

## **Adapting food-based strategies to improve the nutrition of the landless**

### **Executive Summary**

Food-based approaches that focus on dietary diversification are effective strategies for reducing micro- and macro-nutrient deficiencies in malnourished populations. These approaches such as Helen Keller International's (HKI) homestead food production (HFP) model seek to improve the micronutrient intake of individuals, increase household food security, and advance women's empowerment. The standard intervention includes gardening, poultry production, group marketing, and nutrition behavior change communication. However, this model has not yet been fully adapted to improve the lives of those who live in land constrained households.

These models have historically been implemented with small-holder households; however, due to the urgent nutritional needs of the growing number of landless and nearly landless households in Bangladesh, these models must be adapted to reach this marginalized population. Individuals in poor households with minimal land access are among the most food-insecure and malnourished in Bangladesh and they require food-based interventions to be targeted to their unique capabilities.

Targeting these strategies to poor land constrained households in Bangladesh requires modification of this package to focus on technologies that maximize yields and focus on nutritionally rich varieties that can be produced on small plots. Given their limited production capacity and immediate income needs, interventions for the very poor should include skill-building and income earning opportunities that are linked to agricultural production. Nutrition education and counseling are essential for improving nutrition outcomes. In addition, new intervention approaches to reach this group must be thoroughly evaluated. This paper reviews HKI's work with homestead dietary diversification strategies over the past 20 years and then proposes modifications to ensure that the most marginalized can derive equitable nutrition benefits from this food-based intervention.

## Adapting food-based strategies to improve the nutrition of the landless

Food-based approaches that focus on dietary diversification are effective strategies for reducing micro- and macro-nutrient deficiencies in malnourished populations (5; 6; 7). Dietary diversification strategies combine homestead gardening, small animal rearing, and nutrition behavior change communication, and these approaches are uniquely well suited to reducing malnutrition in Bangladesh where cultural food preferences as well as income poverty lead to a Bangladeshi diet that is characterized by a lack of dietary diversity leading, in turn, to the hidden hunger of micronutrient malnutrition (2). In Bangladesh, most households subsist on a diet consisting mainly of rice, which provides 69% of food energy but is low in fat, essential amino acids and micronutrients (2; 3). Animal source foods, which provide high quality protein and bio-available iron and vitamin A, make up less than 2% of total energy intake (4). While rice production has largely kept pace with population growth, cultural food preferences and lack of knowledge about the need for a diversified diet create a limited demand for more diversified agriculture production systems. (1).

Many local and international NGOs have adopted food-based strategies throughout the country. The Government of Bangladesh's National Food Policy names investing in homestead gardening as one key strategy for reducing malnutrition among vulnerable groups (2). However, one of the general caveats related to food-based approaches to nutrition is that by definition, they may fail to serve one of the most needy and food-insecure populations—the rural landless (8). In recent decades, average land-size holdings in Bangladesh have declined significantly. The proportion of landless households in rural areas is increasing, posing long-term threats to national food and nutrition security (9; 10). Land and livelihood security are closely linked in Bangladesh (10); a greater proportion of the landless are poor than those with some land (1) and landlessness is associated with higher rates of malnutrition (11). The majority of the poor have insufficient or irregular income to access nutrient rich foods and they have less horticultural production capacity to produce sufficient food for their own consumption.

Given the steady erosion of land access and the policy attention on the plight of the ultra-poor in Bangladesh, it is critical and timely to consider how a food-based approach can be adapted to tackle malnutrition within this vulnerable group. This paper discusses some issues related to adapting homestead food production models for the landless<sup>1</sup> and proposes programmatic policy suggestions to improve impact among this subgroup. This paper draws on published and unpublished quantitative and qualitative data drawn from a number of Homestead food production projects that have been undertaken by HKI-Bangladesh and is extracted from *Adapting food-based strategies to improve the nutrition of the landless: A review of HKI's Homestead Food Production program in Bangladesh* by Emily Hillenbrand and Jillian L. Waid.<sup>2</sup>

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<sup>1</sup> In this paper a “landless household” is one which owns less than 5 decimals (~200 meters squared) of land.

<sup>2</sup> This paper was presented at the international symposium *Food and Nutrition Security: Food-based approaches for improving diets and raising levels of nutrition* held at the Food and Agriculture office of the United Nations (FAO), on the 7-9 of December 2010.

## *Food insecurity and malnutrition among the landless in Bangladesh*

Despite steady economic growth and near self-sufficiency in rice production, rates of poverty and malnutrition remain high in Bangladesh. In this agrarian economy, there is a distinct correlation between landlessness and poverty. Due to a growing population and the needs of urban areas and industry, agricultural land has diminished from 65% of Bangladesh's land area in 1990 to 55% today (12). Average land holdings have declined, and the proportion of landless rural households is increasing (9). The Agriculture Census of 2008 shows that the percentage of absolute landless rural farming households (households that do not have any access to cultivable land) increased over 26% in the previous 12 years, from 10.2% to 12.8% (9).<sup>3</sup> With predicted sea level rise related to climate change, it is likely that land available for cultivation will further diminish in the future (13).

