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Impact of home- gardening and nutrition education in rural India

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Background

Diet surveys conducted among the rural poor in India show that their diet is qualitatively deficient in micro-nutrients, particularly iron, calcium, vitamin A, riboflavin and folic acid. Since foods of animal origin are expensive, promotion of inexpensive vegetables and fruits rich in these nutrients is the only long- term alternative for achieving nutritional security. Opinions with regard to the impact of vegetables on vitamin A status are however conflicting *(1)*. The authors were part of a of a feasibility study on home gardening for combating vitamin A deficiency in rural India, conducted by the National Institute of Nutrition (NIN)- Hyderabad, India *(1)*. At the end of three years of this initiative in 10 villages each in two districts of Andhra Pradesh in South India, number of households growing β-carotene -rich fruits and vegetables increased significantly *(1)*. However, *c*lear impact on the prevalence of Bitot spots in pre-school children was not apparent. After three years, NIN transferred the above project in Medak district (one of the two selected districts) to a voluntary agency, Dangoria Charitable Trust,(DCT) to facilitate it's further continuity. In this second phase DCT attempted to develop a block-level programme, by involving government departments, besides the community. Strategies were developed for augmenting the supply of horticulture resource on one hand, and demand from the community through nutrition education on the other. Experience is shared here.

Coverage

Eighteen villages (population about 20,000) including the ten villages in the earlier NIN study (old villages) were selected from Narsapur mandal of Medak district for promotion of home gardening and health and nutrition education. In addition, three `bastis' (residential areas) in the village Narsapur (block headquarter, population,7,000), were selected for health and nutrition education.

Involvement of government agencies

Sensitisation meetings were held with district-level and village- level functionaries from the departments of horticulture, agriculture, rural development, health and education. to acquaint them with the project objectives and proposed strategies. Village representatives were also invited to some meetings. While the government functionaries showed keen interest in the project and promised help to the extent possible, village-level functionaries declined to become responsible for project implementation in one or two villages of their choice. The useful outcome however was, getting to know about the government schemes like decentralised people's nurseries, and home- gardening project and dovetailing those schemes into the home -gardening project. Also, the department of horticulture conducted a training programme in nursery raising.

Strategies for augmenting horticultural resource

The following culturally acceptable perennial and seasonal varieties of vegetables and fruits rich in micro-nutrients particularly β carotene, were selected for promotion.. Variety of green leafy vegetables (GLV)(seasonal and perennial), drum stick (Moringa oleifera-for leaves), papaya, mangoes, and carrots. Seedlings of perennials like *bachali* (basella alba- a perennial creeper spinach), drum stick, papaya and *chenangi (Cassia sophera*- a wild growing shrub-leaves very rich in beta carotene*)* were raised in village nurseries. They were initially purchased from the project funds and given free to the interested households (preference being for families with pre-school children), but later the villagers were encouraged to buy them. This became a source of income for those who raised the nurseries. Free seeds and sachets were provided for raising nurseries. Supply of mango and guava seedlings was arranged through the department of horticulture. Transportation cost was recovered from the households.. The local nursery of the forest department was motivated to raise seedlings of plants like drumstick and papaya, and these too were distributed in the community. Seed banks of seasonal GLV like amaranth, and spinach (*`palak'*) were established. These seeds were purchased from the community, and distributed free.

Creation of demand through health and nutrition education

Health and nutrition education to the community was imparted in different ways such as, home visits, focus group discussions with the mothers, use of flip charts, cooking demonstrations, evening slide and sound shows, and activity-related school education programme in health and nutrition for 4th and 5th standard children in the village schools. Addition of GLV and other vegetables or fruits rich in micro-nutrients to appropriate traditional recipes like *`roti'* ,( dry pancakes made from corn flour), *`dal' (* lentil soup) and gruel made from cereal pulse mixes (weaning foods) was taught during the cooking demonstrations. The mothers were involved in cooking. In five villages and three `bastis' of Narsapur where the government of India's Integrated Child Development Scheme (ICDS) was in operation, pre-school children aged 6-36 months were weighed at three monthly intervals, and mothers educated during these sessions.

