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John Ogonowski Asia and Near East Farmer-to-Farmer Program

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Executive Summary

Despite great advances in agricultural production in Asia in last over 50 years, rural poverty continues to be a significant problem, contributing to political and social unrest in many countries. In Asia, many of the impoverished are marginalized, subsistence agriculturists and the majority of their income comes from farming activities. Inequalities in development, as well as lack of access to knowledge and markets, contribute to poverty and environmental degradation. Sustainable agricultural practices that help farmers produce high-value crops and connect them to markets can reverse this trend, and contribute to food security and poverty reduction in the region. Due to the predominance of agriculture in the Asian economies, even small investments in food production and distribution show improvements in rural livelihoods and positively impact overall economic growth.

Based on these challenges and USAID's regional strategic objectives, the goal of the Asia Farmer-to-Farmer (FTF) Program implemented by Winrock International and the Intertribal Agriculture Council was to reduce rural poverty and improve livelihoods through production, marketing, and trade of high-value agricultural commodities in an environmentally sound manner in Bangladesh, India, Indonesia, and Nepal. A few volunteers were also fielded to East Timor, Sri Lanka, and Vietnam. The FTF Program goal was addressed through three objectives:

1. Increase *marginalized producers'* competitiveness and upgrade production capacity, quality, and post-harvest handling and transport of marketable products, by using environmentally sound approaches.
2. Strengthen the capacity of associations and non-governmental organizations (NGOs) to assist farmers in linking to markets and improving production.
3. Increase the capacity of *small- and medium-sized businesses, input suppliers, processors, and retailers* to market high-value products.

Asia FTF had the following life of project (LOP) performance targets:

- at least 197 volunteer experts fielded
- at least four agricultural subsectors improved
- capacity of 85 associations, NGOs, cooperatives, and other agribusiness support organizations within the target subsectors improved
- income of at least 23,000 producers improved directly and through NGOs/associations

As of September 30, 2008, Asia FTF implemented 197 volunteer assignments, completed 3,404 volunteer days, and strengthened 124 host organizations and nine focus areas. These assignments directly benefited 18,298 women (34%) and men (66%). Hosts reported US\$27 million in increased annual gross sales and US\$5.8 million in increased annual net incomes.

The following table summarizes the key performance results by country and focus area.

Country	Focus Area	# Vols	# Hosts Strengthened	Annual Gross Sales Increased (US\$)
Bangladesh	Horticulture	25	18	589,575
	Poultry & Livestock	18	8	23,506,801
	Beekeeping	10	6	270,558
India	Horticulture – Organic Farming	40	16	188,462
	Apiculture	9	12	374,075
Nepal	Horticulture – Off-season Vegetables	22	16	418,431
	Beekeeping	17	13	988,265
	Non-Timber Forest Products (NTFP)	11	10	28,582
Indonesia	Horticulture	12	2	276,956
Sri Lanka	Horticulture	11	8	10,560
Vietnam	Horticulture	3	4	n/a
East Timor	Horticulture	2	2	n/a
Flexible		17	9	297,742
Totals		197	124	27 million

By aligning the program design with the USAID’s Asia & the Near East (ANE) strategy and individual country Mission strategic objectives, the Asia FTF Program received excellent host country support and strong interest in volunteer technical assistance from local producers, agribusinesses, NGOs, and research and extension agencies. To widely disseminate technical and managerial innovations, Asia FTF worked closely in partnership with large national and international NGOs, farmer/commodity associations, large agribusinesses, and donor-aided development projects. Partners included BRAC Commercial Enterprises, BMPCUL/Milk Vita, the Gates’ Foundation-supported dairy project, and Apicultural Association in Bangladesh; M.R. Morarka Research Foundation and Uttaranchal Organic Commodity Board in India; Federation of Nepal Beekeepers’ Association, Medicinal Plants’ Cultivators Group, SIMI and BDS-Maps projects in Nepal; and the World Agroforestry Center, Cold Chain Project, and Agroforestry Innovations and Livelihood Enhancement Project in Indonesia.

Overview of Experience

Throughout the LOP, the John Ogonowski Farmer-to-Farmer Program in Asia fielded 197 volunteers, completed 3,404 volunteer days, and worked with 124 host organizations directly benefiting 18,298 women (34%) and men (66%) in Bangladesh, East Timor, India, Indonesia, Nepal, Sri Lanka, and Vietnam. Recognizing the similarity in agro-ecosystems and in challenges faced by farmers and agribusinesses across the Asia FTF countries, targeted subsectors included high-value horticulture; livestock and dairy, including poultry and small ruminants; non-timber forest products (medicinal and aromatic plants) and smallholder forestry; and apiculture (beekeeping and honey production).

Asia FTF incorporated some changes in focus areas: in Bangladesh, the program added livestock and poultry starting the second year of implementation. In addition to the proposed high-value horticulture focus area in Indonesia, Asia FTF fielded volunteers under flexible assignments in smallholder forestry. Both Indonesia and Nepal fielded a small number of flexible volunteers in livestock, swine, poultry, and coffee subsectors.

Country political and programming issues - constraints to implementation

Bangladesh. During the LOP, assignments were sometimes delayed due to political unrest, monsoon flooding and cyclones, and also a rise in militancy in certain regions of the country. Taking into consideration the security issues, the program continued to operate, registering every in-country volunteer with the US Embassy, consulting the USAID Mission regularly about any travel warnings, and judiciously planning each assignment. Country clearances issued by the US Embassy were mandatory for FTF volunteers in advance of travel to Bangladesh.

The overall political and security situation in the country started improving after the installation of the current caretaker government in early January 2007. Parliamentary elections are scheduled to be held in December 2008 and it is anticipated that the political situation in the country will largely be stable upon transfer of the state power to the democratically elected government. Despite these challenges, FTF Bangladesh successfully met its performance targets.

India. FTF India did not face any major problems in implementing volunteer assignments or conducting impact surveys in the three focus states: Rajasthan, Uttaranchal, and Himachal Pradesh.

Nepal. The active Maoist insurgency created an unfavorable security situation for FTF during the first two and half years of the project. Security risks hindered volunteer placement in most of the mountain districts, especially in the mid-west and far-west regions. However, FTF Nepal was able to continue fielding volunteers by changing geographic focus areas to secure regions.

The security situation improved in April 2006 and FTF Nepal increased fielding volunteers to achieve LOP targets. Since then the program has been able to send volunteers even to the remote mountain districts. With the successful election to the Constituent Assembly on April 10, 2008, and formation of a Maoist-led government, it is hoped that the country's political situation will remain largely stable in coming years despite some ongoing disturbances in the southern Terai regions.

Despite political instability and security problems, the Nepal program has been highly successful in achieving its goals and objectives as evidenced from the following comments of the FTF Nepal impact evaluation team:

“The overall impression of the impact evaluation is that... assignments provided by the FTF align well with the county’s Agriculture Perspective Plan and Government’s focuses, and are provided in line with the growth of agricultural and non-agricultural products and to help generate employment.”

“FTF has been evaluated as one of the most promising and successful approaches, considering practical need and issues of individuals/entrepreneurs. It is important to note that technical assistance, particularly expert training provided guidance to help solve farmers’ problem. Winrock’s FTF program should be continued in the days to come with a wider area of coverage and greater scope of implementation.”¹

Indonesia. Although the vast majority of the country has always been safe, a few high-profile incidents of domestic violence and terrorism of limited geographic scope received widespread coverage in the international press. Imbalanced news reports had negative impacts on volunteer recruiting and some suitable candidates declined assignments in Indonesia. FTF Indonesia also experienced a number of delays due to logistical problems and local democratic evolution. Domestic travel delays are becoming common due to the country’s huge size, remote locations, long travel distances, and limited rural infrastructure. In spite of these obstacles, the volunteers successfully completed their assignments.

Sri Lanka. Political volatility had severe impacts on the ability to field volunteers to Sri Lanka. Additionally, in the absence of an FTF office with Winrock staff, it was difficult to strengthen the capacity of our local partner and provide high-quality volunteer support. As a result, volunteer numbers planned for Sri Lanka in years four and five were reprogrammed to other countries. It is Winrock’s recommendation that in conflict/post-conflict countries, it is important for FTF to have full-time project staff to build local capacity, ensure volunteer safety, and provide effective support for volunteer program implementation.

¹ FTF Nepal Program Final Evaluation commissioned by the Social Welfare Council, Government of Nepal

Summary of Major Outputs and Accomplishments

Summary of EGAT Indicator Tables

A total of 115 volunteers worked in the Asia FTF countries to improve productivity in horticulture with special emphasis on introducing organic farming, low-external inputs agriculture (LEIA), and sustainable agriculture practices (e.g., integrated pest management, composting, and vermicomposting). Similarly, 18 volunteers worked to improve productivity in livestock and dairy focusing on feed and nutrition, disease management, artificial insemination, and broiler, beef and dairy processing in Bangladesh, Nepal, Vietnam, and Indonesia. Fifteen volunteers worked in Indonesia and Nepal to address constraints in the NTFP and smallholder forestry subsector. In the apiculture focus area, 36 volunteers provided technical assistance in Bangladesh, India, and Nepal to introduce improved beekeeping practices with special emphasis on queen production and colony multiplication; artificial feeding; mites, disease, and pest management; honey processing and marketing; building capabilities for producing bee supplies locally; and improving training and extension capabilities. Additionally the program fielded 17 volunteers under flexible assignments.

Key performance results by country and focus area

Country	Focus Area	# Vols	# Hosts Strengthened	Gross Sales Increased (US\$)
Bangladesh	Horticulture	25	18	589,000
	Poultry & Livestock	18	8	23,506,000
	Apiculture	10	6	270,000
India	Horticulture – Organic Farming	40	16	188,000
	Apiculture	9	12	374,000
Nepal	Horticulture – Off-season Vegetables	22	16	418,000
	Beekeeping	17	13	988,000
	Non-Timber Forest Products (NTFP)	11	10	28,000
Indonesia	Horticulture	12	2	276,000
Sri Lanka	Horticulture	11	8	10,000
Vietnam	Horticulture	3	4	n/a
East Timor	Horticulture	2	2	n/a
Flexible		17	9	297,000
Totals		197	124	27 million

For additional details regarding focus area results, see individual country summaries, EGAT Standard FTF Indicator Tables, Success Stories, and Volunteer Impact Summaries.

Key results from FTF interventions include:

- host organizations realized US\$27 million in increased annual sales and US\$5.8 million in increased annual incomes
- volunteers leveraged US\$30,000 in additional resources in the form of reference and training materials (CDs, DVDs, pamphlets, and posters) and small portable farm equipment which they distributed to the farmers
- Asia FTF host and partner organizations leveraged US\$127,800 to support volunteer lodging, food, local transportation, and interpreters
- built the capacity of more than 45 public and private educational and research and extension agencies

- approximately 6.9 million hectares are under improved natural resource management as a result of enhancements in water management, farm waste management, integrated pest management, and use of organic fertilizers
- 58 Asia FTF volunteers performed outreach activities upon their return to the US including 35 media events and 51 group presentations

Major Overall Successes and Breakthroughs

Bangladesh

During the LOP, Dr. Roy Chapin, an animal nutritionist from Oregon worked in Bangladesh with selected hosts and partner organizations to help address cattle feed and nutrition problems, leading to improving dairy sector productivity and profits. Since 2000, he traveled six times to Bangladesh and completed ten assignments (seven during the current phase, and three during the previous phase of the FTF program) working with BMPCUL/MilkVita, the largest dairy cooperative of the country; BRAC Feed Mills, a commercial venture of BRAC, the largest NGO in the world; QFL and SBFFL, two leading private sector feed mills; a top producing private sector dairy farm; and a dairy sector development project, funded by the Bill & Melinda Gates Foundation and implemented by CARE. After making a critical assessment of the feed and nutrition status of the dairy sector, Dr. Chapin noted, “In Bangladesh attention is being paid to producing dairy feed that would meet tag specifications at the lowest possible cost instead of focusing on what the cow really needs to thrive and return the maximum profit to the farmers. The best ration is not the cheapest ration but the one that will make dairy farmers the most money.”

During his six trips to Bangladesh, Dr. Chapin formulated dairy rations for different weight categories of lactating cows, dry cows, breeding bulls, including calf starter and calf grower rations, and developed a formula for producing a dairy premix locally (named *Chapin Dairy Premix*) that supplies a balanced amount of vitamins and trace minerals. In addition, Dr. Chapin has written numerous articles in support of good dairy nutrition, and networked with various people in the Bangladesh dairy sector. The results of improved nutrition suggested by Chapin have been spectacular, highly leveraged, and fast with increased production of milk and meat soon after the hosts implemented the ration improvements. For details, see **Annex F Success Stories**.

India

FTF India focused on working with producer groups, private entrepreneurs, and NGOs to improve organic production, input management, postharvest handling, and food safety issues to improve production and processing, and reduce organic certification costs.

Third party organic certification is required to access new markets, especially export markets, to build confidence among buyers and consumers, and comply with the importing country’s requirements. In India, the high certification costs prevent small and medium growers from accessing such niche markets. During the LOP, FTF India worked with Morarka Foundation, a Jaipur-based national NGO, to help facilitate the establishment of an Indian office of *OneCert Inc., USA*² and introduce low-cost group certification that helped more than 55,000 producers cultivating 12,700 hectares of land in 28 states in India to earn organic

² *OneCert Inc., USA – a USDA, EU, and JAS accredited private certification agency, operating in the US and in Latin American countries.*

certification. The low cost enabled a large number of farmers and producer organizations to be organic certified and increase their product value in the domestic as well as export markets. In 2006-07, the organic farmers traded certified goods worth US\$6 million domestically and US\$250,000 in exports. After volunteer assistance in developing an Internal Control System (ICS) for organic certification, HIMOARD, a Himachal Pradesh non-profit organization, received orders on behalf of their farmer members worth US\$953,000 from domestic buyers for organic products. For details, see **Annex F Success Stories**.