Fractured and dwindling land holdings constitute a significant structural impediment to diversified food production and food security (1; 14). Loss of land is linked to diminished capacity to accumulate other assets and is often accompanied by a shift into agricultural day labor or migration to other areas of Bangladesh for employment (15; 14). Extreme land scarcity limits individual households' capacities to produce adequate food to meet year-round nutritional and/or income needs. Rural economies are poorly diversified; thereby, the vast majority of rural poor are engaged as day laborers in agriculture (72%), a seasonal occupation that can leave households without income for several months of the year (16; 17). In turn, malnutrition related to seasonal hunger compromises the most critical livelihood capital of the landless—their physical labor capacities. Illness associated with poor health and under-nutrition translates into lost labor days and decreased income, exacerbating the cycle of poverty and malnutrition (18).

Rates of poverty are also highest among the landless. While 28% of the total rural population lives below the lower expenditure poverty line, 50% of those that are landless are below the lower poverty line (19; 1). Among poor households in Bangladesh, nutritional status and micronutrient adequacy are severely compromised. About 75% of the daily calories in this wealth group come from rice alone, 5% more than the already high proportion consumed by the population overall (1). Children in these households are malnourished in a greater proportion than children in households who have greater land access (11).

The landless poor are not only poorer than others but also have distinct livelihood strategies and vulnerabilities. In Bangladesh, poor households are more likely than others to be headed by a family member with no education and to have fewer income-earning members per household (10; 1). Poor women have greater mobility than women of higher wealth groups – who are restricted to the homestead (21) – and less access to safety nets due to social exclusion and marginalization. Without land or other livelihood assets, they are excluded from many microfinance organizations and the social capital that such groups can provide (21; 22; 23). Their

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<sup>3</sup> Because this proportion is only calculated from rural households, this figure may understate the growth in landlessness by not counting families who have migrated to urban areas due to loss of land.

acute need for income allows them to transgress cultural constraints on women's mobility and visibility to seek day labor opportunities; however, this transgression simultaneously deepens their social exclusion (21). Their livelihood strategies entail time-consuming investments in making themselves visible to patrons, for example by providing unpaid and degrading labor to wealthy residents in the village in the hopes of being supported by that patron later (16; 17). The opportunity cost of attending group meetings or nutrition trainings is steeper for the very poor, who may end up missing vital opportunities for day labor.

While a number of programs and organizations in Bangladesh are currently targeting the poorest, the majority of these adopts an income-based approach and does not address nutritional status (particularly micronutrient deficiencies). Typical interventions include social safety nets, such as the Government of Bangladesh's Vulnerable Group Development program<sup>4</sup>, temporary cash-for-work or food-for-work programs, and asset transfer. Few of these approaches are nutrition-sensitive or nutrition-centered. For example, food-for-work programs or government food distribution programs are generally rice-based. These grain handouts provide calories but do not provide sufficient micronutrients for health. There is abundant evidence that poverty-reduction schemes alone—while expanding households' access to food—do not automatically result in improved dietary practices (24; 8).

Ensuring balanced and nutritious food for the poor is a key performance indicator in the Government of Bangladesh's National Food Policy (2). Given that 80% of the rural poor in Bangladesh depend on agriculture for their livelihoods, investing in a food-based, nutrition-centered approach such as homestead gardening continues to be an important strategy for addressing malnutrition and food security for a plurality of rural groups (2). However, the landless poor are the group simultaneously most in need of and historically least able to take advantage of agriculture-based dietary diversification approaches. Before discussing possible modification of food based dietary diversification strategies in order to better assist the landless poor, this paper will review how HKI's model has worked in the past and how it has nutritionally benefitted the land-constrained.

### ***Dietary Diversification strategies in Bangladesh***

Begun as a pilot project in 1988, HKI's Homestead food production program (HFP) initially presented a sustainable, agriculture and food-based strategy designed specifically to reduce food insecurity and micronutrient deficiencies, particularly vitamin A deficiency (25). The basic HFP program components focus on providing beneficiaries with agricultural skills to grow year-round, diverse plant varieties rich in vitamin A. Beneficiaries are organized into groups for ease of training and for mutual support. To ensure sustainability of the agriculture component, HFP established a demonstration plot and nursery at community level, later referred to as the Village Model Farm (VMF). The owner of the VMF received support to demonstrate improved

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<sup>4</sup> This program selects poor households in targeted areas of the country to receive monthly supplements of rice at no cost.

gardening techniques and to produce a supply of seeds and saplings of micronutrient-rich plant varieties for the benefit of the community. More information about the scale up of the HFP program in Bangladesh can be found in “Increasing the production and consumption of vitamin A-rich fruits and vegetables: Lessons learned from taking the Bangladesh homestead gardening program to a national scale” by Talukder, et al. (26).