School education included a variety of topics-mostly in nutrition. Children were involved in raising home gardens. Efforts to raise gardens in school compounds were not very successful except in couple of schools. A novel method of school children's diet diaries was evolved for getting qualitative information on children's (which means family's) diet and using it for discussing diet and nutrition with children and school teachers.

Monitoring and Evaluation

Detailed surveys of home gardens were done, after 18 months (interim survey) and after 36 months in 10 of the 18 villages randomly selected. The information obtained in the final survey of NIN project was taken as baseline for this project. Out of the 10 villages surveyed, 5 had earlier been included in the NIN project (old villages) and the remaining 5 were new villages. Every third household was randomly included in the survey. Information on plants grown, survival, consumption, reasons for loss etc. was obtained.

KAP surveys on aspects of health and nutrition were carried out on mothers with pre -school children aged 6- 36 months initially and at the end of 3 years, in above mentioned 5 ICDS villages and in Narsapur. The ICDS teacher conducted this survey in local language. Knowledge of children studying in 5th standard in local schools was also tested initially and at the end of three years through appropriate questionnaire. Estimate of frequency of consumption of GLV by the families was obtained through diet diaries maintained by children studying in class V, over a period of 2 weeks in three seasons.

At the end of the study, pre-school children 2-5 years old were surveyed in the project villages as well as 10 nearby non-intervention villages for the incidence of Bitot spots. NIN data provided baseline information.

Acceptance of home gardening

Fortunately, only 5.4% families were totally land-less. The rest had small land holdings-own or leased. The usual concept of raising home gardens on well-defined plots near the home was tried but was accepted by very few households. Most families raised the seasonal varieties in their fields, and many preferred to raise even the perennial varieties in the fields rather than near their homes. The reasons offered were: inadequate space, water scarcity, and destruction by birds, and ruminants. However, after some persuasion and education, perennial varieties are being raised in the back yards on very little space using wastewater. Apart from use of wastewater, emphasis was on organic farming methods,

Initially when NIN started the project, only 10 % households grew β carotene -rich fruits and vegetables in their garden *(1)*. Contrary to our expectation that a farming community would readily accept a project on home gardening, the initial enthusiasm of the community towards the project was poor, probably because the chosen varieties were not considered to be prestigious enough. Even after accepting the seedlings, there was neglect and loss. With advocacy and education, the acceptance increased and at the end of 3 years of NIN project 42% house-holds had started growing one or more of the above mentioned varieties of perennials and 85% seasonal varieties *(1)*. The extension of the project in the next phase was easier due to `contact effect'. At the end of 3 years of the present project 95% households had started growing perennials and 86% seasonal varieties. (Table 1). Over 80% of those who had grown the plants consumed them. However almost 70% families who grew perennials mentioned losing one or more plants, mostly due to lack of water, or lack of fencing and destruction. Survival of plants like mangoes and guava was better because of better care. The loss of seasonal varieties was only 3% perhaps because they were grown in the fields and required shorter period of nurturing. The performance in the old and the new

villages was similar, the only difference being in the consumption of perennial varieties, where the percentage was as expected higher in the old villages.

Initially, there was reluctance to pay for the seedlings but now the villagers readily buy them. Also the quality of the saplings raised in the nurseries has improved. School children often bring money from their homes and purchase the seedlings, which become their responsibility.

KAP Nutrition of mothers with pre-school children.

Almost 90 percent of the mothers were illiterate. Food taboos during pregnancy, and wrong practices such as giving lesser food during pregnancy so that the child remains small and delivery is easy, introduction of breast milk only from day 3 after birth, and discarding excess water from cooked rice (`*ganji*') because it contains pesticides and is bad for health were common. Education had significant impact on this knowledge *(table 2).* Change in attitude and practice is also occurring. Over 90% of the mothers breast-fed their children beyond 1 year. Thus in this community there is no erosion of breast feeding practice. However the problem area is late introduction of complementary feeding. Though 73% mothers had introduced complementary food by one year, the quantity given was very little. Biscuit was the most favoured weaning food. Nutrition education did have favourable impact on complementary feeding, particularly inclusion of fruits and vegetables. Though the mothers were explained the types and causes of nutritional disorders, their responses in the final survey were not very good. Educating illiterate women about `how' and `why' of science needs more focussed and intensive effort.