Nepal

Volunteer Cesar Flores provided technical support to the Federation of Nepal Beekeepers Associations (FNBKA) based in Chitwan on quality improvement and efficient marketing of honey. Within one year of the volunteer training, FNBKA increased gross value of sales from US\$226,800 to US\$860,300 as a result of enhanced efficiency in beehive management specifically with regard to contamination control, establishing a traceability system for Nepal honey, and an expanded marketing network. FNBKA members sold a total of 650 metric tons of honey with an increase in net income of US\$287,031. Over 4,550 small beekeepers, mostly resource-poor farmers, spread over 28 districts have benefited from increased sales of raw honey through FNBKA. Additionally they can now sell their stock to FNBKA for further processing, adding value to their product. This assignment is a good example of how technical support along the post-harvest value chain can energize a whole subsector. For details, see **Annex F Success Stories**.

Indonesia

Livestock Extension Specialist Jack Boles conducted two assignments in March 2007 and March 2008 with Yayasan Dian Tama (YTD), an NGO in West Kalimantan, Indonesia. He worked with 250 farmers and host staff providing training on general pig management, improving animal feed using local resources, animal health, market evaluation and marketing, and livestock extension methods. Boles' inputs greatly motivated YTD staff and farmers to promote and enhance household level livestock management. As a result of the assignment and follow-up by YTD, 1000 families improved their pig management and marketing capacities. Many farm families have increased pig production by a factor of 1 to 4; other families which previously produced few or no pigs have also expanded or started production. YTD estimates that average pig production has doubled from 5-6 mature pigs and 5 piglets/year/family to 12 mature pigs and 10 piglets/year/family. The average annual value of increased pig production is US\$284 per family, or a total of US\$284,000 for 1000 families. Sixty to seventy percent of the increase has been or will be sold; 30-40% is intended for home consumption. The increase in pig production can be absorbed by local markets where demand exceeds current supply. Based on an average family size of 6.5, YTD estimates that 6500 people benefit from improved income and livelihood conditions. An additional 150 families from other villages have requested assistance with pig production and marketing from the host, YTD. Both Boles and YTD promoted environmentally sound livestock and integrated agro-forestry practices, improving natural resource management in 16 villages and 86,400 ha of land. A total population of 9500 people benefit from the improved environmental services associated with these practices. For details, see **Annex F Success Stories**.

Summary of Work by Focus Area

Bangladesh

Throughout the LOP, FTF Bangladesh completed 53 assignments primarily in high-value horticulture with a focus on low-external inputs agriculture (LEIA); livestock and dairy; and apiculture. The following table provides the quantitative summary of the LOP activities and targets and overall progress against targets:

Bangladesh FTF Impacts

High-value Horticulture

Increase farmer producers' competitiveness; upgrade production capacity and quality; and improve postharvest and marketing practices using environmentally sound approaches

	<i>LOP Targets</i>	<i>LOP Achievements</i>
# of producers and agribusiness/NGOs improve knowledge about low-external input agriculture (LEIA), IPM and organic farming practices	1000 producers 10 agribusinesses/NGOs	1050 producers 15 agribusinesses/NGOs
# of farm producers reduce use of harmful agro-chemicals	1000	1100
# of producers increase production of fruits and vegetables	1000	1150
# of orchards receive training on improved management techniques	20	130

Poultry & Livestock

Improve poultry and livestock (including dairy and meat processing) farm management capabilities with emphasis on feed/nutrition and veterinary services, and dairy products and meat processing

	<i>LOP Targets</i>	<i>LOP Achievements</i>
# of hosts improve feed formulation, nutrition/feeding regimen and husbandry practices	2	6
# of hosts improve dairy products processing, product diversification and quality	3	6 private enterprises 2 NGOs
# of professional technical staff/extension workers/farmers receive improved training in feed/nutrition, vet services, and farm management practices	250	500
# of hosts adopt improved meat processing technique	2	2
# of farmer producer organizations/associations strengthened	2	3

Apiculture Increase beekeepers' income by improving their capabilities in production, post-harvest processing, packaging of honey and honey products		
	<i>LOP Targets</i>	<i>LOP Achievements</i>
# of beekeepers increase income through increased honey production	2000	2250
# of new beekeepers/rural entrepreneurs start beekeeping as a result of volunteer training and micro-credit lending from FTF partner NGOs	100	250
# of organizations/SMEs improve practices for post-harvest processing, packaging and marketing of honey	10	20
# of honey organizations with increased memberships	10	15
# of Mowalis (honey hunters) of the <i>Sunderbans</i> use improved methods of honey collection from the forest	100	N/A. Due to security concerns & Cyclone Sidr, volunteers were not fielded in the <i>Sunderbans</i> areas.

High-value Horticulture

Agriculture is a key economic driver in Bangladesh, accounting for nearly 20% of the GDP and 65% of the labor force. The performance of this sector has considerable influence on overall growth, the trade balance, and the level and structure of poverty and malnutrition³. Sustained government investment in irrigation, rural infrastructure, and agricultural research and extension has helped Bangladesh farmers achieve dramatic increases in agricultural production in recent years. Food production has more than doubled since independence in 1971, but the growth has been primarily “rice-led” and has mostly supported the country’s large population base rather than raising the living standards of the average farmer. Therefore, food security in Bangladesh remains a major development issue with the government calling for a departure from “rice-led” growth to a more diversified production base that includes several non-rice horticultural crops.

Bangladesh is endowed with a soil and climate which favors cultivation of many horticultural crops. It produces over 60 different vegetables and more than 30 different fruits⁴ of indigenous and exotic origin with great regional variation in the extent of cultivation. The production potential for horticulture in the country is far from being fully exploited. Studies have noted that current vegetable production provides only about one-fifth of the recommended daily intake of 200g per person while fruit production provides only 34g toward the daily requirement of 75g per person. Bangladesh’s flower and ornamental sector is currently small but growing rapidly to meet the increasing demand from domestic as well as foreign buyers. Exports of vegetables and fruits account for only a small portion of the total production. Export markets include the Middle East, Europe, North America, Australia, and new markets in Africa. Bangladesh also exports substantial quantities of processed food to many countries in the Middle East, Europe, North America, and Africa.

³ *The World Bank, 2008*

⁴ *Bangladesh Agricultural Statistics Yearbook, 2005*

Strategy

The yield and quality of many horticultural crops in Bangladesh are poor because of inefficient and outdated farming practices, poor quality seeds/ planting materials, lack of agricultural inputs, poor producer knowledge of pest management and disease control, and weak linkages between producers and processors. Also, horticultural production is highly seasonal with unstable prices. Due to inadequate post harvest processing facilities and lack of organized marketing channels, farmers are deprived of fair prices for their produce. One of the most critical concerns is that agricultural production in Bangladesh is underpinned by the increasing use of agro-chemicals and multiple and intensive cropping, and as a result, agricultural land is fast becoming impoverished and degraded. The main focus was to address constraints such as the need for quality seeds and planting materials by building capacities of plant biotechnology labs and horticultural nurseries; improve production and farm management practices of selected horticultural crops to reduce costs, increase yield, and improve quality; and reduce dependence on harmful agro-chemicals by promoting sustainable agriculture practices using low-external inputs agriculture (LEIA) and organic farming.

Activities

FTF Bangladesh completed 29 assignments (25 volunteer trips) working with 17 host and partner organizations, including private agribusinesses, NGOs, farmer groups and associations, and research and extension agencies to strengthen high-value horticulture. Of the total 29 assignments, nine introduced improved production and farm management practices for banana, pineapple, mushroom and citrus fruits; 12 focused on horticulture nursery production and plant biotechnology lab capacity building; six introduced sustainable agriculture farming practices (LEIA and organic farming); and two targeted agro-processing, quality control, branding, and marketing. The volunteers providing technical assistance had diverse expertise in the fields of horticulture, sustainable agriculture practices, plant biotechnology, plant pathology and entomology, agro-processing, quality control, food safety, HACCP and GMP compliance, agribusiness, and export market development.

Results

Volunteers strengthened production, postharvest handling, and marketing capabilities of more than 600 banana producers and 500 horticulture nursery producers including flower and ornamental producers; improved sustainable agriculture farming capabilities of 1050 farmers and extension staff, and 15 agribusinesses/NGOs; improved research capabilities of 300 students and faculty of the botany and biotechnology departments of Dhaka University and

Asia FTF Partners and Hosts Bangladesh Horticulture

NGOs and Associations

- BRAC Agro Forestry Program
- BRAC Plant Biotechnology Laboratories
- Center for Mass Education in Science
- Bangladesh Association for Social Advancement
- Hunger Free World
- Gaira Banana Growers Association
- ITDG-Bangladesh
- Dhaka City Nursery Owners Association
- Church of Bangladesh Social Development Program
- World Vision Bangladesh

Private Agribusinesses

- Paragon Agro Ltd.
- The ACME Agrovet (Pvt.) Ltd.
- AMCL – PRAN
- Integrated Nature Farming
- East West Seed Ltd.
- Synergy Conservation Pvt. Ltd.

Dhaka University

- Dept. of Botany
- Dept. of Genetic Engineering & Biotechnology

selected biotechnology labs; and improved tissue culture laboratory procedures of roughly 100 lab staff and extension workers. FTF volunteers also strengthened the service delivery and program management capacities of two associations, one society, one university, five private enterprises and eight NGOs. Volunteers also strengthened processing, quality control, and marketing capabilities of two large agro-processing enterprises.

Some of the notable successes of Bangladesh high-value horticulture assignments are as follows:

- Sales value of horticultural and agro-processed products of FTF-assisted hosts increased by US\$5 million with incremental net income of US\$825,000.
- Six hundred banana growers of Modhupur/Tangail in northeastern Bangladesh benefited by adopting volunteer recommendations regarding fertilization, fruit protection, pruning and follower selection, seed selection, planting systems, disease and pest control through IPM, and postharvest techniques. Sixteen randomly selected banana growers, owning a total of 26 hectares, reported that volunteer training and demonstrations helped them reduce production cost per banana cycle of 8-10 months by 62% from US\$79,970 to US\$49,774 resulting in a total net income increase of 134% from US\$30,108 to US\$70,447, or US\$4,403 per grower.
- Gross sales of five hosts adopting volunteer recommendations on sustainable agriculture practices (LEIA, organic farming, compost, and vermicompost production) increased by 52% from US\$79,295 to US\$120,163 and net income increased by 85% from US\$40,936 to US\$75,638.
- BRAC Plant Biotechnology Lab (BPBL) achieved significant improvements in lab procedures by implementing volunteer recommendations regarding micropropagation and tissue culture of important horticulture crops such as orchids, gerbera, citrus fruits, and tropical fruits such as mango and jack fruits. BPBL also started production and marketing of critical farm inputs such as orchid fertilizers, rooting hormones, and organic fertilizers. All these activities helped BPBL to increase gross value of sales by 42% from US\$56,450 to US\$80,000 and net income by 55% from US\$19,355 to US\$30,000.
- With volunteer assistance, ACME AgroVet & Beverages Ltd., a major fruit juice processing company, successfully addressed critical juice formulation and blending problems, which helped reduce product recalls to a minimum against 6-8% before FTF assistance. As a result, six months after the assignment, average annual production cost was reduced by 20% from US\$106,975 to US\$85,615, resulting in an annual 6% increase in gross value of sales from US\$1,376,819 to US\$1,464,701 and a net income increase of 370%, from US\$93,113 to US\$437,318. For details see **Annex G Volunteer Impact Summaries**.

Poultry & Livestock

Livestock including poultry contributes 3% to Bangladesh's GDP and about 16% of agricultural GDP, generates more than 6% of total foreign exchange earnings, and provides full-time employment to about 20% of the economically active population. However, the productivity of livestock farms and per capita availability of livestock products are extremely low because of poor livestock quality, inadequate and substandard feed quality, the threat of disease outbreaks, and rudimentary husbandry practices. The average consumption of milk

and milk-based products, eggs, and meat is less than one-third of the recommended minimum consumption requirements, and far below than that in neighboring countries.

In Bangladesh, there is a fast growing demand for animal products - fresh milk, dairy products, eggs, and meat - triggered by population growth, urbanization, and higher incomes earned by the urban and peri-urban population. A number of private businesses are currently exploring export markets for processed animal products such as beef and broiler meat. In addition to the growing number of international (three, four and five star) hotels, international fast food chains such as KFC, Pizza Hut, A&W, Nandos, and Wimpy have opened outlets in Dhaka and other major cities, creating a substantial demand for hygienically processed broiler, beef, and dairy products. Therefore, in the meat and dairy processing sectors, excellent opportunities have emerged to warrant addressing quality and supply problems by establishing new facilities and improving capabilities of existing broiler, beef, and dairy processing enterprises.

Strategy

The livestock and dairy focus area in Bangladesh is affected by a myriad of problems. FTF Bangladesh addressed:

- Shortage of quality and quantity of feed and fodder, inadequate knowledge of feed formulation and feeding regimes, high feed costs; poor lab capacity for testing feed, feed ingredients, vitamins, and mineral premixes; poor breed quality, and animal diseases;
- Technical and hygienic shortcomings of slaughtering and processing techniques currently used in beef and broiler processing;
- Lack updated dairy processing technologies, product diversification, and skilled dairy technologists, and marketing professionals; and
- Lack of knowledge and skills in the application of good manufacturing practices (*GMP*), hazard analysis critical control points (*HACCP*), standard operating procedures (*SOPs*), and compliance issues in the dairy and broiler/ beef meat processing enterprises.