Dietary diversification through gardening and small animal rearing is a flexible, nutrition-sensitive intervention that can be adapted to meet different target populations and to support various goals, including poverty reduction, maternal and child health, and women’s empowerment. In the 20 years since the program began, HFP has enabled project beneficiaries to increase egg and lentil consumption, nearly triple garden production, double the varieties of vegetables produced (27). In addition, certain projects that had a more comprehensive evaluation structure have shown that HFP can drastically reduce rates of anemia.

From the outset, HFP included a nutrition component to educate beneficiaries on the importance of consuming vitamin A-rich foods and a more diverse diet. The main measures of success were increases in dietary diversification (a proxy indicator for food security and reduced micronutrient malnutrition), along with changes in agricultural production techniques emphasizing greater plant varieties and year-round production. Measurements of HFP program success also documented women’s noticeable gains in control over household decisions and income generated from the sale of surplus HFP products.

Over the years, the HFP program evolved into a more comprehensive approach to food security, developing greater income earning opportunities for beneficiaries in addition to the original nutrition aims of the program. In 2002, HKI added a poultry-rearing component, based on evidence that the vitamin A from animal source foods is more easily absorbed than that from plant sources (28; 29). Since 2005, a goat rearing component has been added as an asset transfer for the poorest women. Nutrition education was always a component of HFP, but as the program evolved, it expanded to address more broad-based nutrition issues, such as infant and young child feeding practices and the importance of increased consumption of food and micronutrients during pregnancy (31; 32).

In concert with the changes in program design and after the conclusion of a nationwide program, HKI increasingly turned its attention to those in greatest need of homestead food production. The most food insecure and nutritionally vulnerable populations in Bangladesh tend to be land-constrained and living in environmentally insecure areas, such as those on riverbanks and riverine islands. As the program began to reach out to more vulnerable populations in more remote and environmentally insecure locations, the mean land size also dropped.

### ***Programmatic policy adjustments to improve impact amongst the land-constrained***

As HKI expanded its work with landless sub-groups, the organization also conducted qualitative and participatory research to gain insights into their characteristics and livelihood strategies. While there is yet limited HKI data that is disaggregated by land-size group and

intervention basket, the program experiences outlined above offer some preliminary lessons that can be developed and refined into a comprehensive strategy for meeting the needs of land-constrained groups. While further research is needed, a set of basic observations follows.

*Expand technologies to intensify nutrition-sensitive micro-plot production.* The standard technical training provided to HFP beneficiaries emphasizes techniques that can improve the productivity of medium-scale plots, through raised bed drainage systems, use of fencing, and creation of compost pits. However, poorer women may lack the family support for the traditionally male aspects of gardening labor, such as raising beds or building a fence, or taking their surplus produce to market (21). Field reports suggest that the landless cannot follow this technical approach.

Effective technologies to maximize poor quality and flooded land do exist (such as roof-top gardening or floating gardens), and can be applied in targeted geographical zones of Bangladesh. Promising techniques such as hydroponic technologies being tested by other NGOs could be considered in an HFP program targeting ultra-poor living in flood-prone regions or with minimal land holdings (33). In addition poor landless households should be encouraged to plant pit crops, such as pumpkin and cucumber, which are hardy, fast-growing, require minimal space, and tend to generate quick and sizeable income.

Intensifying the year-round productivity of small plots not only calls for new mechanical technologies or hardier, micronutrient-rich varieties, but also for consistent use of training approaches and planning tools that capitalize on beneficiaries' understanding of seasonality and their particular land characteristics. HKI uses participatory land mapping and garden-planning exercises with beneficiaries, which develop their capacity to plan year-round and to modify their production strategy at different times of the year. This process, facilitated by field staff, encourages the beneficiaries to consider the nutritional as well as income goals for their garden, and to design a growing strategy based on the particular capacities and limitations of their land plot. Ultimately, this enables those with little available land to make greatest use of limited resources and builds the planning skills that represent an important livelihood capital.

*Equity-centered approach based on livelihoods and nutritional analysis.* An equity-centered approach is based on a clear understanding of who is malnourished within a beneficiary population and why, and what different capabilities the sub-groups have (8). Landless poor beneficiaries are involved in irregular day labor activities, face greater time constraints than less poor beneficiaries and have the most urgent income and nutrition needs. For these beneficiaries, HFP agriculture-related interventions (seed support and gardening training) need to be complemented with more immediate, short-term benefits. This approach would be a first step in building equity into HFP across economic groups. HKI successfully introduced cash-for-work and cash-for-training components into its HFP program, which enable landless ultra-poor to meet food needs while building human and financial capital for agro-based microenterprises. Other complementary strategies might include direct asset transfer, conditional cash transfers, and group-based access to savings accounts, agriculture credits, or leased land.