Nutrition knowledge of school children

Improvement in knowledge of school children with regard to nutritional deficiency diseases, and foods rich in micronutrients was remarkable. Most teachers also mentioned benefiting from these classes. Though both the initial and final surveys were done on children of class V, the children surveyed finally had been exposed to these classes from the time they were in class 3, because in rural schools, classes are combined .

Children to parents transfer of knowledge.

In the interim and final home gardening surveys, 69% and 84% parents respectively acknowledged receiving messages from their children about the advantages of growing and consuming vegetables and fruits being promoted.

Frequency of Consumption of GLV

Information obtained through children's diet diaries at the end of this project compared with the data on semi-quantitative diet survey conducted on families (with particular reference to β-carotene -rich foods using the guidelines suggested by IVACG) in the earlier NIN study, showed improvement in the frequency of consumption of GLV (Table 3). Since both the methods of survey gave information on family's diet, comparison was attempted. Children's diet diaries did not reveal any seasonal variations in the consumption of GLV.

Incidence of Bitot's spots in pre-school children

At the end of the study, 427 children aged 2-5 years from study villages and 234 from the surrounding non-intervention control villages were examined for the presence of Bitot spots. The incidence in the former was 3.3%, and that in the surrounding non-intervention villages 8.1%. The incidence of 3.3% though high is lower than 4.4% observed at the end of NIN study (phase I). In the NIN study reduction in Bitot spots was found to be related to the duration of participation in the study. The higher incidence in the surrounding non-intervention villages suggests that the project did perhaps have a positive impact.

Conclusions

The experience in the present study shows that promotion of home gardening is feasible though it does require considerable effort and flexible approach to suit local conditions. Home gardening alone may not however be

enough to eradicate vitamin A deficiency in communities where the incidence is high and diet mostly vegetarian. Other initiatives such as selective medication, or food fortification need to be considered to complement the dietary approach. Promotion of animal foods such as egg and milk also needs to be considered. The cost-benefit analysis of various strategies needs to be done. Nutrition education should accompany home gardening, and here again innovative social marketing strategies are needed.

References

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Table 1
Status of Home gardening

Type of plant	Grown %			Consumed / now consuming. % of those who had grown.		Lost % of those who had grown.	
	Base line	Interim	Final	Interim	Final	Interim	Final
One or more type of perennial	42	78.6	95	87.7	88.9	71.1	45.6
One or more ttpe of seasonal	85	73.8	87.9	99.6	94.8	2.7	3.1

Baseline information from NIN study for Medak District (unpublished).
Sample size- Interim survey after 18 months, 599 households; final survey after 34 months, 595 households.

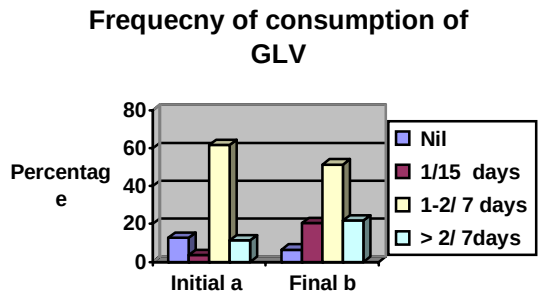
Table 2

Change in KAP of mothers with 6-36 months old children

Subject	**Initial %**	**Final %**
Sample size	130	180
More food required during pregnancy.	0	35
Less food required during pregnancy	27	19
Same quantity of food required during pregnancy	73	41
Foods like papaya, GLV etc should be avoided during pregnancy.	88	29
Breast-feeding should start from day 1 after birth.	41	61

Table 3
Frequency of consumption of GLV
Percentage

Frequency/week	Initial [a]	Final [b]
Nil	12.7	6.4
1/15 days	3.5	20.5
1-2/ 7 days	61.6	51.3
> 2/ 7days	11.4	21.8



a Initial values based on - semi-quantitative diet survey of 10 households each from 10 villages done in earlier NIN study for Medak District(unpublished)

b Final values based on diet diaries of 78 children- present study

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