Asia FTF Partners and Hosts Bangladesh Poultry & Livestock

NGOs, Donor and Cooperatives

- BRAC Feed Mills
- BRAC Aarong Dairy
- BRAC Broiler Processing Center
- CARE Bangladesh: Gates' Foundation Dairy Project
- Milk Vita (the largest cooperative in the country)
- ATDP-II (USAID Funded Project)
- Welfare Association of Village Environment (WAVE)

Private Agribusinesses

- Quality Feeds Ltd. (QFL)
- Dhamrai Dairy Ltd. (DDL)
- PRAN Dairy Ltd.
- NAICOL (Cheese Production)
- Kazi Farms Ltd.
- Premium Seed Ltd.
- Snowbe Ice Cream

Activities

FTF Bangladesh completed 18 assignments working with 15 hosts and partner organizations, including private enterprises, NGOs, farmer groups, cooperatives, associations, and donor-supported livestock development projects. Of the total 18 assignments, seven focused on cattle feed formulation and production, six addressed dairy processing problems, three strengthened broiler and beef processing capability, and one assignment each addressed problems related to poultry diseases and small ruminant (goat) management.

Results

During the LOP, FTF Bangladesh strengthened the livestock and dairy focus area by addressing the problems of feed/nutrition, disease and bio-security, meat and dairy processing, product diversification, and quality control. For leverage and to create a sector-wide impact of volunteer recommendations, the program worked with carefully selected hosts/partners, such as the largest dairy cooperative of the country, the Bangladesh Milk Producers' Cooperative Union Ltd (BMPCUL), popularly known as *Milk Vita*; the commercial enterprises (feed mill, dairy plant, and broiler processing) of BRAC, the largest NGO in the world; two leading private sector feed mills (QFL and SBFFL); a private dairy run by the country's largest agro-processing company AMCL-PRAN; and a dairy development project supported by the Gates Foundation and implemented by CARE Bangladesh. For example, BMPCUL/Milk Vita represents 1600 primary milk producers' cooperative societies having a membership of about 160,000 farmer-members, while BRAC's livestock program reaches an estimated 600,000 cattle throughout the country. By working with these types of hosts and partners, the FTF Program leveraged technical assistance to thousands of resource-poor livestock farmers as well as built capabilities of private sector enterprises including feed mills, poultry farms, and meat and dairy processing enterprises.

Some of the notable successes of the Bangladesh livestock and dairy assignments during the LOP are:

- Volunteer support helped Northern Agricultural & Industrial Company Ltd (NAICOL), a multi-sector private agribusiness company, achieve a 92% increase in monthly production of mozzarella cheese from 1,200 Kg to 2,300 Kg, resulting in an average 109% annual increase in gross value of sales, from US\$84,706 to US\$177,429, and 474% increase in annual net incomes from US\$5,082 to US\$29,640. In addition, the finished product quality achieved noticeable improvements, two new cheese varieties (cheddar and processed cheese) have been added to the product line, and the demand for NAICOL cheese is rising. Increase in NAICOL's cheese production volume helped more resource-poor dairy farmers in and around the cheese making facility in poverty stricken northern Bangladesh, because smallholder dairy farmers now have a better market for their milk.
- Improved processing and storage techniques, and adjustments in cooling, freezing, and refrigeration systems suggested by a poultry processing specialist helped BRAC Broiler Processing Center (BBPC) increase production and improve quality of processed products significantly. BBPC's daily broiler meat production has increased by 63% and currently stands at around 130 MT/ month versus 80 MT/ month at the time of the volunteer's first assignment in May 2005. Due to production increases and quality improvements, monthly gross sales increased by 128% and net income by 97%. For details, see **Annex F Success Stories**.
- Improved feed formulation and feeding regimes suggested by an animal nutrition volunteer helped host Dhamrai Dairy, a reputable and top milk producing commercial dairy enterprise, achieve an average 71% monthly increase in milk production, from 21,000 liter to 36,000 liters resulting in an average 88% monthly increase in gross sales value (\$6,150 to \$11,550), and monthly net income increase of around 30%, from \$2,435 to \$3,130 in just eight months from the date of the assignment. For details, see **Annex F Success Stories**.

- BRAC Dairy & Food Products, a commercial dairy venture of BRAC, achieved marked improvements in almost all critical aspects of dairy value chain (milk collection-transportation-processing-marketing), and volume of processed dairy products increased by about 75%, which currently stands at an annual average of 30,000,000 liters against 17,100,000 liters before the volunteer assignment. As a result, average annual gross value of sales increased by around 110%, from \$9,052,941 to \$18,970,588 and annual net income increased by 163%, from \$502,941 to \$1,323,529 one and half years after the FTF assignment. For details see **Annex G Volunteer Impact Summaries**.

Apiculture

Beekeeping and honey production is a low-tech, easy to start, highly profitable enterprise and is used in Bangladesh as a livelihood strategy for generating self-employment and supplemental cash income among rural poor and subsistence farmers including indigenous minorities and women. Through appropriate interventions and modest technological improvements, honey producers can increase their income significantly. In a country with a high rate of poverty, beekeeping represents a significant contribution to economic development.

Bangladesh has the potential of producing 10,000 MT of honey and current production is estimated at only about 1000 - 1100 MT. There is an estimated demand of about 2500 MT of honey in the country and the demand is gradually growing due to increased awareness of its health benefits and the use of bee hives to pollinate a number of important horticultural crops. The demand – supply gap is met by importing honey from other countries. An estimated 15 - 20,000 beekeepers, including the *Mowalis*, the honey hunters of the Sunderbans mangrove forest, are engaged in beekeeping and honey hunting in Bangladesh. FTF volunteers report that Bangladesh honey due to its unique color and flavor has high export potential but before that can happen there is a need for an organized marketing system to boost domestic sales and further upgrade processing, packaging, and labeling to comply with international market requirements.

Strategy

With the abundance of natural flora and flowering and nectar bearing crops such as mustard and litchis, beekeeping and honey production provide excellent opportunities for sustainable rural enterprise development. But lack of expertise and technical know-how on improved hive management practices for both *Apis cerena*, and *Apis mellifera*, low hive productivity due to poor apiary management, lack of knowledge on mites, pests, and disease management, and lack of updated processing and packaging techniques for higher value addition are major constraints. The Bangladesh honey market is not well organized and beekeepers are deprived of fair prices for their seasonal stocks. In addition, there is lack of

Asia FTF Partners and Hosts Bangladesh Apiculture

NGOs and associations

- Bangladesh Association for Social Advancement
- Hunger Free World
- Center for Mass Education in Science
- Bangladesh Institute of Apiculture
- Apiculture Network Bangladesh
- Bangladesh Apicultural Association

Private enterprises

- AP (Dhaka) Ltd.
- ATM Bee Farm
- FAME Enterprise

skills for local production of essential bee supplies and equipment such as wax foundation, protective equipment, beekeeping tools, bee boxes, etc. To combat these constraints, FTF's focus was improving beehive management including bee nutrition and efficient dark period management; production of healthy queens with hygienic behavior traits; mites, disease, and pest control; and association strengthening and NGO capacity building.

Activities

FTF Bangladesh completed 10 assignments working with nine host organizations to build the capacity of Bangladesh's apiculture subsector. Host organizations included four NGOs, three private honey enterprises, one beekeepers' association and one network of beekeeping service providers.

Results

To reach large numbers of rural beekeepers and achieve sector-wide impacts, FTF worked with NGOs with beekeeping programs and wide outreach activities. The program also worked with private honey enterprises to build capacity in honey processing, packaging, and marketing. FTF has fielded volunteers since 2000 to strengthen the beekeeping-honey marketing value chain, and successfully introduced simple and inexpensive techniques for appropriate hive management, colony development, colony maintenance and care, harvesting, and processing, all leading to marked increases in honey yields.

The following are some of the notable successes of FTF Bangladesh beekeeping assignments and follow-up activities with the hosts and beneficiary beekeepers:

- Strengthened management and service delivery capacities of four NGOs, one beekeepers' association, one network of beekeeping service providers, and seven private small- and medium-size honey enterprises.
- More than 2250 beekeepers increased honey production and income; more than 250 rural trainers improved their skills; 17 SMEs/NGOs improved practices for honey processing, packaging and marketing; and 12 NGOs/agribusiness support organizations increased memberships.
- One private entrepreneur started producing comb honey, a value-added product, for the first time in Bangladesh. With improved skills learned from the volunteers, this producer also started a selective queen breeding program to supply quality queens to the beekeepers. Good quality queen bees with hygienic behavior traits are one of the most critical inputs for achieving increased honey yields. Another private entrepreneur started making queen cups, equipment necessary for increasing honey production that previously were imported from other countries and were in short supply.
- In line with the volunteer-suggested marketing strategies to increase sales of locally produced honey, the Bangladesh Apicultural Association (BAA) in conjunction with the Apiculture Network Bangladesh (ANB) continues to organize periodic honey fairs for their members to sell their product. BAA in collaboration with ANB has organized nine honey fairs with an estimated 40 MT of honey sold worth over US\$35,000. Other FTF partners such as Bangladesh Institute of Apiculture (BIA), Bangladesh Association for Social Advancement (BASA), Center for Mass Education in Science (CMES), Hunger Free World (HFW), Fame Enterprise, ATM Honey, and other organizations sold an estimated 45 - 50 MT worth US\$37,000 to US\$41,000 through organized marketing channels as an outcome of improvements in quality, packaging, and labeling. Honey fairs

- continue to serve as an important tool in consumer education of the health benefits of honey and its multiple uses, and in building consumer confidence in quality local honey products, as well as greatly helping the beekeepers sell their seasonal stocks. Largely due to continued FTF support, honey marketing in Bangladesh has gradually started to emerge as a profitable agro-enterprise, and organizations like BASA, Fame Enterprise, and PROSHIKA have installed three separate honey processing plants to strengthen their honey marketing capabilities, and to cater to the processing needs of the beekeepers.
- Recent random impact surveys of 40 beekeepers from the program areas of FTF partners BIA, BASA, CMES, and HFW revealed that between December 2005 (before volunteer training) and July 2008 (three and half years after volunteer training), the beekeepers were able to increase honey production on average by 1033%. As of July 2008, total honey produced by these 40 beekeepers stood at around 85,000 kg versus 7,500 kg in December 2005. As a result, total gross value of sales increased by more than 1539% from US\$9,150 to US\$150,000 resulting in a gross net income increase of 1902% from US\$4,250 to US\$85,100. This sharp increase in honey production and resulting growth of gross and net incomes was due to the adoption of FTF volunteers' suggested improved hive management practices and aggressive marketing campaign.
 - A proposal produced by a volunteer helped FTF host BASA secure a grant of US\$140,000 from the European Union to implement a beekeeping project for rural poverty alleviation through increased honey production and improved marketing.
 - Nepal-based International Center for Integrated Mountain Development (ICIMOD) signed letters of agreement with two FTF hosts, Bangladesh Institute of Apiculture (BIA) and Bangladesh Small & Cottage Industries Corporation (BSCIC) to implement a regional beekeeping project focused on conserving indigenous bee species *Apis cerena indica*.
 - FTF continued to widen sector impacts by assisting the partner organizations in organizing *Beekeepers' Field Days*, seminars, workshops, and field demonstration trainings involving a large numbers of rural beekeepers. Also whenever there was a volunteer in-country, FTF organized day-long discussion sessions/seminars, where beekeeping sector stakeholders were invited to interact with the volunteers, discuss key sectoral issues, and share lessons learned.
 - Through bee-pollination of selected nectar bearing plants, FTF helped reduce production costs and produce healthier crops by restricting the use of agro-chemicals as insecticides and pesticides cannot be sprayed when bees visit the crops to collect nectar.

India

FTF India completed 50 assignments focused primarily on organic farming and beekeeping. The following table provides the quantitative summary of the LOP activities, targets, and overall progress against LOP targets.

India FTF Impacts

Organic Production

Increase the income of farmers/growers and farmers' groups in the hill tracts of Uttaranchal State, Himachal Pradesh, and State of Rajasthan by producing high-value organic products for the growing urban market

	<i>LOP Targets</i>	<i>LOP Achievements</i>
# of certified organic growers of fruits, vegetables and other crops	6000	55,000 with 44,000 ha
# of farmers increase income	6000	25495
# of farmers' organic associations/groups strengthened with increased memberships	10	3 groups with a membership base of more than 55,000
# of organic producers' associations established	6	8 (and five domestic organic certification agencies)
# of agricultural staff of NGOs in organic farm management get improved training	300	11200
# of states with certification process in place	1	3

Apiculture

Increase income of farmers through beekeeping, and other bee products in the hill tracts of Uttaranchal State, Himachal Pradesh and Rajasthan

	<i>LOP Targets</i>	<i>LOP Achievement</i>
# of beekeepers increase income through increased honey production	6000	14000
Increase honey production in Uttaranchal(UT) and Himachal Pradesh(H.P.) for <i>apis cerena</i> and Rajasthan for <i>apis mellifera</i>	4 - 6 kg/hive in UT & H.P 30 kg/hive in Rajasthan	accomplished
# of beekeepers take up beekeeping as additional/ new income generating activities	200	3200
# of farmers' organizations strengthened with new technologies for product diversification like royal jelly, bee venom, bee pollen	10	2
# of beekeepers/honey organizations established	10	2
# of NGOs strengthened in agribusiness, honey production and product diversification	20	2

Organic Production

India is one of the largest producers of fruits and vegetables in the world but has less than 2% of the world trade. The productivity per unit remains lower than in most developed nations. The use of chemical-based agricultural inputs in India is low with pesticide usage per hectare at 570 grams against world average of 2.9 kg/ ha. This low use of agro-chemicals is being transformed into opportunities as consumer demand for organic products, commanding a premium price, is increasing not only in the domestic market but internationally as well. Over the past few years India has become a major source for organic products for the world market.