An equity-centered approach to HFP requires a revision of input distribution, with differentiated needs of the beneficiaries identified. Working with small, homogeneous groups, in slightly different intervention components may be more effective—though ultimately more costly. However, smaller, more homogeneous groups for training, income-generating, and group savings activities may help the ultra-poor leverage social, labor, and financial support from the program. A participatory livelihoods or social analysis during program design stage would identify the livelihood capitals (beyond land) that different groups within a population can access or need to acquire to improve their immediate and long-term nutrition security.

*Emphasize subsidized poultry rearing for nutrition and income.* HKI's Improved Poultry Program is particularly appropriate for the landless ultra-poor, as it requires minimal land to produce a sustainable source of animal source foods. The emphasis of the poultry program is on intensive production of eggs, through supplemental feeding and better chick-rearing practices. Poultry rearing maximizes the productivity of micro-plots and generates immediate income and animal-source foods for consumption. HKI data show that poultry, as opposed to livestock or other agriculture assets, is more likely to remain in women's control. Furthermore, it has a significant impact on women's and children's anemia rates (34).

A further benefit of the poultry program is that it creates livelihood opportunities for ultra-poor women, who tend to have greater mobility than less poor women. Within the HFP program, HKI has trained a number of ultra-poor women as mobile community vaccinators, who are then linked to the government for supplies and charge a fee for providing both individual and mass vaccinations. In one USAID-funded HFP project, 244 ultra-poor, landless women were trained as community-based vaccinators. In this course of this project, high-performing vaccinators were earning as much as Taka 4,000-5,000 per month (\$57-71), while those at the lower end of the scale earn around Taka 500 to 1,500 per month (\$7-21).<sup>5</sup> This improves the income status of the individual vaccinator, and meets a critical need of smallholder producers throughout the community, by filling the demand that government extension services are not able to meet (30).

*Develop agro-enterprises with emphasis on nutritional outcomes.* Building on the success of the community-based vaccinator program, modifications of the HFP model could consider additional agro-based occupations for which HFP generates demand. Skills-training in these occupations should be specifically targeted to the landless HFP participants, who are less able to benefit from the homestead gardening component. One opportunity built into the HFP program is the emphasis on distributing less disease-prone local (rather than hybrid) poultry breeds. Given the steady demand for quality, local-variety poultry birds in HFP programmatic areas, building up some ultra-poor women into certified local poultry breeders would be a sustainable solution that would generate benefits to the ultra-poor, as well as to the broader smallholder community.

Other agro-based occupations might include mobile seed-selling (to reach smallholders located far from the VMF), sapling production; large livestock vaccination; mobile promotion of

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<sup>5</sup> This income estimate is based on the rate of 70 Bangladesh Taka (BDT) to \$1.

farm technologies (such as micro-irrigation equipment); or tree grafting. In HKI projects, the poultry program has also been shown to create local employment for carpenters, who produce the sheds. Female ultra-poor beneficiaries could also be trained in this skill, which would not only create income but would transform social norms about gendered occupations.

*Incorporate market research and value-addition processes.* In the original HFP program design, income-generation from sales of vegetables and poultry was a positive side-effect, rather than primary purpose of the program. Data from HKI projects show that almost all HFP families with land generate and sell some surplus produce, and this income-generating aspect of the program is significant for the associated gains in women's autonomy and decision-making. HKI has gradually increased focus on the marketing component of the program, developing approaches such as group marketing that enable women to generate profit with minimal inconvenience or time loss.

Incorporating a market-oriented approach to HFP that strengthens linkages with the private sector may create alternative livelihood opportunities for the poor. It can also have benefits for the broader community by facilitating access to quality inputs, and creating a cheaper, more diverse and nutritious food supply in the local markets and for households. Apart from being a demonstration farmer, the VMF could also be trained in business plan development and supported to establish linkages with private-sector market actors.

Nutrition-sensitive subsector and value-chain analyses conducted at the outset of the HFP program can identify niche crops where value-addition can provide employment for the ultra-poor and greater profits for all producers in the group. In addition to basic post-harvest grading and handling processes, primary and secondary processing can add significant value to products and enable sales during the off-season. In HFP catchment areas where primary post-harvest processing can be done at the beneficiary level, the functionally landless producers can be trained and equipped to participate in value-addition processes, including packaging or home-based processing. Technologies that can be introduced at the beneficiary level include solar driers, rice-husking machines, and canning processes. Processing and storing food can also serve the overall purpose of providing access to nutritious food year-round. However, maximizing the nutritional gains of food storage techniques will depend on selecting appropriate technologies that preserve the micronutrient content of the selected product (6).

*Nutrition behavior change communication for different populations.* The risk of incorporating market-oriented approaches into the HFP program is that the emphasis on income will displace nutrition goals. In some cases, sudden or rapid access to income for cash-poor households allows them to access foods that are perceived as 'higher status', although these may not be nutritionally valuable. Much of malnutrition relates to intra-household allocation or to inappropriate adolescent, maternal, and young-child feeding practices. Research shows that intensive nutrition education alone—without micronutrient supplements—can improve the status of moderately malnourished children (35). From the outset, the HFP program united nutrition communication with agriculture training. The combination of homestead food production with nutrition



education has brought about significant reductions in anemia rates and improvements in dietary diversity in diverse project areas.

