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Integration of Animal Husbandry into Home Gardening Programs to Increase Vitamin A Intake from Foods: Bangladesh, Cambodia and Nepal

Micronutrient malnutrition is a serious problem among women and children in Bangladesh, Cambodia and Nepal. Home gardening programs in these countries have been effective in increasing the production and consumption of vitamin A-rich plant foods and in increasing the diversity of the diet. However, in order to improve vitamin A intake from foods, it is important to increase the consumption of animal foods. Because animal foods are often too expensive for poor households, strategies to increase their consumption should include production at the household level. Helen Keller International has been successful at integrating animal production into home gardening activities. Program impacts include increased egg and chicken liver consumption among poor households.

At least one half of preschool-aged children and pregnant women in Bangladesh, Cambodia and Nepal are affected by micronutrient malnutrition, including deficiencies of vitamin A and iron.¹⁻⁴ These micronutrient deficiencies are also common among older children, adolescents and non-pregnant women. Micronutrient deficiencies are highly prevalent in these countries because the typical diet lacks diversity and is low in quality. Micronutrient malnutrition has serious implications for the health, productivity and development of countries because micronutrients are essential for growth, protection from infections, cognitive function and for performing physical work.

Programs currently addressing the problem of micronutrient deficiencies include supplementation, food fortification and dietary diversification. Dietary diversification involves improving dietary intake by having a sufficient, affordable and diverse supply of micronutrient-rich foods throughout the year, and their adequate consumption. Home gardening, a means

of addressing dietary diversification, is one strategy that Helen Keller International (HKI) has used in Bangladesh, Cambodia and Nepal.

HKI home gardening program

The HKI Asia-Pacific home gardening and nutrition education projects work by providing technical assistance, training, agricultural supplies and management support to partner NGOs for 3 years.⁵ The first project was initiated in Bangladesh 12 years ago and based on this experience, a similar model was used in Cambodia and Nepal. Support is provided to each NGO partner to establish village nurseries, which are then a good source of seeds, seedlings and saplings for household gardeners. Approximately 60 to 70 village nurseries are set up per district/sub-district, each with a minimum area of 800 square meters and serving nearby villages. The village nurseries also serve as a focus for community support, to demonstrate agricultural methods, and to provide practical training for targeted household gardeners and the leaders of NGO women's groups. Household gardeners are encouraged to



improve gardening practices by growing several varieties of vegetables and fruits throughout the year. In this way, the program increases the proportion of households with 'improved' and 'developed' gardens (see Box).

Type of gardens	
Traditional garden:	Produce only gourd and traditional types of vegetables, seasonally and in scattered plots.
Improved garden:	Produce a number of vegetables in fixed plots, but not throughout the year.
Developed garden:	Produce a wider range of vegetables in fixed plots throughout the year.

Role of home gardening in improving micronutrient status

Animal foods are the best source of micronutrients, but vegetables and fruits are often the only affordable source of micronutrients in the family diet of poor households. The production of fruits and vegetables provides the household with direct access to important nutrients that may not be readily available or within their economic reach. Therefore, home gardening is a means to improve household food security.⁵ Data from the HKI Nutrition Surveillance Project (NSP) in Bangladesh show that in the year 2000, households with improved or developed home gardens consumed micronutrient-rich, non-cereal foods more frequently than other households (Figure 1). These foods included high quality foods such as *dal* (lentils) and animal products that are not produced in the garden but can be purchased using income

generated from the garden. Figure 2 shows that the same households also consumed a more diverse diet as indicated by the number of micronutrient-rich, non-cereal foods consumed in the previous week. Similar results were obtained when the data was analyzed by land ownership, an indicator of socio-economic status in Bangladesh.

These findings from rural Bangladesh provide evidence that home gardening enables households to consume micronutrient-rich non-cereal foods more frequently, to diversify their diet and thereby to increase the quality of their diet. We would therefore expect that home gardening lowers the risk of micronutrient deficiencies, and data collected by the NSP for the national vitamin A survey in 1997 suggests that this is the case. Children aged 12-59 months who had not received a vitamin A capsule (VAC) in the previous 6 months were less likely to be night blind, an early symptom of vitamin A deficiency, if they belonged to a household with a home garden.⁶ In addition, the effect of VAC on the risk of night blindness in children was less in households with a home garden than those without one.

While plant foods are important sources of vitamin A and other micronutrients, it is now well known that the bioavailability of vitamin A from plants is lower than originally thought.⁷ Therefore, it is crucial to increase the consumption of animal foods. For this reason, HKI initiated pilot projects in Bangladesh, Cambodia and Nepal to integrate animal production into on-going home gardening programs. This integrated approach is referred to as homestead food production.

Figure 1. The percentage of households that consumed common non-cereal foods on at least 3 days in the previous week by the type of home garden in rural Bangladesh in 2000 (n=53,848). Bars indicate 95% confidence intervals. GLV= green leafy vegetables, YOVF = yellow/orange fruits and vegetables.

