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Home Gardening in Hilly and Tarai areas in Nepal: Impact on Food Production and Consumption

Micronutrient malnutrition, resulting largely from inadequate intake of micronutrient rich foods, is a serious problem in Nepal with negative consequences on health and economic development. Based on evidence from several countries in Asia, homestead food production activities such as home gardening increase food consumption, lower the risk of vitamin A deficiency disorders, increase household income and empower women. The replication and expansion of the successful home gardening program in Nepal described in this bulletin could improve the health and survival of women and children, improve food security for poor households and advance the economic and social development of Nepal.

In Nepal, more than 70% of women and children suffer from anemia, while 6% of pregnant women and >1% school-aged children suffer from night blindness,[1] the first clinical sign of vitamin A deficiency. Extensive evidence shows that micronutrient malnutrition slows a country's economic growth and development because it increases the risk of morbidity and mortality, slows cognitive and physical development of children and lowers work productivity.

Micronutrient malnutrition results largely from inadequate availability, access and consumption of foods rich in micronutrients. Data on food availability suggests that Nepal only produces around 30% of its fruit and vegetable requirements. In addition, more than 60% of households live below the poverty line, and thus are not able to purchase foods that are good sources of vitamin A, iron and other important micronutrients. Thus one way to combat micronutrient deficiencies is to promote homestead gardening. Experience in Bangladesh and Cambodia has shown that homestead food production programs improve micronutrient intake through increased consumption of micronutrient-rich plant foods from improved gardening techniques and practices. In addition, households increase their purchasing power (from the sale of garden produce) to buy micronutrient-rich animal products. Finally, the program empowers women who then have better opportunities to care for their families. Through these multiple mechanisms, home food production programs can reduce poverty, improve food security and improve health and survival of women and children.

Helen Keller International (HKI) has developed extensive experience, over the past 10 years, in the monitoring and evaluation of programs in as home gardening, food fortification and food assistance.

HKI/Nepal Home Gardening program

Drawing on the experience in Bangladesh,[2] HKI implements a home gardening and nutrition education program in the

Helen Keller WORLDWIDE

Evidence that gardening reduces risk of vitamin A deficiency

Food-based programs can have a direct impact on vitamin A deficiency through increasing the consumption of vitamin A-rich foods, by increasing access through production, preservation and/or distribution between and within households.[1] And, food-based programs can have an indirect impact in various ways,[1] including:

- Providing diversified foods that, in-turn, can lead to an increased intake of vitamin A-rich foods and/or improved bioavailability and bioconversion.
- Increasing income and empowerment that can result in increased intake of micronutrient-rich foods (for example eggs and meat) as well as other foods such as oil, and improved caring practices, which can reduce morbidity and therefore lower the need for vitamin A.

In 1997-98, HKI/Bangladesh conducted a National Vitamin A Survey and confirmed that home gardening plays a role in the control of night blindness in rural Bangladesh. Among children who did not receive a vitamin A capsules, those living in households without garden were 2.2 times more likely to suffer from night blindness (first clinical sign of vitamin A deficiency). Data on serum retinol concentration of children and women, and data on night blindness among women showed the same.[2]

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hilly and *tarai* (plain land) areas of Nepal aimed at increasing year-round availability and consumption of foods rich in vitamin A. The program started in 1997 and is implemented in collaboration with local non-government organizations (NGOs).

Village resource nurseries (VRNs) provide community-based support services where households can obtain training, seeds and seedlings, participate in practical training, and obtain other technical assistance to establish "round-the-year" gardens. To date, the program has established 7 central resource nurseries (CRNs), 119 VRNs and 9,408 household gardens in 9 districts.

HKI provides technical training to partner NGO staff as well as to VRN owners and households. HKI also provides training materials, inputs (seeds, seedlings, saplings) and nutrition education for mothers and children.