For most of the landless poor, a focus on income-generation is critical to enable them to purchase the nutritious foods that they are not able to produce on their homesteads, however there is clear evidence of the critical role that nutrition education plays and this would need to be included as a core component along with the other livelihood strategies outlined in this paper. However, specific nutritional research and training materials may need to be designed to ensure that nutrition messages and programs are addressing the specific vulnerabilities of poor households, including the elderly and those of non-reproductive age.

*Improving targeting through improved evaluation systems.* As dietary diversification strategies, such as HKI's HFP, are adapted to work with the ultra-poor, more attention needs to be placed on the evaluation of these programs' success in improving the nutrition of different demographic groups overall and the individual impact of program components. The authors of the Lancet series on child and maternal under nutrition did not recommend dietary diversification strategies as an intervention to prevent malnutrition for mothers or children, because the authors found that these strategies had "insufficient or variable evidence of effectiveness" and in the text asserted that such programs to date had been small scale with insufficient evaluation (39). In Bangladesh, these programs have not been small scale; 210 out of 460 sub-districts in Bangladesh have been reached by HKI alone through over 70 local NGOs. However, the Lancet series is correct that the lack of rigorous evaluations of these programs has led to insufficient published evidence of the success of these programs.

The Lancet article considered 29 studies and one systemic review of home gardening, small scale animal husbandry, and dietary modification strategies for its assessment of these programs, a number much higher than recommended interventions (39). However, most of the approaches the series recommended were evaluated using randomized control trials (RCT); a methodology based on the way medical research has been undertaken and currently considered the most rigorous. No RCT evaluation has yet been undertaken with a dietary diversification intervention; due in part to the evaluation tradition in agricultural research out of which HFP has come, an easy acceptance of HFP when the project was launched, and the state of evaluation methodologies in the 90s.

From the inception of the Homestead Food Production (HFP) projects, the increase in the productivity of homestead land has been remarkable. All projects since the initial pilot project have shown at least a threefold increase in vegetables produced. In step with increases in production have been increases in consumption of vegetables by multiple members of the family. In addition, because women control HFP, more resources are passed to the more vulnerable members of the family. However, despite HKI's long history with HFP and the strong monitoring systems that have been a part of every program since the inception of the model, there has been little evidence that the program's impact on dietary diversity has resulted in gains in anthropometric or biometric nutrition indicators in children or adults.

Applied agricultural research has a completely different premise from what one would find in a RCT. Applied agricultural research is only undertaken after basic agricultural research has proven the technique successful, so field trials are only testing the ability of households to accept and utilize the practice and obtain increased production. In this context, uptake of the new technology by outsiders to the experiment is encouraged and often studied as an additional mode of enquiry. However, for an RCT this “replication” makes it extremely difficult to keep control groups uncontaminated from the intervention. The technologies taught through HFP are easily transportable, and the uptakes of HFP technologies by households neighboring program beneficiary households are documented in the early years of HFP projects. Though this replication of project components is beneficial to the welfare of households in the project area, it will contaminate any nearby control group, and a more distant control group is less likely to be similar to the treated households.

In addition, because past evaluations of HFP interventions have not used population based samples, the treated households are only a subset of the control, because in the treatment group there are only households who have elected to join the program while in the control there are households who would and would not join the program if it were offered to them. To overcome this problem a population passed sample could be drawn from treatment and control areas that are separated by buffer areas, however this sample would make measuring impact more difficult because included into both samples are populations who are using no aspects or only a few select aspects of the intervention. The program would need to ensure that large numbers of households in the treatment area take up the project or the evaluation would get false negative results.

During the ten year NGNESP, seven rounds of implementation of HFP dissemination were completed. An RCT could have easily been undertaken by randomly assigning areas to phases and comparing households in the current phase to households where implementation was planned three or four phases later. This was not undertaken at this time because RCT had not yet come into common use for the evaluation of development programs and HKIs attention was focused on scaling up and the government’s and donors’ ready acceptance of the program led to an environment where rigorous evidence was not required and therefore not funded. This is a huge missed opportunity as the HFP intervention has only grown more complicated in the intervening years. The complicated nature of the program makes evaluation more difficult and results of an evaluation able to be interpreted in multiple ways.

The nutrition impacts from the current HFP program could come from multiple impact pathways. A better nourished infant could be healthy due to their mother’s increased food intake during pregnancy or due to their mother’s adoption of better infant and young child feeding practices. The mother could be better nourished because she is now earning an income in the household and investing that income in food for the household or because she is currently eating more of what she herself grows or because her family now respects her more due to her contribution to the family income and are now offering her a more equal allocation of household goods. Based on how the researcher interprets the impact pathway they could label any one of these components the cause of the improvement in young child outcomes. Analysis must

account for interactions between project components and allow for a heterogeneous outcome on the treated population.