Strategy

Organic farming in India is in its nascent stage as smallholders who produce organically by default cannot take advantage of niche markets due to high certification costs, lack of location-specific standardized production practices, and poorly developed market linkages. Farmers often compete with traditional or conventional products and due to the low volume produced organically they are not able to take advantage of the premium pricing prevailing in

niche markets. Following are some of the organic farming constraints that FTF India addressed during the LOP:

- lack of public awareness of organic products limiting access to niche markets that pay premium prices
- inadequate support to cover Internal Control Systems (ICS) certification costs, and high cost of third party certification
- small land holdings are difficult to certify due to possible contamination from surrounding non-organic areas
- lack of inputs such as organic manure, bio-pesticides, and organic seeds
- lack of knowledge of food safety as it applies to food processing enterprises
- lack of storage capacity and processing units near farmlands in remote areas
- inadequate retail marketing infrastructure for organic products, and general market risks

To address these constraints, FTF provided technical assistance to improve the following aspects of the organic farming value chain:

- capacity building of NGOs, farmer groups/ associations, private agribusinesses, and government agencies on organic production techniques
- lowering the cost of third party certification by providing training on group certification process and assisting in implementing an Internal Control Systems (ICS)
- capacity building by providing training on improved food processing with special emphasis on food safety, quality, and environmental standards such as GMP, HACCP, and ISO

Activities

FTF India completed 40 assignments in the three focus states of Rajasthan, Uttaranchal, and Himachal Pradesh. Focus of the assignments was on organic production technologies and organic inspection and certification; group certification and ICS designs; postharvest handling, transportation, storage, and packaging; product diversification and marketing; organic apple nursery development; and organic mushroom and honey production. Of the 40 assignments, 14 dealt with on-farm organic production technologies; 20 focused on extension services; three provided assistance in food safety, quality control, and value addition; one focused on organic fresh produce marketing; and two provided training for organizational development/strengthening.

Asia FTF Partners and Hosts India Horticulture/ Organic Farming

NGOs, Private Enterprises & Government agencies

- M.R. Morarka-GDC Rural Research Foundation
- Kalasan Nursery Farm
- Himalaya Consortium For Himalaya Conservation (HIMCON)
- Karsog Valley Farmers Group
- SNS Foundation
- Himalayan Organization for Organic Agri-Product Research & Development
- Seva Mandir
- Institute of Himalayan Environmental Research and Education
- Central Himalayan Rural Action Group
- Aajeevika Bureau
- OneCert Asia Agri Certification (P) Ltd
- Uttaranchal Organic Commodities Board
- Agriculture and Processed Food Products Export Development Authority
- Maharana Pratap University of Agriculture & Technology
- Himalayan Institute For Environment Ecology & Development
- Kaushal Mehta Farm
- Central Himalayan Rural Action Group
- Indo-Dutch Mushroom Project

FTF India forged partnerships with NGOs with extensive outreach activities. FTF assignments also built capacity of private entrepreneurs/enterprises, state government organizations, and educational institutions in organic production, processing, quality control, food safety, and marketing. During the LOP, FTF worked with 15 NGOs/associations, eight private enterprises/entrepreneurs, and four government organizations and educational institutions.

Results

FTF assistance in organic farming played a significant role in starting organic certification processes in the states of Rajasthan, Uttaranchal (UT) and Himachal Pradesh (HP). During the LOP, FTF volunteers helped establish the following eight organic producers' associations:

- Organic Cut Flower Growers Association, Jaipur, Rajasthan
- Organic Farmers Association, Nawalgarh, Rajasthan
- Organic Seeds Growers Association, Masi, Almora, UT
- INHERE Ajeevika Uthaan Samiti, Almora, UT
- Organic Apple Growers' Club/ Association, Marothi, HP
- Karsog Valley Farmers Group, HP
- Organic Apple Growers Association, Karsog, HP
- North Harvest, Karsog, HP

FTF also acted as a catalyst in establishing five domestic certification companies

- Apof Organic Certification Agency (AOCA), Bangalore, Karnataka
- *OneCert Asia*, private organic certification agency, Jaipur, Rajasthan
- Natural Organic Certification Association NOCA, Pune, Maharashtra
- Uttaranchal State Organic Certification Agency, Dehradun
- Rajasthan Organic Certification Agency (ROCA)

Formation of eight organic producers' associations has been one of the key impacts of FTF organic assignments in India. This has helped introduce group certification systems resulting in a significant reduction in organic certification costs for resource-poor farmers. NGOs that received FTF assistance started implementing group certification processes and this helped in reducing third party certification costs by almost one third. The partners and host organizations along with the beneficiary farmers also received training on resource conserving organic farming techniques.

As an outcome of FTF training, approximately 25,000 vegetable farmers increased incomes by adopting volunteer suggested organic farming practices. FTF training helped more than 8,146 farmers with 14,000 hectares become certified organic fruit and vegetable growers, and approximately 46,000 farmers with 61,000 hectares are currently under organic conversion and audit stages. Thousands of NGO extension workers including staff associated with a certification agency received improved training on organic farming; and three organic groups/ associations (*OneCert Asia*, IHHERE, UT and HIMOARD, HP) have increased memberships, with *OneCert Asia* alone mobilizing a membership base of 55,000 farmers spread over 28 states of India. Additionally, volunteer training strengthened production, postharvest handling, tissue culture, and seed production capabilities of approximately 1000 mushroom growers, 2500 fruit and vegetable growers, 3000 apple growers, 500 organic seed

producers, 200 flower producers, and 55 herbal and medicinal plant producers. Some other notable successes of organic farming assignments in India are:

- In FY 2006-2007, FTF partners Morarka Foundation and OneCert Asia helped member farmers sell organic certified goods worth US\$6 million in the domestic market and US\$250,000 in the export market.
- In UT, 82 farmers saved US\$12,628 from lower use of pesticides following volunteer recommendations.
- With the emergence of private retail organic chains, FTF host INHERE started supplying organically processed products to supermarkets in Delhi and Gurgaon areas. INHERE also participated in the organic food fairs in Bangalore and established organic markets in South India.
- Volunteer training helped INHERE to bring 3000 farmers under a group certification system with a collective Internal Control System (ICS).
- An FTF volunteer assisted Kalasan Nursery Farm in Karsog Valley of HP to become the first and only private nursery to grow and sell organic apple clonal rootstock in that area. In the past four years Kalasan Nursery Farm sold more than 40,000 rootstocks covering more than 80 hectares. The host sold US\$36,000 worth of rootstocks with a net income of US\$18,000 over a period of 3 years. FTF assistance helped introduce high-density apple planting as a new technology, which was unheard of before volunteer training and is expected to change the apple cultivation practices in the valley in years to come. For details, see **Annex F Success Stories**.

Apiculture

Beekeeping in India provides sustainable income generation for rural and tribal farmers. India has the potential to keep 120 million bee colonies that would provide self-employment to over 6 million families. Bee products also constitute important ingredients of folk and traditional medicine. Increase in beehives will lead to an increase in other bee products such as beeswax. India can produce 15,000 tons of wax annually. Most importantly, honeybee colonies help increase production in many crops such as apples, citrus, and mustard through pollination. Research has shown that bees have doubled production of sunflowers and increased yields of other fruits and vegetable crops by 20-30%. Several other bee products such as queen bees, propolis, and royal jelly also have a significant economic importance in domestic as well as export markets.

Available statistics show that apiary honey production in India has reached 10,000 tons, valued at about US\$6.6 million in 2004-05. Research findings indicate that honey yield from one *Apis cerana* (indigenous bee) colony varies from 3kg to 5kg per year and for India, the average yield is about 4.3 kg. There is a great potential to increase the production of honey from *Apis cerana* colonies, especially in the hill states. After the introduction of European honey bee species (*Apis mellifera*), the beekeeping scenario has undergone dramatic changes. *Apis mellifera* is highly productive, yielding 30-50 kg per hive, and the agro-climatic conditions prevailing in the vast Indo-Gangetic plains of India are well-suited for this exotic species.

Strategy

Beekeeping in India currently operates far below its potential. Lack of technical know-how, negligible support from the government, and unorganized honey markets are major constraints that prevent beekeepers from improving apiary management practices. During the LOP, FTF worked to address the following critical issues:

- poor apiary management techniques, inadequate knowledge of hygienic queen breeding and nucleus colony production
- lack of knowledge and skills of appropriate migration of bee colonies
- limited skills on identification and proper treatment of parasites, mites, and various bee diseases
- lack of awareness of production and use of organic honey among consumers, certification agencies, and training organizations
- lack of knowledge of diversification of beekeeping and quality improvement of bee products
- inadequate knowledge of processing, packaging, food safety, and marketing of honey
- lack of organized marketing channels and inadequate marketing linkages
- absence of strong beekeepers' federations/organizations at state levels

Asia FTF Partners and Hosts India Apiculture
<p>NGOs, Associations & Commodities</p> <ul style="list-style-type: none"> • Uttarakhand Organic Commodities Board (UOCB) • National Beekeeping Centre • Mountain Research and Development Associates (MRDA) • Lupin Human Welfare & Research Foundation • Institute of Himalayan Environmental Research and Education (INHERE) • Kalasan Nursery Farm • Shri Prayag Dutt Tiwari • Brij Healthcare

Activities

FTF India completed nine assignments and built capacities of 12 host organizations. The assignments focused on improving hive management practices to increase productivity per hive, and improve capabilities for identification, prevention, and cure of diseases, mites, and parasites. A number of assignments were dedicated to improving skills in hygienic queen bee production, colony division, and colony multiplication to help the hosts improve queen bee quality leading to increasing hive productivity. Volunteers also provided training on organic honey production and production of value-added products such as beeswax, propolis, bee venom, and royal jelly to help increase income. One assignment addressed problems of honey processing and quality, and the volunteer helped the host introduce HACCP and GMP practices to improve food safety.

Results

During the LOP, FTF India helped strengthen capabilities of four NGOs, two state government agencies, and three private enterprises, which now have a large membership base. FTF assistance helped approximately 14,000 farmers increase income through increased honey production, and approximately 3,200 farmers to take up beekeeping as an additional income generating activity. As a result of FTF assistance, 575 beekeepers received organic certification. One NGO and one private enterprise successfully improved postharvest handling, processing, and marketing of honey. Brij Health Care, a private enterprise in Bharatpur, Rajasthan, apart from improving disease management capabilities, successfully

launched honey processing and marketing following volunteer training. FTF also helped form one beekeepers' cooperative consisting of 200 beekeepers, and helped two farmers' organizations adopt new technologies for producing value-added bee products. Following are some of the notable successes of FTF beekeeping assignments in India:

- Beekeeping was introduced in 10,000 hectares of mustard growing areas in nine districts of Rajasthan, where beekeeping was never practiced before. This is providing employment opportunities to rural unemployed youth and women, in addition to enhancing related crop productivity by 20-30%.
- Honey production in program areas of host Lupin Human Welfare Research Foundation (LHWRF), Bharatpur, Rajasthan, has increased significantly from 950 MT to 2500 MT following FTF training.
- LHWRF with FTF assistance received a grant of US\$50,000 from the Rajasthan government to promote beekeeping in the state. The host also submitted a proposal valued at US\$133,000 to create a Central Facility Center for Beekeeping in Bharatpur.
- Brij Health Care established a honey processing plant in Bharatpur, Rajasthan, with an investment of US\$229,885. Around 200 beekeepers of the Bharatpur area are now supplying honey directly to the processing plant without any middlemen. In addition, Brij Health Care submitted a proposal and secured GOI funding from the Ministry of Panchayati Raj to develop a Rural Business Hub for promoting beekeeping. They have already listed 750 beekeepers under this initiative.
- Training in basic principles of HACCP helped FTF host Brij Health Care improve their processed honey quality and supply US\$25,000 worth to organized retail. The host is in the final stages of negotiation for an order from an Indian multinational consumer goods company.
- FTF volunteers trained apple farmers in Himachal Pradesh in bee-pollination helping increase yields and improve fruit quality. Following training, apple farmers doubled the number of bee hives per acre of apple orchard thereby increasing fruit yields by almost 15%.
- The Institute of Himalayan Environmental Research & Education (INHERE), an NGO in Uttaranchal, successfully started organic honey production and marketing after receiving FTF training.
- Uttaranchal Organic Commodity Board (UOCB), a state government organic promotion agency, translated the Beekeeping Management booklet developed by a volunteer into the local dialect for wider dissemination in both India and Nepal. UOCB also engaged an FTF volunteer as a paid consultant for three months to provide additional training on beekeeping and to introduce organic honey production in UT. Recommendations provided by the volunteer were later incorporated into state sponsored beekeeping initiatives.
- FTF introduced quality and food safety standards such as GMP and HACCP in honey processing units in Rajasthan and Uttaranchal.