Monitoring

A comprehensive, flexible monitoring system has been established as part of the home gardening program. In addition to being used as a management tool for the NGO partners, the monitoring system also provides essential information on vegetable and fruit production, consumption, household income and other related indicators. Results reported below were derived from the monitoring rounds conducted before and one year after the start of the program.

Results

Changes in gardening practices

Household gardens are classified as 'traditional' (few crops and scattered plants), 'improved' (scattered crops, mainly on fixed plots, but not year-round), and 'developed' (fixed plots, more crop varieties and year-round). At baseline, 86% of

Figure 1. Changes in gardening practices (n=566)

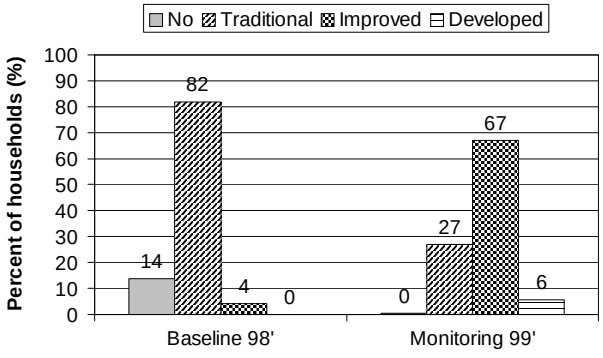


Figure 2. Change in the number of vegetable varieties produced, by garden type (n = 566)

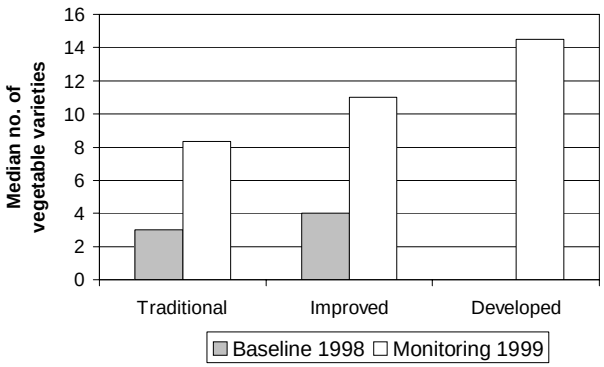
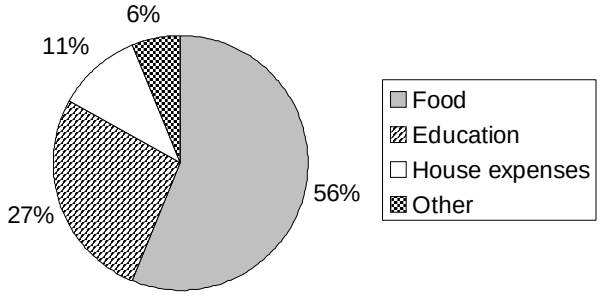


Figure 3. Main use of income earned from selling garden produce (n=566)



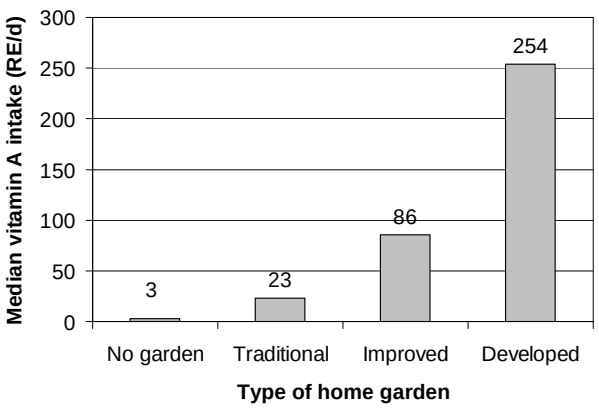
households practiced homestead gardening but almost all of them had a traditional garden. After one year of participation in the program, the proportion of households with improved gardens had increased from 4% to 67% and 6% were doing year-round gardening (Figure 1).

Shifting gardening practices and number of varieties
Diversification is important for increasing the consumption of vegetables. Figure 2 shows that within one year, the number of varieties produced had increased 2-3 times, regardless of gardening type, and were highest among households with a developed garden.