There are three major reasons why even today RCTs are difficult to conduct for dietary diversification interventions: easy contamination of the control, a high number of components, a reliance on intent to treat analysis, and a complicated impact pathway. An ideal evaluation of HFP would need to consist of comparing different baskets of agricultural technologies – including those drawn from horticulture, aquaculture, and small animal husbandry – to a similar population in an area without the intervention. Any observed impact must be tested for heterogeneous effects by comparing the benefit received by women and children at different stages of the life cycle. Instead of seeking to answer one big question: What is the impact of this program?, evaluations should seek to answer multiple discrete questions such as: What is the impact of this program on pregnant women? What is the impact of this program for the poorest in this community? What is the impact of this program on children not yet born? Only by answering these questions, can we hope to justify HFP for different specific populations to the nutrition community.

## **Discussion**

The conditions and approaches detailed above are highly specific to the context of Bangladesh, where land scarcity is extreme and constitutes a defining characteristic of food insecurity and malnutrition. However, the challenge of evolving tried-and-true food-based, nutrition-sensitive approaches to reach more marginalized populations will be a global imperative in the decades to come, as climate change, urbanization, and population pressures limit resources (including water) available for diversified agriculture production. HKI's research and field experience has shown that landless beneficiaries have great enthusiasm to be included in HFP interventions, which was seen as providing a stable source of food, potential income, and social capital. However, to ensure that the landless poor are able to gain equitably from HFP certain modifications of critical areas of the “standard” HFP model are required.

Food-based approaches are unique in that they specifically promote nutrition outcomes, which have long been neglected in poverty reduction and agriculture extension programs. The very poor are the most nutritionally compromised and malnourished and have reduced access to health services. The livelihood strategies of the most vulnerable tend to be more diverse and varied. Their lack of assets means that they have to employ nutritionally risky coping mechanisms. For this reason, the capacity to produce even a small quantity of home-based, nutritious food with minimal labor or time inputs can be especially valuable intervention for the poor. Having better nutrition and fewer nutrition-related health complications can translate into a sustainable livelihood gains for the poor, for whom physical labor capacity is often their most important livelihood resource.

HKI's homestead food production, which places a central focus on nutrition, has been shown to be a flexible production model that can have positive nutrition benefits for the landless. Adapting the model for the landless calls for an equity-centered approach, based on a clear

understanding of how and why different populations are malnourished, and what different capabilities the sub-groups have to produce or access nutritious foods. This equity-centered approach also entails stratifying support packages for different sub-groups.

HKI experience to date indicates that to maximize their capacity to benefit from the HFP strategy, the ultra-poor require both food-based and income-oriented supports, which enable them to meet immediate needs while building up longer-term food security and stability. This may include a combination of agro-based micro-enterprises, emphasis on food storage techniques, and combinations of asset-transfer and livelihood skill-building. Developing nutrition-sensitive agro-enterprises in a community-based model can also yield nutrition benefits for the broader community, as it can expand the availability of and demand for a diversified horticultural food basket.

Training on nutrition and nutrition-sensitive agriculture planning is an indispensable component of any food-based intervention, particularly one that targets the ultra poor. However, communication approaches to improve the nutritional practices of the ultra-poor are not identical to those promoting child growth outcomes. To have lasting impact on their nutrition status, a behavior change communication strategy for the ultra-poor must be designed based on an understanding of the underlying determinants of their malnutrition and their nutrition strategies.

These essential programmatic modifications have implications for intervention costs as well as for further research and evaluation needs. Further extension research is also required into growing technologies and seed varieties, including flood-sensitive varieties, which can maximize the year-round productivity of poor quality, small plots of land. As food-based nutrition interventions are modified to address the ultra-poor, disaggregation of nutrition outcomes by wealth quintile and rigorous monitoring of intervention types will be critical to determining the most cost-effective and efficacious strategies.