Nepal

FTF Nepal completed 53 volunteer trips. The assignments were focused primarily on high-value horticulture with an emphasis on off-season vegetables, apiculture, and NTFPs

(medicinal and aromatic plants). FTF Nepal fielded three flexible volunteers, one each in swine, coffee, and poultry. The following table provides the quantitative summary of the LOP activities, targets and overall progress against LOP targets:

Nepal FTF Impacts

High-value Horticulture

Increase rural income through the production and sale of vegetables, including off-season vegetables

	<i>LOP Targets</i>	<i>LOP Achievements</i>
# of hill districts Increase vegetable production from current production levels	10	9 hill 1 Terai
Increase average productivity of vegetables	11.6 MT/ ha	12.14 MT/ha
% increase of supply of fresh vegetables in domestic market		67%
# of hill districts Increase export of off-season vegetables	10	3
# of women's vegetable producer groups/ cooperatives increase participation	50	14
# of households increase income in 10 hill districts	2,000 households	10,734 households

Apiculture

Increase income of marginalized groups through the production and sale of processed honey in hill (*Apis cerena*) and Terai (*Apis mellifera*) districts

	<i>LOP Targets</i>	<i>LOP Achievements</i>
# of hill and Terai districts increase honey production	8 hill 5 Terai	3 hill 4 Terai
Increase productivity of honey in hill and Terai districts	Hill - 10 kg/hive Terai - 50 kg/hive	Hill - 6 kg/hive Terai - 50 kg/hive
# of honey processors Increase the quality of processing, packaging and marketing		5
# of honey organizations strengthened	10	10
# of households increase income from honey sales	1200 households	2,156 households

NTFP (Medicinal & Aromatic Plants)

Increase income by improving cultivation practices and processing of medicinal and aromatic plants for higher value addition and sales

	<i>LOP Targets</i>	<i>LOP Achievements</i>
# of community forest user groups (CFUG) strengthened for sustainable utilization and management of Medicinal and Aromatic Plant (MAP) resources in 10 hill and 10 Terai districts	20 districts	10 CFUG in 3 districts; 22 medicinal & aromatic nurseries established
Increase production of MAPs	MAPs production increase	additional 51.2 ha in herbal plants
Increase export of MAPs	export increase	increased export of essential oils from 190 kg to 802 kg
% increase in the value of processed MAPs		5.8%
# of households increase income	800	1509

High-value Horticulture

Agriculture contributes 33% to Nepal's national GDP and provides employment to over 70% of the population. Despite its important role in the country's economy, sector performance has been far from satisfactory. During the Tenth Five-Year Plan period (2002-2007), the average annual sector growth rate was only 2.67% against its target of 4.11%. The Agriculture Perspective Plan (APP) prepared in 1995 for the period 1995-2015 remains the

cornerstone of Nepal's agriculture development strategy. APP has identified high-value crops (HVCs) including off-season vegetables as one of the priority agricultural outputs. Nepal has the potential to produce a wide range of HVCs, especially in the mountain areas because of favorable climatic conditions. Off-season vegetables command significantly higher prices than the main season products. In some hill districts vegetable production has made a significant impact on the local economy and improved the livelihood of smallholders through improved food security and income generation. Hill farmers are gradually expanding cultivation of HVCs including off-season vegetables to meet the increasing domestic demand as well as export to neighboring Indian states. Potentially large markets also exist in other Indian states and Bangladesh for off-season vegetables, especially during summer and rainy seasons when the hill areas of Nepal have a distinct production advantage over the plains where supply is low and prices are high.

Strategy

The agriculture system in Nepal is in the process of a gradual shift from subsistence to commercial farming. However, there are several problems resulting from the lack of appropriate production technologies and a dysfunctional marketing chain due to limited access to market information.

Additionally, a lack of proper storage facilities and inadequate transportation are resulting in low productivity and losses. Pests and disease continue to be a major problem of vegetable growers, especially in the cultivation of off-season vegetables, causing yield losses of up to 30%. Due to inadequate extension services, farmers are not aware of the available safe and effective methods for controlling pests and diseases. Until recently, vegetable growers in Kathmandu valley and Makwanpur district were facing severe problems from clubroot disease, which the FTF program helped manage with appropriate and timely

technical assistance. There is export potential for off-season vegetables to India, Bangladesh, and Gulf countries, provided that farmers can improve quality with the appropriate use of IPM techniques and organic farming methods. Vegetable exporters from eastern Nepal have faced problems in exporting to India due to the difficulty to fully comply with the sanitary and phyto-sanitary (SPS) requirements of the Indian Plant Quarantine office located at the India-Nepal border. FTF Nepal recognized the need to train vegetable growers and build their capacity to enable them to fully comply with the quality standards and SPS requirements of the importing countries.

Activities

FTF Nepal completed 22 assignments working with 15 host organizations including farmer groups, cooperatives, a wholesale market management committee, and government agencies to strengthen the high-value horticulture subsector. A primary focus was on organic farming (establishing internal control systems for organic certification), IPM in fruits and vegetable crops, clubroot disease management, fruit fly management, tomato cultivation practices, postharvest handling of vegetables in wholesale markets, and plastic house technology for

Asia FTF Partners and Hosts Nepal Horticulture

- Koshi Multipurpose Cooperative Ltd.
- Agricultural Produce Wholesale Market Committee
- Grahamin Mahila Bahuudeheshiya Sahakari Sanstha
- DAFACOS
- Jagannath Cooperative Society
- Gautam Nursery
- Kalika Off-season Vegetable Production Group
- SIMI
- IPM CRISP
- Canadian Center for International studies
- District Agriculture Development Office
- FORWARD, a National Level NGO
- Nepal Agriculture Research Council

hailstone protection. The program partnered with District Agriculture Development Offices (DADOs), NGOs, the USAID-funded Nepal-SIMI project, the Canadian Center for International Cooperation and Cooperation (CECI), and IDE-Nepal. Volunteers providing technical assistance had diverse backgrounds and expertise in the fields of horticulture, plant pathology, entomology, agri-engineering, plant quarantine services, postharvest technology, and product marketing.

Results

During the LOP, FTF strengthened the high-value horticulture subsector by assisting farmers to improve production as well as marketing linkages. FTF volunteers helped to improve farming practices, postharvest handling, and marketing with an emphasis on off-season vegetable production, organic farming, and IPM techniques. Among the host organizations, farmers' groups and cooperatives constitute a significant number. Working with these types of host organizations enabled the program to reach resource-poor marginalized farmers. In addition, the program worked closely with the District Agriculture Development Office in Kathmandu to ensure continuity and sustainability of ICS for organic vegetable farming. For programmatic synergy, and wider dissemination of volunteer recommendations, FTF also worked closely with Nepal-SIMI, a local USAID Mission-supported project working to assist vegetable farmers. Along with improvements in production and disease management capabilities, there have been significant sales and net income increases as an outcome of volunteer assistance.

Some of the notable successes of Nepal's high-value horticulture assignments are as follows:

- Total increased sales value of vegetables exceeds US\$2 million with incremental net income of US\$418,431 benefitting 25,735 farm families. On average, 10,734 farm families increased net income by US\$77 per family.
- Reduced clubroot disease incidence and seedling mortality by 80% as a result of farmers' adoption of appropriate management practices. The farmers receiving volunteer training are now able to produce healthy seedlings themselves rather than depending on market supply.
- Volunteer training on off-season tomato production helped a group of smallholder farmers (207 farm families) increase gross value of sales 298% from US\$53,428 to US\$213,057, and net income by 86%, from US\$40,071 to US\$74,560, representing an increase of about US\$167 per beneficiary farm family. For details, see **Annex F Success Stories**.
- Average productivity of vegetables in nine hill districts and one Terai district has increased from 11.43 MT/ha to 12.14 MT/ha. This has helped a total of 10,734 farmers increase household incomes.
- Volunteer assistance helped to sustain the export of vegetables to India with the adoption of improved postharvest management practices and better grower understanding of SPS measures. Export of vegetables from three hill districts increased from 11,400 MT in 2003 to 20,000 MT in 2006.
- A women's vegetable production group was trained on organic farming practices and Internal Control Systems (ICS) for organic certification.
- Women's participation in ten vegetable producer groups and four cooperatives increased by more than 50% after FTF trainings.

Apiculture

Beekeeping has a long tradition in Nepal and is an increasingly popular income generation activity for resource-poor farmers. The activity requires less land, relatively smaller investment, is less labor intensive, and can be done by women in rural areas. However, beekeeping is still in its early stages of development as a commercial enterprise in Nepal. Most beekeepers, especially in mountain areas are keeping the colonies of local *Apis cerana* bees under traditional management. It is estimated that 5,000 families are involved in this subsector on an organized basis with an estimated annual production of 850 tons of honey (PSSP, GTZ⁵).

Asia FTF Partners and Hosts Nepal Apiculture

- Suryamukhi Beekeeping Cooperative Ltd.
- Gorkha Bee Farm
- Gandaki Bee Concern
- Rapti Beekeepers Association
- Nepal Beekeepers' Association
- Federation of Nepal Bee Keepers Assoc.
- Mount Everest Honey Product
- Sewa Foundation Nepal
- Everest Consultancy and Research Center
- District Agriculture Development Office

Strategy

The abundance of floral resources in forest and farm lands makes beekeeping a viable enterprise both in the hills and Terai. However the lack of expertise on modern beekeeping practices, low productivity due to poor management, lack of proper knowledge on pest and disease management, and lack of improved processing and packaging techniques for value addition are major constraints in this subsector. In addition, Nepalese beekeepers are not able to take advantage of the export potential of honey, especially to European Union (EU) countries, because of certification issues regarding quality and food safety.

Activities

During the LOP, 17 volunteers completed 16 assignments in Nepal working with 13 hosts including beekeepers' groups, cooperatives, and private enterprises. FTF focused on improving management of indigenous *Apis cerana* and European *Apis mellifera* bee colonies, quality improvement, postharvest management and marketing, and honey-based value-added product development and marketing. FTF Nepal partnered with the District Agriculture Office in Dolakha, Sewa Foundation, an NGO active in mid-west region, PSSP/GTZ project, and the local Mission-funded Ujjyalo Project. Volunteers had expertise in bee colony management, hygienic queen production, disease and parasite management, and honey processing, packaging, and marketing.

Results

Impact assessments of Nepal beekeeping assignments show that volunteer assistance in this subsector immensely contributed to achieving the overall objectives of increasing incomes of marginalized groups through increased production and sale of honey in the hills as well as Terai districts. Technical assistance provided in partnership with Nepal Beekeepers Association (NBA), an umbrella organization of beekeepers, was effective to introduce quality control measures among its constituent members who include beekeepers and honey processors. In assignments related to management practices of indigenous *Apis cerana* bee colonies, FTF noted that beekeepers needed a longer time period to make the shift to improved hives from traditional 'log' hives.

⁵ PSSP-GTZ-Private Sector Promotion Project, German Technical Cooperation

The following are some of the notable successes of Nepal apiculture during the LOP:

- A total of 2,156 beekeepers increased income from sale of honey on average by US\$186 per beekeeper.
- Five honey processors significantly improved packaging and marketing including exporting by two processors.
- Beekeepers with *Apis mellifera* achieved a 60% increase in production from 25 to 40 kg per hive.
- The Federation of Nepal Beekeepers' Association increased gross value of sales 279% from US\$226,800 to US\$860,294 within one year of the FTF assistance as a result of enhanced efficiency in beehive management, specifically with controlling contamination, establishing traceability systems, and expanding the marketing network.
- Community beekeeping association members organized more formally and as a result, the rural beekeepers are recognized by the district beekeepers' associations.

NTFP- Medicinal and Aromatic Plants (MAPs)

Nepal is rich in NTFPs, especially medicinal and aromatic plants, owing to its rich floral biodiversity. Nearly 100 species of NTFPs are currently harvested, approximately 10,000 – 15,000 MT, from the forests and exported largely to India, with a total value US\$26.5 million a year. The contribution of NTFPs to the nation's GDP is estimated at 4%. The Master Plan for the Nepal Forestry Sector (1989 - 2011) has identified MAPs and Minor Forest Products Development as one of the six major forestry sector development plans. Similarly, the Tenth Five-Year Plan (2002-2007) has given priority to the maximum utilization of MAPs for rural poverty alleviation.

Strategy

Many of Nepal's poor, especially disadvantaged communities such as "dalits," are collecting MAPs to fulfill their subsistence needs.. Most of the MAPs are collected from the wild, primarily from government and community forests. Common MAPs collected are asparagus root, *Swertia chiraita*, lichen, and cinnamon. Primary collectors of MAPs sell to local dealers, with the majority of the product going to the Indian market in unprocessed form while passing through several market chains. It is estimated that harvesters receive less than one third of the final price of MAPs in India. In recent years, some exotic aromatic plant species such as lemon grass, palmarosa, citronella, and Japanese mint have been cultivated for commercial processing by the department of plant resources, and also by some private growers. It is reported that in recent years the problem of genetic deterioration of some of these species has been affecting the extraction of essential oils.

Asia FTF Partners and Hosts Nepal NTFP

Selected Hosts/ Partners

- Medicinal Plants Cultivators' Group
- Vrindawan Botanical Garden
- Tribhuvan University
- Sundari Community Forest User Group
- Gorkha Ayurved Company Pvt Ltd.
- Chisapani Jadibuti Prashodhan Udyog Pvt. Ltd.
- BDS-MaPS
- IDE an American NGO
- Sahamati, a National Level NGO
- NARMSAP

In Nepal processing enterprises including public sector Herbs Production and Processing Co. Ltd. (HPPCL) and some private processors are operating distillation units to process essential oils, mainly lemongrass, citronella, palmarosa, mint, chamomile, and eucalyptus. Due to the lack of appropriate technology, the processors are not able to process essential oils that meet export quality. For example, in the processing of eucalyptus oil the cineole content is obtained at the level of 65-70% whereas international markets demand oils with over 80% cineole content. Similarly, chamomile oil should be deep blue in color, but locally processed product is greenish and has lower composition or absence of essential constituents such as chamazulene and bisalolol. Technical improvements such as re-distillation are needed to improve the quality of essential oils to meet international standards. In the NTFP subsector, FTF Nepal addressed the constraints both at primary production/ collection level as well as at the level of traders and processors who play an important role in expanding the subsector with increased exports.

