in teaching several curricular concepts using the garden as a teaching aid. Suggestions on which textbook lessons may be taught effectively with the garden have also been provided in the manual.

A bimonthly newsletter was circulated to share news and updates between the schools, the field coordinators and others involved in the programme. The newsletter included observations made by CEE staff during monitoring visits and articles from the coordinators that highlighted good practices (such as spray of botanicals, garden management during holidays) and issues (lack of fence etc.).

2.4 Community partnership

The community of the village is the major stakeholder as the message of organic kitchen garden is also intended to reach the community, and the fact that the support from community is needed and inevitable in the gardening project. The schools with the help of field coordinator have organised participatory exercises with the community for their inputs on selection of vegetable varieties, cultivation aspects, etc. This has also helped in identifying the possible involvement of the community for the development and maintenance of the garden. A participation of 100% the community was observed as a result of this. The participation involved lending the field equipment, land preparation, seeds of local vegetable varieties, manure, etc. On an average seeds of 3 additional vegetable varieties were contributed by the community. At the later stages, the community was constantly approached by the school for suggestions on pest control measures, manuring, etc. Towards the end of the project, an event was organized in 86 schools out of 150 schools, facilitated by the field coordinators, which acted as a forum for experience sharing between the community and schools.

2.5 Monitoring

The field coordinators provided support to the schools on technical and management aspects by visiting each school biweekly. CEE has provided monitoring support to the

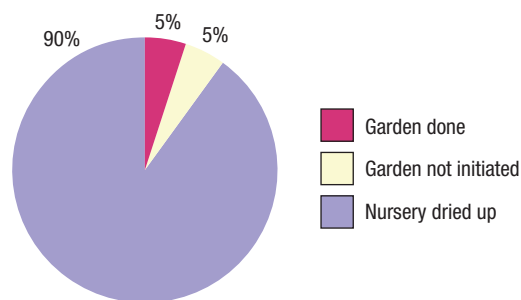


Figure 1. Garden status in 150 schools of Medak district

schools and field coordinators on technical and management aspects by visiting the field coordinators and a sample of 25 schools every month.

3 Results

3.1 Gardens in schools

Out of 150 schools selected, the gardens were initiated in 136 schools (i.e. in 90 % of the selected schools). The average size of the garden is 2-3 cents⁴. This reflects the high level of acceptance of the Organic Gardening in the schools. In 5% of the schools, the gardens were not initiated as the soil is not suitable for gardening; in another 5% of the schools, the gardens were initiated but dried up due to lack of sufficient water.

3.2 Involvement of the school

Teachers and students played an active role in initiation and maintenance of the gardens. Student committees were formed in all the schools for tending the gardens with defined roles. Plans were developed for care during holidays as well. Mid-day meal cooks were also involved in garden management aspects like regular watering, harvesting, utilizing the produce for cooking, etc.

3.3 Garden as base for education

In several schools the vegetable beds were provided by the teachers with labels giving scientific and common names of the vegetables. These gardens were also used as a base for teaching of related chapters of the curriculum such as agriculture, plant varieties, parts of plants, plant adaptations, geometry, measurements, accounting, etc.

3.4 Produce utilization

In all the schools, the produce was utilized for mid-day meals. Leafy vegetables are the most frequent ones to go into the pot due to the short intervals between harvests. These were the Indian Spinach and Hibiscus, rich in vitamin A and iron. The produce on an average was utilized for 3-5 times a week. The new menu included 10-15 varieties of vegetables, whereas the old menu included 3. On an average, around 5 kgs of vegetables were harvested each week by each school. In

⁴One cent is 40 sq meters.

Table 1. Roles played by the stakeholders.

Stakeholder	Involvement
UNICEF	Concept, overall support in terms of finance, coordination with the department of education etc.
Department of Education	Facilitating teacher participation, support in school selection, venue for the training etc.
Centre for Environment Education (CEE)	Concept, design and overall implementation and monitoring of the project with support from UNICEF, Department of Education, and field coordinators.
Teachers: Master trainers	Implementing the project in respective schools, training the teachers in respective mandals, with support from CEE and field coordinators.
Teachers	Implementing the project in their respective schools, coordination with community.
Field coordinators (appointed by CEE)	Close support to master trainers during mandal level training, support to teachers in conducting planning exercise with community, monitoring support.
Community: Sarpanch (elected local head)/ Deputy Sarpanch/progressive farmers Parents Village institutions/ mid-day meal cooks	Involvement in garden planning exercise, support in garden initiation (providing tractor and implements for land preparation etc.) Involvement in garden planning and management aspects. Regular tending of the garden, using the produce for midday meals

some cases, some vegetables are also utilized by the teachers and shared with the community. Some schools have sold the produce as well.