## References

1. *To what extent can food-based approaches improve micronutrient status?* **Allen, Lindsay H.** S1, 2008, Asia Pacific journal of Clinical Nutrition, Vol. 17.
2. **FAO.** *Food-based Nutrition Strategies in Bangladesh.* Bangkok : Department of Agriculture Extension, Government of Bangladesh and Food and Agriculture Organization (FAO) Regional Office for Asia and the Pacific, 2007. RAP Publication 2007/05.
3. *Food-based strategies to meet the challenges of micronutrient malnutrition in the developing world.* **Tontisirin, Kraissid, Nantel, Guy and Bhattacharjee, Lalita.** 2002, Proceedings of the Nutrition Society, Vol. 61.
4. **FPMU.** *National Food Policy: Plan of Action (2008-2015).* Ministry of Food and Disaster Management, Government of the People's Republic of Bangladesh. Dhaka : Food Planning and Monitoring Unit (FPMU), 2009. Monitoring Report 2009.
5. **Darton-Hill, I., et al.** *Tables of Nutrient Composition of Bangladeshi Foods: English Version with Particular Emphasis on Vitamin A Contents.* Dhaka : Helen Keller International, Bangladesh, 1988.
6. **FAO.** Food Security Statistics. *Food and Agriculture Organization.* [Online] 2010. [Cited: March 22, 2010.] <http://www.fao.org/economic/ess/food-security-statistics/en/>.
7. **BBS.** *Household Income and Expenditure Survey.* Planning Division, Ministry of Planning, Government of the People's Republic of Bangladesh. Dhaka : Bangladesh Bureau of Statistics (BBS), 2007.
8. **Kennedy, Eileen T.** Approaches to Linking Agriculture and Nutrition. *Health Policy and Planning.* 1994, Vol. 9, 3.
9. **BBS.** *Preliminary Report of Agriculture Census.* Planning Division, Ministry of Planning, Government of the People's Republic of Bangladesh. Dhaka, Bangladesh : Bangladesh Bureau of Statistics (BBS), 2008.
10. **FAO & WFP.** *Special report: FAO/WFP crop and food supply assessment mission to bangladesh.* Economic and Social Development Department, Food and Agriculture Organization (FAO) & World Food Programme (WFP). Rome, Italy : Food and Agriculture Organization (FAO), 2008b.
11. **BBS & UNICEF.** *Child and Mother Nutrition Survey of Bangladesh.* Statistics Division, Ministry of Planning, Governemtn of the People's Republic of Bangladesh. Dhaka, Bangladesh : Bangladesh Bureau of Statistics (BBS), 2007b.

12. **Ministry of Agriculture.** Handbook of Agricultural Statistics, December 2007. *Ministry of Agriculture, Government of the People's Republic of Bangladesh.* [Online] 2007. [Cited: 11 25, 2010.] <http://www.moa.gov.bd/statistics/Table5.01CI.htm>.
13. *Global warming induced sea level rise on soil, land and crop production loss in Bangladesh.* **Hossain, M. A.** Brisbane, Australia : World Congress of Soil Science, 2010. 19th World Congress of Soil Science, Soil Solutions for a Changing World; Global Challenges and Soil Salination. pp. 77-80.
14. **Manprasert, Md. Habibur Rahman and Somprawin.** Landlessness and its impact on economic development: A case study in bangladesh. *Journal of Social Sciences* . 2006, Vol. 2, 2.
15. **Chowdury, Mehruna Islam.** *Impact of Increasing Landlessness on Access to Food: Experience of Small and Marginal Farmers in Rural Bangladesh.* Dhaka : Unnayan Onneshan--The Innovators, 2009.
16. **Van Haeften, Roberta and Phil Moses.** *Bangladesh Food Security Country Framework FY 2010-2014.* Washington, DC : Food and Nutrition Technical Assistance Project (FANTA II), Academy for Educational Development (AED), 2009.
17. **Matin, Imran, Sulaiman, Munshi and Rabbani, Mehnaz.** *Crafting a Graduation Pathway for the Ultra-Poor: Lessons and Evidence from a BRAC Programme.* Dhaka : BRAC Research and Evaluation Division, 2008.
18. *Calorie and Micronutrient Deprivation and Poverty Nutrition Traps in Rural India.* **Jha, Raghendra, Gaiha, Raghav and Sharma, Anurag.** 5, 2009, World Development, Vol. 37, pp. 982-991.
19. **Akhter U Ahmed, Ruth Vargas Hill, Lisa C. Smith, Tim Frankenberger.** *Characteristics and Causes of Severe Poverty and Hunger.* Washington, DC : IFPRI, 2007.
20. **HKI.** *A Gender Analysis of the Reconstruction, Economic Growth, and Livelihoods (REAL) Project.* Dhaka, Bangladesh : Helen Keller International (HKI), 2009.
21. —. *Social Analysis in Laxmichari Upazila.* Dhaka, Bangladesh : Helen Keller International (HKI), 2010.
22. **Tango International.** *Char Fassion Assessment Design Document, prepared for Save the Children USA, Bangladesh.* Dhaka : Tango International, 2009.
23. **CGN Mascie-Taylor, MK Marks, R Goto, R Islam.** Impact of a cash-for-work programme on food consumption and nutrition among women and children facing food insecurity in rural Bangladesh. *Bulletin of World Health Organization.* 2010, Vol. 2010, 88.