Activities

During the LOP, 11 volunteers completed assignments working with 10 host organizations that included Community Forest User Groups (CFUGs), private enterprises, government agencies, and one university. FTF assignments focused on varietal improvement, propagation of medicinal and aromatic plants, quality upgrading of herbal products, processing/distillation, marketing of herbs and essential oils, and introducing good manufacturing practices. FTF partnered with the National Resource Management Sector Assistance Program (NARMSAP), a local USAID Mission- supported project *Business Development Services-Marketing, Production and Services* (BDS-MaPS), and International Development Enterprises (IDE) Nepal to assist project beneficiaries on improving processing and product quality. Volunteers had expertise in the fields of medicinal and aromatic plants, herbs production, processing, marketing, essential oils distillation, and quality improvement.

Results

Notable contributions included: volunteer assistance in seed germination technology of *Swertia chiraita*, cultivation techniques of *Asparags*, quality improvement of aromatic oils, and herbal and medicinal products' development (such as herbal soaps). Many indigenous communities that depend on the extraction of MAPs, directly benefited from the introduction of sustainable methods of extraction and marketing of herbal, aromatic, and medicinal products. Partnerships with the BDS-MaPS project was effective in extending technical assistance to hosts on improving processing and product quality as well as new product development. Private and community run enterprises were found to be more responsive in terms of adoption of volunteer recommendations compared to public sector agencies. The following are some of the results derived from the impact assessments of Nepal's NTFP-MAPs assignments:

- Twenty-two medicinal herb nurseries established by seven CFUGs in Makwanpur district. These nurseries produced 20,000 *Swertia chirata*, 20,000 *Cinnamomum tamala*, 10,000 *Valerianajatumansi*, and 6,000 *Taxus baccata* seedlings worth a market value of US\$3,466. A total of 1,509 households including those from minority and disadvantaged ethnic groups will benefit from planting the seedlings in community forests.
- Sales revenue of two herbal companies, one private nursery, and two community operated distillation units increased 8% from US\$313,173 to US\$338,886.

- Net income of two herbal and one private nursery, two community operated distillation units, and one CFUG increased 40% from US\$51,793 to US\$72,851. For details see **Annex G Volunteer Impact Summaries.**
- One host, Gorkha Ayurved Company, introduced World Health Organization standard-based Good Manufacturing Practices for the first time in Nepal by any *Ayurvedic* (traditional medicine) company which improved product quality by minimizing the chances of cross contamination.

FTF also fielded one volunteer to assist a women's group with piggery management. The volunteer imparted skills on castration and tooth cutting of piglets. The assignment was implemented in collaboration with the District Livestock Service Office, Makwanpur. As a result of FTF assistance, gross sales value of piglets and fattened pigs increased 101% from US\$5,700 to US\$11,467 and net income increased 100% from US\$2,544 to US\$5,097, six months after the volunteer assignment.

Another volunteer worked with the government Department of Livestock Services (DLS) and Himalayan College of Agricultural Science and Technology to enhance capabilities on avian influenza (AI) surveillance. Following volunteer training, DLS started an AI awareness raising program as a regular extension activity through veterinary technicians. With increased awareness and surveillance, the DLS is now better prepared to deal with the threat of AI outbreaks. A third flexible volunteer worked in Palpa and Gulmi districts where coffee growers faced severe infestation of the stem borer. The assignment was completed in collaboration with District Agriculture Development Office, Palpa and SIMI-Sewa Karyakram, a local Mission supported project.

Indonesia (non-core country)

FTF Indonesia completed 19 assignments focused primarily on high-value horticulture and smallholder forestry. FTF fielded two flexible volunteers to assist smallholder livestock farmers. The following table provides the quantitative summary of the LOP activities, targets, and overall progress against LOP targets:

Indonesia FTF Impacts

High-value Horticulture

Smallholder Home Garden Production and Marketing

To enhance the livelihood of smallholder farmers through improved small home garden (primarily tree crops) production and marketing

	<i>LOP Targets</i>	<i>LOP Achievements</i>
# of farmer groups with strengthened capacity to undertake an active role in the marketing of home garden products	10	19
# of farmers using commercial linkages and product marketing	300	332 130 households (650 people)
# of farmers increase income with improved production (quantity and quality) and marketing of home garden products	2000	58 farmers, 200 households, 50 nurseries

Flexible — Smallholder Forestry

To enhance the livelihood of smallholder farmers through improved forestry activities (specifically tree seed and timber production)

	<i>LOP Targets</i>	<i>LOP Achievements</i>
Identify and recommend models of partnership which are able to develop seed and seedling business by local NGOs and smallholder farmers – with emphasis on production and marketing network	identify partners and develop seeds	16 groups(232 farmers) and 28 staff enhanced capacity to produce quality seedlings
Strengthen the capacity of NGOs and farmers groups to collect, produce and market tree seed	5	7 NGOs 10 farmer groups
Identify ways of improving smallholder timber production and marketing to enhance farm incomes	Improve smallholder timber production	110 farmers

Flexible – Livestock and Small Ruminants

Improve productivity and marketing of livestock as it relates to integrated horticultural systems for smallholders

	<i>LOP Targets</i>	<i>LOP Achievements</i>
Improve productivity and marketing of livestock	Improve productivity and marketing	201 farmers trained, 15 NGO staff trained, 1035 households increased farm income

High-value Horticulture

The greater Jakarta and Bogor areas have a population of 16-20 million which creates a huge demand for quality horticultural products. The Government of Indonesia (GOI) reports that in 2003 the country imported 241 million kg and 324 million kg of fruit and vegetables respectively, while exporting only 21 million kg and 113 million kg respectively (Ditjen BP2HP, 2004). Only 1-3 hours from Bogor and Jakarta, Nanggung has an advantageous location to serve these lucrative markets. The conditions in North Sumatra are similar. Medan, the country's third largest city, has a population of 2.1 million and Sibolga, a district capital, a population of 100,000. There is a high demand for fruits and vegetables in those locations. Additionally, North Sumatra, Jambi, and Aceh provinces are market/ production centers for key commodities such as rubber, cacao, sugar palm, coffee, and various fruits. The demand for these commodities in the provincial and national markets, which are linked to international markets, exceeds current supply.

Strategy

Smallholder farmers in Indonesia face a number of constraints in pursuing market opportunities for horticultural crops. Most smallholder horticultural systems are traditional, lacking proactive management and planning. Farmers have limited access to quality planting materials, other agricultural inputs, technical information, or extension services. Few have a clear understanding of market channels or product specifications. As a result, most farmers have little experience producing commodities to meet market specifications. They use rudimentary postharvest handling methods, with product quality often declining due to substandard handling and storage. Additionally, the farmers pursue a passive marketing approach, waiting for middlemen to visit their farm; as a result they forfeit the higher prices they may receive elsewhere. Importantly, there is a need to protect the unique biodiversity of many areas, and efforts to enhance smallholder horticultural production must be balanced with the traditional sustainable natural resource management practices of local communities.

During the LOP, FTF Indonesia worked to address these constraints at various sites across the country.

Activities

FTF Indonesia facilitated 12 horticultural assignments. The focus of assignments was on improving smallholder fruit and vegetable production and marketing, nursery production and extension, farmer marketing association development, and biodiversity conservation and livelihood enhancement. Volunteers also helped smallholders to improve production, processing, and marketing of nilam in post-tsunami Aceh and cacao in North Sumatra. The volunteers had diverse backgrounds and expertise in the fields of horticulture, biodiversity conservation and livelihood enhancement, farmer association development, postharvest handling, transportation, packaging, and marketing.

Results

Throughout the LOP, approximately 2,464 farmers (389 in West Java; 382 in Jambi; 599 in Aceh; and 1,094 in North Sumatra) received improved training on high-value horticulture production, postharvest handling, storage, and marketing. In addition, relevant government officials, fruit and vegetable traders, and NGO staff benefited by participating in FTF volunteer training and demonstration programs. Multiple volunteers visited most sites and some farmers participated in multiple events. As a result of volunteers' efforts, farmers participating in the FTF Program have demonstrated the ability to produce high-quality horticultural products that now meet market specifications.

Asia FTF Partners and Hosts Indonesia Horticulture

- World Agroforestry Centre (ICRAF)
- Cold Chain Project
- Agroforestry Innovations and Livelihood Enhancement in West Java Program
- District Forest Offices in Aceh Jaya, West Aceh, and Pidie (Aceh Province)
- Farmer Groups in Nanggung, West Java, Batang Toru, North Sumatra and in Bungo, Jambi
- Banana Fruit and Vegetable traders in Nanggung, West Java
- Conservation International – Indonesia

Some notable successes of the FTF Indonesia high-value horticulture assignments are as follows:

- 2,464 individuals including 591 women benefited directly from the volunteer assignments
- Thirty-three farmers in Nanggung increased banana productivity (measured by fruit weight) per stem by 20-25%. The most active farmers have increased the area of banana cultivation by 30-45%. Banana production that meets market specification and can be sold has increased from 60% to 85%; and price per bunch received by farmers increased three-fold from US\$0.70 to US\$2.15. Traders now report improvements in the quality of bananas purchased from the farmers.
- Use of plastic crates helped decrease transportation damage to bananas from 10% to 3%, and the volume of bananas transported increased by 38%.
- Farmers' net annual agriculture income rose from US\$152 to US\$232, representing an increase of 152% in gross agriculture income.
- 200 Nanggung households adopted improved vegetable production and marketing practices and production increased by 30%, net income by 20%.

- 105 Batang Toru households established various smallholder farm enterprises: 5 developed indigenous flowers enterprises with sales of a minimum of US\$278 or US\$56/family; 5 established forest mushrooms enterprises with sales of approximately US\$222 or \$44/family; 45 use traditional medicines to replace store-bought medicines, representing an annual cash savings of US\$47/family; and 20 women farmers developed a medical tonic enterprise with an annual group income of US\$222 and a profit US\$144.
- Results of conservation-livelihood strategies were integrated into a provincial planning workshop. The Governor of North Sumatra and other stakeholders concurred that the conservation-livelihood strategy approach is an effective means to promote both local livelihood enhancement and achievement of public conservation goals.
- 267 households in Jambi received US\$11,000 in in-kind rewards for their commitment to *conservation agreements*; with rewards used to install micro-hydro generators and to improve productivity of rubber-fruit agro-forestry systems.
- 100 farmers in Batang Toru increased cacao production and income by 10-15% by adopting volunteer's recommendations, without increasing cash expenses.
- Farmer groups and NGO partners in Aceh established 50 community nurseries, producing 377,000 seedlings of cacao, rubber, and fruit species with a market value of US\$647,000; 73% of the seedlings will be used to rehabilitate the partners' land; 27% will be sold for a projected US\$175,000.
- A farmer partner in Aceh produced commercial charcoal from agricultural bi-products and sold 600 kg for a total income of US\$652.
- 92 farmers in Aceh are in the process of establishing 5 ha of nilam agro-forestry systems, with a projected gross commercial value of US\$49,352 and net income of US\$35,101.

FTF Indonesia also fielded three smallholder forestry volunteers, one focused on *smallholder timber production and marketing*, one on *tree seed production*, and one on *tree seed marketing*. As a result of these assignments:

- 1,100 members of 70 farmer groups, 75 staff from 16 NGOs, 75 staff from 14 district government offices, 5 researchers, and 10 staff of three seed companies enhanced their technical capacity regarding tree seed production and management. Additionally, approximately 110 farmers and 19 timber agents enhanced their capacity regarding small-scale timber production and marketing.
- Fifty hectares of *farmer demonstration trials* and *farmer seed orchards* have been established to enhance awareness of the importance of tree seed quality and improve access to quality seed at the local level.
- Local partners established a national network of NGOs, farmer groups, government agencies, research agencies, private seed suppliers, and universities, involved with tree germplasm management, distribution, and conservation.
- Recommendations from the timber volunteer's report were used in a proposal to *improve smallholder teak timber production*. The four year project started in 2007 and targets improvement of silvicultural, marketing, and financing aspects of smallholder teak timber systems. Economic analysis indicates that over 30 years the project could generate US\$83 million and benefit 1.5 million timber farmers managing 500,000 hectares in Java.

Two flexible volunteers conducted three assignments to help improve goat/chicken and pig/chicken production and marketing as components of integrated horticultural agro-forestry systems in North Sumatra and West Kalimantan.. The beneficiaries in North Sumatra are farmer groups in two villages associated with ICRAF efforts to protect orangutan habitat and strengthen community agro-forestry-based livelihoods. Beneficiaries in West Kalimantan are 16 villages associated with the FTF partner NGO Yayasan Dian Tama's (YDT) efforts to enhance agroforestry-based livelihoods through land rehabilitation.

Across the two sites and three assignments, more than 300 farmers and NGO staff gained technical capacity directly from the volunteers; one-third of those beneficiaries were women. The number of indirect beneficiaries is 350 households in North Sumatra and 1000 households in West Kalimantan. The following are some of the notable results of FTF Indonesia livestock assignments:

- Average pig production has doubled for 1000 households in West Kalimantan, increasing from 5-6 mature pigs and 5 piglets/family/year to 12 mature pigs and 10 piglets/family/year. The value of increased production is US\$284/family, or a total of US\$284,000. Sixty to seventy percent of the increase has been or will be sold in local markets; 30-40% is for home consumption. The increase in production can be absorbed by local markets, because demand exceeds current supply.
- 35 households in North Sumatra have increased goat production by one buck/year. Those bucks are sold during the annual Ramadan holiday when demand and prices are high; approximately US\$85/buck/family, or a total of US\$2,975/year. Goat and pig production inputs are sourced locally and labor is provided by family members. Families do not value the cost of those inputs; thus sales price and net incomes are functionally the same.
- The key message from the pig/chicken volunteer in West Kalimantan was, know your markets, customers, and products. The goat volunteer in North Sumatra emphasized simple livestock management improvements that are adoptable by local farmers. Farmer leaders and livestock farmers at the sites said the volunteers enhanced their awareness of livestock management, negotiation methods, and the power of the farmer producer when dealing with traders.