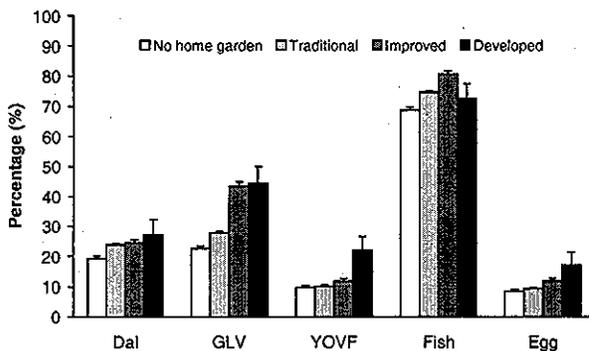
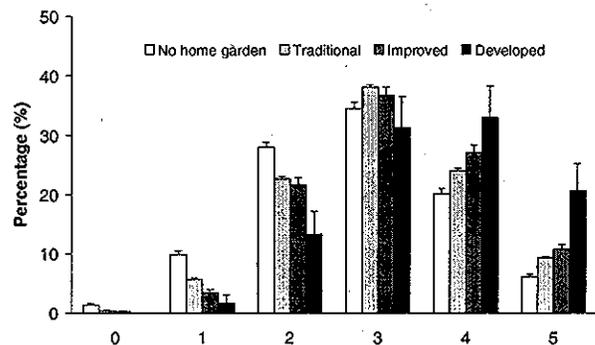


Figure 2. The percentage of households that consumed 0 to 5 different non-cereal foods in the previous week by the type of home garden in rural Bangladesh in 2000 (n=53,848). Bars indicate 95% confidence intervals.



HKI homestead food production program

The HKI Asia-Pacific homestead food production approach builds upon home gardening programs in Bangladesh, Cambodia and Nepal by integrating animal components into the existing gardening activities: poultry and eggs in all three countries and milk and fish production in Bangladesh. Interested village nursery owners become village model farmers who provide training, demonstration and other support services to household food producers. The program promotes household egg production by introducing improved breeds of birds that can produce more eggs, and by ensuring these birds are vaccinated and provided with adequate housing and feed. The program also provides access to improved varieties of grass and deworming tablets for cows to improve milk production, and introduces fast growing fish cultivars and plant sources of fish feed to increase fish production.

Findings from baseline and monitoring surveys in all three countries show that chicken liver consumption increased significantly 10-12 months after baseline, and that the percentage of households obtaining chicken liver from their own production increased (Table). Data from Bangladesh also show that egg consumption by any household member, mothers and children significantly increased. Because eggs and liver are good sources of micronutrients, an increased consumption improves intake of micronutrients, including vitamin A.

Table. Consumption of eggs and poultry liver and source of poultry liver in Bangladesh, Cambodia and Nepal at baseline of pilot homestead food production project and after 10-12 months.^a

	Baseline (n=544)	After 10-12 mo (n=551)
H/hold consumed liver in last 7 days (%)	21	35
Source of liver (%) ^b		
Own production	28	41
Purchase	70	57
Other	2	2
No. eggs consumed last week (median) ^c		
Any household member	5	12
Mothers	1	2
Children	2	3

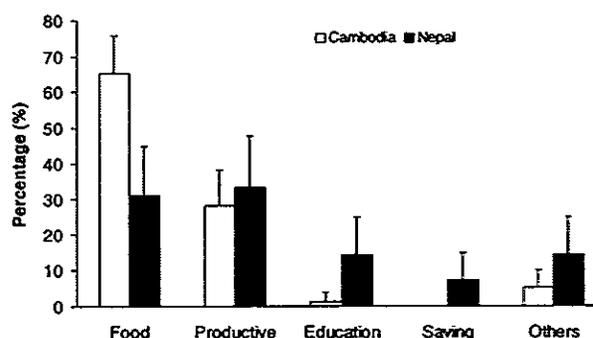
^a Data comprises two cross-sectional surveys.

^b Data from Cambodia and Nepal; only households that consumed liver in the last 7 days are included.

^c Data from Bangladesh; only households that have children are included.

Food consumption and dietary quality are further increased when households use income generated from selling some of the produce from homestead food production to purchase other high-quality foods. Data from Cambodia and Nepal show that 31-65% of income from selling poultry was used to purchase other foods (Figure 3).

Figure 3. Main use of income generated from selling poultry produce in Cambodia and Nepal (n=120). Bars indicate 95% confidence intervals.



The HKI homestead food production program is a good example of how vegetables, fruits and animal foods can be made available throughout the year for poor households in Bangladesh, Cambodia and Nepal.

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Conclusions

With technical assistance and support from HKI's homestead food production programs, households can be encouraged to integrate animal husbandry/poultry into existing home gardening activities, and thereby to increase the household-level production of animal products, vegetables and fruits throughout the year. Homestead food production also provides a source of income for poor women, which is used to buy other foods.

The increased availability of home-produced foods and income enables households to increase their consumption of micronutrient-rich foods from both animal and plant sources and to diversify their diet, and thus lower the risk of micronutrient deficiencies.

Integration of animal husbandry/poultry into existing home gardening programs using locally available resources is simple to implement and cost effective.

Recommendations

- Programs that increase the production and availability of micronutrient-rich foods, both animal and plants, should be included in strategies to reduce micronutrient deficiencies.
- HKI's homestead food production program has proven success in three Asia-Pacific countries in improving the availability of micronutrient-rich foods through poultry raising, animal husbandry, fish cultivation and home gardening. It is important that the program is expanded to other areas in these countries and implemented in other countries where micronutrient deficiencies are a public health problem.



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