During project (initial stage):

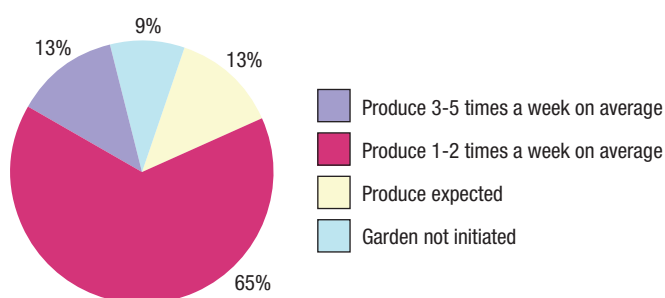


Figure 2. Production status in the garden

Post project (later stages):

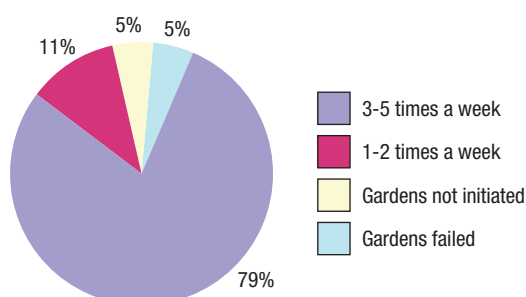


Figure 3. Produce utilisation (Post project)

3.5 Quality standards maintained:

Schools have not only raised the garden but also maintained quality standards to produce the vegetables through sustainable agricultural practices:

- Used biofertilisers, compost, cattle manure, goat manure and vermicompost as fertilizers. Schools have maintained a separate compost pit for this purpose.
- Used neem oil, custard apple decoction, ash, and chili and garlic decoctions as pesticides.
- Utilized the available space in an efficient manner in making plots and managing the interspaces.
- Waste water from water points was directed towards the garden.
- Used bottle drip methods for irrigation in water-scarce areas.

3.6 Partnerships

The project has helped in building fruitful partnerships among various stakeholders, which has helped in mutual learning, cooperation, and has set up a mechanism for sustenance especially within the district and villages. The following are the table 1 detailed roles played by the stakeholders.

3.7 Economics

The cost incurred per school was Rs. 3,000 (over 40 euros) (including project implementation and material costs) which has resulted in education for 250 students and 500 community members, 5 teachers besides giving produce worth Rs. 1,000 (on an average)⁵.

4 Discussion

Initiating organic vegetable gardens has facilitated the process of ‘learning by doing’ among students and has helped the teachers in effective teaching of related topics. This has also resulted in increased outdoor interactions between students and teachers.

⁵Mandal is an Administrative division of a district.

Some of the vegetables for the student meals have come from their own garden, which are also chemical free. This has also cut down the cost (between 30-50%) incurred on purchasing vegetables by the school.

The gardens in the schools have acted as an entry point activity for influencing the community on kitchen gardening, organic farming, the role of vegetables in a balanced diet etc.; but have also provided an opportunity for the community to contribute to the school through their skills and knowledge (eg, which vegetables grow well in the area, how to manage a pests and diseases in a traditional way etc.).

Around 72% of the schools have shown interest in continuing gardening after the project period ended. By the end of the first season, they have started planning, seed collection etc. And 19% of the schools have requested support for input such as seed, water storage facilities etc. At present, 66% of the schools are continuing the garden in a full-fledged manner.

The aspects discussed above indicate that there is room in schools for organic vegetable gardening, which can be facilitated with a minimum of technical inputs and start up kits. However, the following are observed to be the major factors for successful initiation and management of the garden in schools:

- Minimum facilities, such as open space of 3-4 cents, water facility, protected compound etc.
- Interest and willingness among the teachers
- Strong links between the village administration and the school
- Seed material and garden tools
- Support from the community in land preparation and making compost pits, especially in primary schools as the primary school children have difficulties performing these tasks.

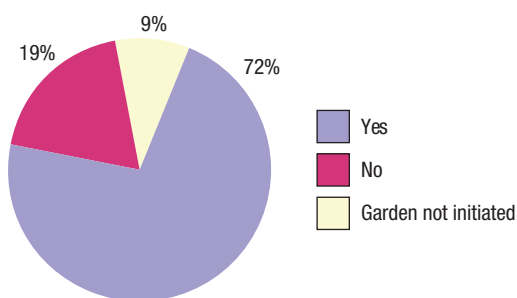


Figure 4. Schools prepared continue gardening

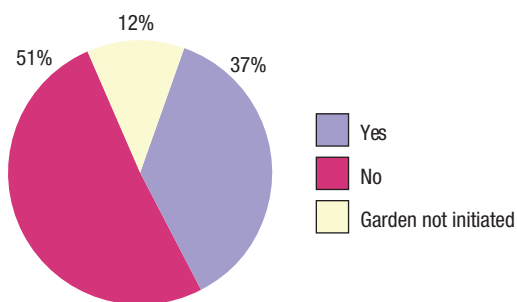


Figure 5. Status of gardens in schools

4.1 Review of the project from an ESD perspective

Besides providing the nutrient-rich, chemical-free vegetables for the students, the gardening project has helped the students to learn by doing, acted as a bond between the school and the community, reduced the school expenditure on vegetables, and increased greenery in the schools. An emphasis was placed on local varieties and organic cultivation practices as this message was targeted to the community as well. Thus the project has met the objectives of Education, Health, Community Partnership and Cost reduction.

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