Analysis of Key Impacts, Successes and Failures

Methodology for measuring impacts

Winrock's monitoring system aims foremost to provide the information that FTF staff members need to effectively manage for results, as well as to provide data for reporting. We gathered data that is most useful to hosts, partners, and field staff, and cost-effective to collect.

Baseline data was collected at the host and subsector levels. Baseline data for individual hosts was collected while preparing the FTF assignment's scope of work. The profile included available information about the host's production, services, membership, and incomes, and enabled hosts and field staff to assess changes that occur as a result of the volunteer assignment. This information also informed the volunteers about the host's size capacity. By working in subsectors that have already been targeted by USAID and local governments, Winrock used existing subsector data for baseline and annual monitoring, rather than spending resources to conduct rigorous sector and competitiveness analyses. Existing data sources included studies from USAID and other donors, government statistics, and analyses conducted by FTF partners. In a few cases, volunteers collected some baseline data as a secondary activity during their assignment.

Output data was collected in the volunteer's debriefing and end of assignment report. Field staff and partners conducted follow-up impact surveys approximately 9 to 12 months after assignment completion. These surveys were an important tool for field staff to provide additional guidance to the hosts. Lessons from impact monitoring were fed immediately back into program implementation at the host and country level, and significant lessons were shared across countries through email and during regional retreats.

Field staff adjusted the timing to conduct the impact survey based on when results are expected to appear. Staff followed up with a sample of hosts from previous fiscal years, as well as hosts for assignments during the past 12 months. In many cases, hosts received multiple volunteers and impact surveys were conducted with key hosts throughout the life of project.

Some impact data was gathered through direct observation (for example a new product or enterprise can be observed). However, most impact information was gathered by interviewing the host and other assignment participants. Winrock's survey format is intended to be an outline for in-depth interviews, which means that the interviewer does not follow a strict survey form, but instead asks open-ended questions that guide the conversation to discuss assignment results, lessons, and next steps. Survey questions are translated into terms that are appropriate for the local language and particular assignment situation. After each interview, the country manager and other relevant staff discussed the survey responses and lessons for how to improve future volunteer assignments.

Based on Asia FTF's value chain approach, Winrock analyzed quantitative and qualitative impacts in different ways. FTF field staff documented tangible results, such as increased gross sales and net income, for targeted value chain actors including producers and agro-enterprises. FTF staff also documented qualitative results such as changes in technologies and practices that can lead to improved value chain competitiveness. Lastly, FTF staff

documented and analyzed sustainability indicators, such as new organizations and financial resources. Quantitative data is compiled in EGAT's FTF indicator tables. Qualitative information is provided in focus area summaries and success stories.

Qualitative assessment of impacts

FTF volunteer technical assistance impacted farmers in many positive ways beyond those that are quantifiable by the program's M&E systems. The qualitative impacts were essential to the success of the FTF interventions that demonstrated how simple and cost-effective solutions can bring tangible improvements. The following are some of the examples of FTF interventions that generated qualitative impacts throughout the region during the LOP.

- FTF technical assistance empowered women. For example, **in Nepal**, a women's vegetable production group has been trained on organic farming practices and Internal Control Systems (ICS) for organic certification of vegetables produced by cooperative members. Also, following volunteer interventions, women participation in ten vegetable producer groups and four cooperatives increased by more than 50%. The women are very proud of the knowledge and skills they acquired from volunteer training, and the contribution they are now able to make to their families.
- FTF technical assistance fostered collaboration between farmers, farmer groups and relevant stakeholders in selected focus areas of FTF interventions. By supporting producer organizations and emphasizing the benefits of collective action, the farmers created important bonds that positively impacted their sales and incomes. **In Bangladesh**, volunteer technical assistance in beekeeping was highly helpful in bringing together the beekeepers and relevant stakeholders under one umbrella (apiculture networks and beekeepers' associations), leading to undertaking coordinated activities for sustainable development of the sub-sector. Honey fairs are now collectively organized under the leadership of the Bangladesh Apicultural Association (BAA) that has been helpful in creating mass awareness about the quality of locally produced honey and has been helping the beekeepers in selling their seasonal stocks.
- Farmers started investing in natural resource conservation. They now understand the importance of sustainable agricultural practices, such as low-external inputs' agriculture (LEIA), organic farming, zero tillage, water conservation, and shifting from chemical to biological fertilizers, to benefit both farm productivity and the environment. **In Nepal and India**, organic farming assignments were highly successful and helped bring down certification costs, increase productivity and profits, and improve natural resource conservation.
- FTF technical assistance contributed to the growth of the farmers' entrepreneurial spirit. Many farmers participating in FTF technical assistance realized that they can expand existing enterprises or start new ones. **In Bangladesh**, a private beekeeper started production of comb honey, a value-added product, for the first time in the country, with support and assistance of FTF volunteers. Another private entrepreneur started making queen cups, another critical input for increasing honey production. A private reputable agribusiness company in Bangladesh has diversified cheese product line by incorporating two new cheese varieties: cheddar and process cheese, after the company learned how to make these cheeses from the FTF experts.

Key issues that helped in achieving sector-wide impacts from volunteer assignments:

- Sector-wide interventions proved successful due to a comprehensive approach to address value chain issues involving all stakeholders (farmers, inputs suppliers, processors, policymakers and marketers).
- Highly skilled volunteers with a background in production management helped improve productivity and enhanced farmer response as they ‘spoke the same language’.
- Host commitment was critical because it helped to ensure that recommendations were adopted and tailored to the specific constraints of the host.
- Synergy with other donor projects helped leverage technical and financial resources for FTF beneficiaries to implement volunteers’ recommendations.
- Systematic interventions were instrumental in promoting changes at the host and sector levels.
- FTF demonstration plots reached a larger audience and helped promote the acceptance of innovations by farmers.
- Timeliness of technical assistance was important as it met farmers perceived needs with volunteer support.
- Increased capacity of support institutions was vital to ensure sustainability of technology and knowledge transfer after FTF program activities concluded.
- Well-managed and coordinated activities of FTF field offices contributed to program success as the program goals and objectives were communicated to the participating hosts and volunteers.

Key accomplishments in addressing sector constraints

The following accomplishments were common throughout the intervention focus areas in the Asia FTF countries, with some degree of variance.

The horticulture sector was afflicted by low productivity; poor produce quality, pests and disease, lack of access to high quality inputs, and lack of knowledge of appropriate marketing. Through targeted interventions, FTF technical assistance

- Improved orchard management practices, including pruning, fertilization, irrigation, pest and disease control, and post-harvest handling, packaging and marketing;
- Promoted sustainable agriculture practices (low-external inputs agriculture, organic farming, composting, vermicomposting, etc.) and helped reduce farmers’ organic certification costs manifold.
- Improved tissue culture lab operations procedures by building capacity lab personnel and improved micropropagation/ tissue culture of important horticultural crops;
- Introduced low-cost options for greenhouse set up to improve hardening of tissue cultured plant materials;
- Introduced improved techniques for good quality mycelium production to improve mushroom farm productivity;
- Introduced production of off-season vegetables and introduced new tomato varieties to improve farmer productivity and profits;

- Promoted demonstration plots to adopt new technologies to local conditions and demonstrate results to large number of farmers;
- Promoted innovative marketing ideas to improve sales of agricultural products.

The apiculture focus area in Bangladesh, India, and Nepal suffered from lack of expertise on modern beekeeping practices, low productivity of bees due to poor management, lack of proper knowledge of pests, mites, and diseases management, and lack of improved processing and packaging techniques for higher value addition. Through appropriately designed assignments, FTF technical assistance:

- Introduced low-cost improved techniques for hive management including colony multiplication, colony division, and care;
- Introduced screened bottom boards to control varroa mites;
- Taught improved bee breeding techniques to produce queen bees with hygienic behavior traits;
- Provided low-cost organic solutions for mites, pests and diseases management;
- Suggested ways to improve honey extraction, processing, packaging, and marketing;
- Built capacity for producing beekeeping equipment locally.

The productivity of livestock farms and per capita availability of livestock products across FTF Asia countries are extremely low because of poor livestock quality, inadequate feed and substandard feed quality, the threats of disease outbreaks, and rudimentary husbandry practices. Besides, dairy and meat processing enterprises lack updated technologies, product diversification, and skilled technical and marketing workforce. FTF interventions addressed these constraints by

- Improving feed formulation, feed ingredients' selection, and feed testing skills, and suggesting improved feeding regimes;
- Providing training on AI and enhancing the skills of veterinary services providers;
- Introducing improved meat (beef and broiler) processing techniques;
- Imparting training on food safety, good manufacturing practices (GMP), standard operating procedures (SoPs), and hazard analysis critical control points (HACCP);
- Improving livestock research institutions in genetics and livestock management.

The agro-processing sector in Asia FTF countries is underdeveloped and lacks updated technology for improving processing, upgrading quality and food safety. FTF interventions helped:

- Upgrade existing processing techniques and technologies, and improved quality and food safety;
- Introduced new marketing techniques, including packaging, labeling, product promotion and brand development.

Influence on other projects and activities

Working with other USAID programs helps foster programmatic synergy and create sector-wide broader spread of program impacts. Besides, leveraging resources of USAID and other donor programs is a major cost saving measure as the projects requiring FTF services contribute resources such as volunteer housing, transportation, translation, and communication services. Some examples of broader impacts are highlighted below:

During the LOP, **FTF Nepal** program has fielded volunteers to provide complementary support to other USAID funded projects such as Nepal-SIMI, BDS-MaPS and Ujjyalo, creating a development synergy to impact on the livelihoods of smallholders and marginalized farmers. The Nepal program has also collaborated with other donor-funded projects such as PSP/GTZ in common areas of support in the beekeeping sub-sector. **In Bangladesh**, the FTF program during the current and previous phases collaborated closely with the USAID funded ATDPI and ATDPII projects and fielded volunteers to provide complementary technical assistance in agro-processing, dairy and poultry, fish feed, and agribusiness development. Similarly, working with MACH in Bangladesh, FTF injected complementary technical assistance to improve pineapple production to increase yields, and reduce top-soil erosion from hill slopes; promote IPM approaches for watershed and floodplain crops; poultry waste management; and develop a strategy for tilapia production suitable for Bangladesh conditions. FTF Bangladesh also worked with the Gates' Foundation funded dairy strengthening project implemented by CARE in the northern parts of the country. In addition, a grant proposal produced by a beekeeping volunteer helped FTF Bangladesh host BASA secure a grant of €10,600 (\$140,000) from the European Union for implementing a beekeeping project designed for rural poverty alleviation through increased honey production and improved marketing. **In Indonesia**, volunteer recommendations were used in two donor-funded projects: i) improving smallholder vegetable production in Southeast Asian watersheds in Indonesia, Vietnam, and the Philippines, and ii) improving smallholder teak timber production and marketing systems in Central Java (Indonesia). Besides, volunteer recommendations and assignments' impacts have been used in six papers presented in various international conferences. All papers were published for wider distribution. This process helped to extend volunteer recommendations and impacts beyond the scope of the FTF Indonesia project.

Failures

Throughout the LOP, the FTF Asia program recorded a few assignments that failed to produce noticeable impacts. The following are some of those assignments:

India There has been no direct impact from an assignment designed to provide training to improve farmers' skills on post harvest technology and packaging of fresh fruits and vegetables in the state of Himachal Pradesh. The assignment was implemented in April 2007 working in conjunction with Jaipur, Rajasthan based FTF partner Morarka Foundation. Main reason for failure is the partner's inability to produce a comprehensive business plan for assisting the farmers. There was also no competent authority on behalf of Morarka to help implement the recommendations working with the farmer beneficiaries. In his end of assignment report the volunteer observed: *"it is my belief that a current comprehensive Business Plan must be developed for each project, each department, and for the foundation as a whole, unless one already exists. It is most critical that it be done rapidly for the Shimla District"*. This is an example showing that many times a lack of focus and understanding of

larger picture dissuade the host/ partner organizations from implementing volunteer recommendations and any follow up activities.

Indonesia The *farmer marketing association* assignment completed in February 2007 working with FTF partner ICRAF failed because of the farmers' lack of commitment to implement the volunteer's recommendations despite proven financial advantages. Following the assignment, a marketing association was successfully established but the association was abandoned after one transaction, where farmers were able to increase income by 53%. The volunteer identified this potential problem during his assignment and mentioned: '*the main challenge to the development of a successful marketing association would be the farmers to embrace a business culture that valued the development of win-win conditions for all players in the value chain*'.

The *vegetable production* assignments completed in August-September 2005 and August 2006 in West Java and Batang Toru had limited impact because volunteer recommendations did not consider the actual conditions and limitations of farmer beneficiaries, nor the need to maintain traditional natural resource management practices that conserve valuable environmental resources. The volunteer favored conversion to commercial market production.

The *smallholder forestry* assignments completed in July 2005 and September 2005 successfully achieved objectives, but did not result in direct economic impacts for the partners. That has been perceived by the beneficiaries as a disappointment.

Nepal Two beekeeping assignments, one designed to provide honeybee management training to a women's group (November - December 2005), and another to provide queen rearing training to the beekeepers' association (March 2007) in the mid-western Dang District Valley of Nepal were considered as failed assignments as prolonged dry weather caused failure of mustard crops affecting the availability of floral resources to sustain the productive level of honeybee colonies in the years (2006 and 2007) following the volunteer assignments with the beekeepers in the district.