Main use of income earned selling garden produce
Households earned approximately NRs. 275 (median) per 3 months from selling fruits and vegetables. Figure 3 shows that that income is mainly spent on food (56%), which helps to improve the family diet, but also on educational purposes, such as buying educational materials, and on household expenses, such as buying kerosene, construction materials and seeds.

Garden type and children's vitamin A intake from vegetables
Vitamin A intake among children living in household with either developed (254 RE/d) or improved (86 RE/d) types of gardens was higher than among those living in households without a garden (3 RE/d) or with a traditional garden (23 RE/d; Figure 4). This was related to the round-the-year availability of vegetables and fruits and the larger number of varieties grown in improved and developed gardens. Similar findings were reported from Bangladesh.[3]

Figure 4. Children's vitamin A intake from vegetables, by garden type (n=566)



Maximizing the amount of vitamin A obtained from foods

Until recently it was assumed that 6 mg dietary beta-carotene provided 1 mg retinol equivalent (RE).[1] However, according to recent research the amount of dietary beta-carotene required for 1 RE may be 2-6 times higher.[2,3] In order to maximize the amount of vitamin A obtained from the diet, the following is recommended:

- increase the intake of retinol-rich foods (egg, liver, milk, butter)
- select vegetables and fruits with high carotene content, that is, more intense color (green, red, orange or yellow) and sun-dried vegetables because of their low moisture content
- ensure that meals contain at least 3-5 g fat and consume fruit together with fat-containing meal or snack
- improve hygiene (no parasites, little morbidity)
- use appropriate food preparation methods (mash vegetables, limit cooking time)

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See 'Conclusions & Recommendations' on back page

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Conclusions

The HKI home gardening program in Nepal has been successful in

- Improving gardening practices (more varieties as well as during more months of the year).
- Increasing production of vegetables and increasing vitamin A intake of both mothers and children.
- Providing additional income, which was mainly used for purchasing food.

Recommendations

- Replicate and expand the home gardening program to other areas of the country and expand its scope to include raising poultry and producing eggs because these are good sources of micronutrients.
- Explore the links between home gardening and the environment and other sectors.
- Extend the experience in monitoring and evaluation to other sectors and programs, building on HKI's experience in the Asia-Pacific region.

NGO Partners

The Nepal Home Gardening program is carried out by HKI in collaboration with the United Mission to Nepal Community Development and Health Project (UMNCDHP); the Center for Environmental and Agriculture Policy Research, Extension and Development (CEAPRED); the Multiplication Research Sustainability Center (MRSC); Nari Bikash Sangh (NBS); the Nepal Red Cross Society (NRSC); the Environment, Culture, Agriculture, Research and Development Society (ECARDS); Gramin Sudhar Manch (GSM); the Rural Women's Development and Unity Center (RUWDUC); and ROSHAN.

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For information and correspondence, contact:

Helen Keller International, Nepal
P.O. Box 3752, Min Bhawan
New Baneshwor, Kathmandu
Nepal
Telephone: (977-1) 480921 / 493344 / 493432
Fax: (977-1) 480234

Mr. Aminuzzaman Talukder, Country Director
E-mail: zaman@hkinepal.wlink.com.np

Ms. Nalini Shakaya, Nutrition Advisor
E-mail: nalini@hkipc.wlink.com.np

Helen Keller International, Regional Office
P.O. Box 4338, Jakarta Pusat
Indonesia
Telephone: (62-21) 7198147 / 7199163
Fax: (62-21) 7198148

Dr. Martin W. Bloem, Regional Director
E-mail: mwbloem@compuserve.com

Dr. Regina Moench Pfanner, Regional Coordinator
E-mail: remoench@cbn.net.id

Dr. Saskia de Pee, Regional Nutrition Research Advisor
E-mail: sdepee@compuserve.com

Ms. Lynnda Kiess, Regional Advisor
E-mail: lkiess@bdonline.com

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