24. **HKI.** *Economic and Social Impact Evaluation.* Dhaka : Helen Keller International (HKI), 2006.
25. *Increasing the production and consumption of vitamin A-rich fruits and vegetables: Lessons learned from taking the Bangladesh homestead gardening programme to a national scale.* **Talukder, Aminuzzaman, et al.** 2, s.l. : The United Nations Univeristy, 2000, Food and Nutrition Bulletin, Vol. 21, pp. 165-172.
26. **Iannotti, Lora, Cunningham, Kenda and Ruel, Marie.** Diversifying into healthy diets: Homestead food production in Bangladesh. [ed.] David J. Spielman and Rajul Pandya-Lorch. *Millions Fed: Proven Successes in Agricultural Development.* Washington, D.C. : International Food Policy Research Institute, 2009, pp. 145-151.
27. *The impact of semi-scavenging poultry production on the consumption of animal source foods by women and girls in Bangladesh.* **Neilsen, Hanne, Roos, Nanna and Thilsted, Shakuntala H.** s.l. : American Society for Nutritional Sciences, 2003, The Journal of Nutrtrion, Vol. 133.
28. *Can interventions to promote animal production ameliorate undernutrition?* **Leroy, Jef L. and Frongillo, Edward A.** s.l. : American Society for Nutrition, November 2007, The Journal of Nutrition, Vol. 137.
29. **HKI.** Training Communities on Essential Nutrition Actions. *HKI Bulletin Number 4.* Dhaka, Bangladesh : Helen Keller International (HKI), 2010. Vol. April, 4.
30. —. Dishari project staff meeting minutes. Dhaka, Bangladesh : Helen Keller International, October 2010.
31. **Saha, Shantanu Kumar.** *Soiless Cultivation for Landless People: An Alternative Livelihood Practice through Indigenous Hydroponic Agriculture in Flood-Prone Bangladesh.* s.l. : Ritsumeikan Asia Pacific University.
32. **HKI.** *Female decision-making power and nutritional status within Bangladesh's socio-economic context.* Dhaka, Bangladesh : Helen Keller International (HKI), 2006.
33. **InterAction.** Best Practices and Innovations in Agriculture, Round 1. *www.InterAction.org.* [Online] November 2010. <http://www.interaction.org/bpi-round-1-full#hki>.
34. *Intensive Nutrition Education with or without Supplementary Feeding Improves the Nutritional Status of Moderately Malnourished Children in Bangladesh.* **Roy, S. K., et al.** 4, Dhaka : Journal Health Population and Nutrition, 2005, Vol. 23.
35. *Anaemia in Bangladesh: A Review of Prevalence and Aetiology.* **Ahmed, F.** 4, December 2000, Public Health and Nutrition, Vol. 3.

36. *Extent of vitamin A deficiency among rural pregnant women in Bangladesh.* **Lee, Vanessa, et al.** 12, 2008, Public Health and Nutrition, Vol. 11.
37. **Bangladesh Planning Commission.** *Bangladesh: Unlocking the Potential, National Strategy for Accelerated Poverty Reduction.* Washington, D. C. : International Monetary Fund, 2005.
38. **Ministry of Agriculture.** *National Agriculture Policy.* Dhaka, Bangladesh : Government of the People's Republic of Bangladesh, 1999.
39. **Sulfiqar A Bhutta, Tahmeed Ahmed, Robert E Black, Simon Sousens, Kathryn Dewey, Elsa Guigliani, Batool A Haider, Betty Kirkwood, Saul S Morris, HPS Sachdev, Meera Shekar.** Maternal and Child Undernutrition 3: What Works? Interventions for maternal and child undernutrition and survival. *The Lancet.* February, 2008, Vol. 371, 9610.
40. **Management, Government of Bangladesh Ministry of Food and Disaster.** *Bangladesh Country Investment Plan (revised): A Road Map Towards investing in Agriculture, Food Security and Nutrition.* 2010.
41. *Sex bias in the family allocation of food and health care in rural Bangladesh.* **Chen, Lincoln C., Huq, Emdadul and D'Souza, Stan.** 1, s.l. : The Population Council, March 1981, Population and Development Review, Vol. 7.
42. *Vitamin A deficiency in poor, urban, lactating women in Bangladesh: Factors influencing vitamin A status.* **Ahmed, Faruk, Azim, Asfia and Akhtaruzzaman, Mohammad.** 5, 2003, Public Health and Nutrition, Vol. 6.
43. **HKI.** *Homestead food production: An effective integrated approach to improve food security among the vulnerable char dwellers in northern Bangladesh.* Dhaka, Bangladesh : Helen Keller International (HKI), 2006.
44. —. *Homestead food production improves household food and nutrition security.* Dhaka, Bangladesh : Helen Keller International (HKI), 2004.
45. —. *Homestead food production: Improving nutrition and food security and empowering women in the rural Barisal Division of Bangladesh.* Dhaka, Bangladesh : Helen Keller International (HKI), 2008.
46. —. *The burden of anemia in rural Bangladesh: The need for urgent action.* Dhaka, Bangladesh : Helen Keller International (HKI), 2006.
47. —. *When the decision-maker is a woman: Does it make a difference for the nutritional status of mothers and children?* Dhaka, Bangladesh : Helen Keller International (HKI), 2001.