Major Lessons Learned

During the past five years, Asia FTF gained many lessons about program implementation, focus area selection and intervention strategies, managing effective partnerships, and how to make the best use of volunteer technical assistance.

Focus Area Approach. The focus area/sub-sector approach has been quite useful and effective to address observed weaknesses along the value chain, and devise interventions to strengthen the target sub-sectors. The focus area approach has resulted in increased knowledge by the FTF staff of strategic opportunities, and the experiences of concentrating volunteer assignments in a few areas has been positive across Asia FTF countries. For example, in **Nepal**, focus area approach has helped the host organizations increase production and exports of off-season vegetables significantly. Beekeeping has expanded in **Bangladesh, India, and Nepal** with improved management practices adopted by beekeepers leading to significant increases in productivity per hive. In addition, honey processors adopting improved processing, quality control and packaging were able to achieve manifold increases in productivity and profits in all three countries. In **India**, volunteer support to organic farming focus area has helped reduce certification costs significantly that helped a large number of farmers and producers become organic certified. In **Bangladesh** livestock focus area, volunteer interventions have helped strengthen cattle feed formulation capabilities, and the host organizations adopting volunteer recommendations achieved manifold increases in productivity and profits with the dairy farmers getting more milk by using improved quality feed. Most importantly, volunteer interventions played a catalytic role in introducing formulated concentrate cattle feed for the first time in Bangladesh in 2000. For additional information on country focus areas, and key successes, refer to section 2: Summary of Works by Focus Area for each country separately, and **Annex F Success Stories**.

Strengthen links between producer groups, agro-processors, and support institutions. FTF volunteers and staff strengthened value chain alliances among producer organizations, agro-processors, and support institutions. To sustainably integrate smallholders into competitive value chains, these three groups must work together effectively. An example of this is FTF assistance to India beekeeping host Lupin Human Welfare Research Foundation (LHWRF), based in Bharatpur, Rajasthan. Working through LHWRF, FTF helped introduce beekeeping in 10,000 hectares of mustard growing areas in Rajasthan for the benefit of the resource-poor farmers. In addition, using volunteer report, LHWRF was able to get a grant of US\$50,000 from the Rajasthan government to further promote beekeeping in the state.

FTF staff has observed that when volunteers provide agro-processors with technical assistance related to market requirements and quality improvement, the processors share this information with producers and manage quality improvements along the whole chain. This approach is more sustainable, cost-effective, and broad-based than if FTF worked only with producers.

Demonstrable interventions are the most effective. The most successful and effective interventions were those where the farmers and agribusinesses were able to observe the results firsthand and within a short timeframe. The demonstrated technologies encouraged farmers and value chain participants to implement the volunteers' recommendations, invest their time and scarce resources, as well as disseminate their experiences to their peers.

Interventions that were affordable and readily available to the farmers proved to be the most successful and sustainable rather than those with high capital requirements. Successful examples from Asia FTF include practical hands-on demonstration of improved banana cultivation techniques that helped over 600 banana growers in north eastern Bangladesh to reduce production costs by around 61% and increase net income by about 134% by implementing volunteer recommendations with regard to fertilization, fruit protection, pruning and follower selection, seed selection, planting systems, diseases and pests control through IPM, and post-harvest techniques.

Working with associations and private sector support institutions maximizes impact. Working with cooperatives, associations, and farmer/producer groups demonstrated a cost-effective means for the program to reach the maximum number of beneficiaries with limited FTF resources. Many assignments were designed to transfer volunteer's knowledge to association members and technical personnel who conduct producer and processor training.

FTF public outreach is important to gain partners and hosts. The FTF Program conducted both US-based and host country public outreach campaigns, which proved to be highly effective in promoting the goals and objectives of the program. The US-based public outreach strategy allowed FTF to facilitate market linkages between US and Asian businesses, as well as attract interested volunteers for various technical assignments. The host-country public outreach approach allowed FTF to find effective hosts that were committed to growing their businesses and improving competitiveness, and educate host country citizens regarding US foreign assistance.

Partnerships with other NGOs maximize resources and results. FTF's collaboration with other NGOs, such as BRAC, BIA and CMES in Bangladesh, Morarka Research Foundation, Institute of Himalayan Environmental Research & Education in India, Yayasan Dian Tama in Indonesia, and Sewa Foundation Nepal was effective by combining resources to maximize results and impact on beneficiaries and avoid unnecessary duplication. Close communication among project managers and staff allowed each program to focus on and strengthen different aspects of the same value chain and provide assistance in their areas of expertise.

Cooperation with agricultural extension agencies improved services for farmers and food processors. By forming strong partnerships with agricultural research and extension agencies, Asia FTF was able to gain support for its activities, create an important network between hosts and extension and agribusiness support institutions, as well as effectively represent farmer's needs to policymakers. In India, the program built the capacity of Uttaranchal Organic Commodity Board (UOCB), a state government agency, to provide better extension services to beekeepers. In Nepal, the FTF program built the capacity of the department of livestock services in designing effective avian influenza surveillance.

Low cost interventions generate the most response. Affordable and readily available interventions proved to be the most successful and sustainable rather than those requiring high capital investments. Examples are: beekeeping assignments in Bangladesh, India, and Nepal; banana and feed assignments in Bangladesh; organic assignments in India; IPM and off-season vegetables' assignments in Nepal.

Piggyback assignments are cost-effective. Fielding one volunteer for multiple assignments during one trip, within the country or to other Asian countries, is a good cost-effective

strategy when the assignments are appropriately designed and coordinated. It is particularly effective when volunteer assignments consist of separate yet similar scopes of work and the activities with the hosts are not time consuming. This arrangement helped reach a wider audience and ensured extensive technology transfer with reduced assignment-related costs. For example, in Bangladesh animal nutritionist Dr. Roy Chapin completed ten assignments in six trips working with more than one hosts in each trip.

Volunteer continuity builds sustainability. Assignments that required multiple visits by a volunteer to a host proved to be effective. During the initial visit, volunteers familiarized themselves with specific constraints on the host and targeted sector, and initiated the required technology transfer. During subsequent visits, the volunteers assessed how the initial technology transfer influenced the host and what the host could do to accelerate technology transfer. For example, animal nutrition volunteer Dr. Roy Chapin's continued support helped in building local capability in feed formulation, feed ingredients' selection, and devising intelligent feeding regimes. Starting in 2000, Dr. Chapin traveled six times to Bangladesh and completed ten assignments working with the largest dairy cooperative of the country (BMPCUL/ MilkVita), two leading private sector feed mills, a top producing private sector dairy farm, and the Gates' foundation funded dairy development project. Dr. Chapin's continued assignments were highly helpful in improving dairy sector productivity and profits. Through Dr. Chapin's assignments, FTF leveraged technical assistance to thousands of resource-poor dairy farmers of the country apart from building capabilities of private sector feed enterprises. Similarly, volunteer continuity in organic farming in India had been helpful in reducing certification costs manifold to the benefit of organic producers.

Assignment continuity builds all-around capacity. Assignments that required multiple visits by volunteers from various skill areas to build the capacity of the host proved to be very effective. Volunteers addressed complex business development issues, including production, processing, and marketing, which helped hosts to strengthen their businesses from various perspectives. For instance, beekeeping assignments in Bangladesh, India, and Nepal, IPM assignments in Nepal, and organic farming assignments in India helped build sector wide capability leading to increased productivity, sales and income.

Strong USAID Mission relations are strategic. Throughout the LOP, Asia FTF countries continued to maintain close collaboration with the USAID Missions, and the country programs were aligned with the relevant strategic objectives of the Missions in the respective FTF countries. FTF country managers continued to keep the Mission representatives informed of the volunteer assignments by sharing work plans, volunteer end of assignment reports, and success stories, and providing volunteer debriefings upon request. To foster synergy and sector-wide spread of program impacts, Asia FTF countries collaborated with other USAID-funded projects wherever appropriate. In Bangladesh and Nepal for example, the Mission staff have been extremely supportive of the FTF program by encouraging other USAID-supported projects to develop collaborative relationships with FTF. In addition, the Missions continued to invite country managers to attend grantee coordination meetings, and annual partners' retreats where they (FTF managers) had the opportunities to spread information about the FTF program and continue to building collaborative relationships with other USAID grantees. The FTF program should continue to work closely with the local Missions, and align program development with Mission strategic objectives.

Recommendations

The lessons extracted from the last five years of program implementation in Asia resulted in the following set of recommendations for future FTF programs.

Serve horticulture, tree crop, and dairy value chains. Continue to target high-value agricultural products to enhance value chains' competitiveness, and increase employment and incomes for the poor, and build private sector agribusiness capabilities. Implement value-added strategies such as processed products and new product development and provide agro-processors and producer groups with the knowledge and skills to meet buyer requirements. Continue to help hosts differentiate their products and identify niche markets.

Focus on quality improvement and buyer standards. Quality improvement has played an important role in FTF hosts' success across various focus areas. The program promoted GMP, HACCP, EUREPGAP, FDA, and USDA quality and sanitation standards. In addition, efficient farming practices that helped decrease production and processing costs were all very effective strategies. In today's volatile agricultural markets, quality and production costs will continue to be the important factors for maintaining and increasing value chain competitiveness. Developing market and sales strategies such as improved packaging and branding focused on penetrating formal markets through optimum client service and aggressive marketing. Therefore, focus on quality improvement for buyers' compliance should remain one of the major FTF interventions in future.

Improve natural resource management. The FTF Program should continue to promote sustainable natural resource management initiatives and increase the peoples' awareness about agriculture and natural resource conservation techniques. Technical assistance in areas such as environmentally friendly production and processing technologies, water and soil conservation, and integrated pest management should continue.

Increase women's participation. FTF should continue its emphasis on including women as participants and targeted clients in its programming activities. Each host country had specific opportunities to promote women's active involvement in agricultural and trade. Asia FTF fielded a number of female volunteers to assist their counterparts in host countries to inject new production and business skills, which strengthened their ability and confidence to participate in decision-making and leadership roles.

Promote spread effect. FTF should maximize the dissemination of its interventions through continued work with association/producer groups and agricultural education institutions, as well as facilitating the formation of agricultural producers' forums, and supporting information dissemination networks. Continued collaboration with associations/producer groups will increase FTF's impact on a larger audience, as well as encourage value chain actors to share knowledge and skills. Also, continued collaboration with producer groups, networks, forums, research, and extension workers helps ensure the sustainability of FTF interventions through transferring skills and knowledge to a wider range of value chain actors.

Collaborate with partners. FTF partnerships played an important role in generating positive outcomes from FTF interventions in targeted sectors. Although attribution of impacts is more difficult with this strategy, collaborative work helped each party (FTF, international/local

project implementers, and donors) achieve their program objectives and facilitate changes among targeted audiences. For example, FTF worked in conjunction with USAID funded MACH, ATDPI/ATDPII, and Food Security Enhancement Initiatives in Bangladesh, BDS-Maps in Nepal, and ICRAF/ World Agro-Forestry Center in Indonesia. FTF should continue to maintain synergistic relationships with donor/ development projects and should strengthen partnerships in those areas where there is a lack of local expertise, and donor projects do not have the resources for additional technical assistance.

Implement demonstration projects. FTF should continue to support demonstration projects in cooperation with hosts and donors to show how innovative, low-cost technologies can increase productivity and profitability. Local partners and donors can provide funds for these demonstrations.

Annex A

**EGAT Indicator Tables 1-7
(see accompanying Excel file)**

Table 1a Farmer-to-Farmer Program Volunteers FY 2004 - FY 2008

Implementing Agency	Geographic Region	Country	Focus Area	No. of Volunteers															Number of Volunteer Days Completed					Estimated FTF Program Expenditures					FTF Program Cost/ Volunteer Day												
				Male					Female					Total					Year 1	Year 2	Year 3	Year 4	Year 5	Five Year Total	Year 1	Year 2	Year 3	Year 4	Year 5	Five Year Total											
				Year 1	Year 2	Year 3	Year 4	Year 5	Five Year Total	Year 1	Year 2	Year 3	Year 4	Year 5	Five Year Total	Year 1	Year 2	Year 3													Year 4	Year 5	Five Year Total								
WI	ANE	Bangladesh	Apiculture	2	4		3	1	10							0	2	4		3	1	10	33	61		57	17	168	25,381	57,800			50,360	14,827	146,526	769	948	919	884	872	872
WI	ANE	Bangladesh	Horticulture	6	7	6	2	4	25						0	6	7	6	2	4	25	85	106	93	36	74	394	65,376	100,439	85,461	31,806	64,541	343,638	769	948	919	884	872	872		
WI	ANE	Bangladesh	Poultry & Livestock	2	2	4	4	4	16	1		1			2	3	2	5	4	4	18	41	43	84	72	93	333	31,534	40,744	77,191	63,612	81,113	290,435	769	948	919	884	872	872		
WI	ANE	East Timor	Horticulture		1				1	1					1	1	1					2	19	24			43	14,613	22,741				37,504	769	948	919	884	872	872		
WI	ANE	India	Apiculture	3	2	1	2	1	9						0	3	2	1	2	1	9	48	35	22	34	16	155	36,918	33,164	20,217	30,039	13,955	135,188	769	948	919	884	872	872		
WI	ANE	India	Organic Production	8	8	6	11	3	36		1	1	2		4	8	9	7	13	3	40	135	133	113	244	48	673	103,833	126,023	103,840	215,574	41,865	586,976	769	948	919	884	872	872		
WI	ANE	Indonesia	Horticulture	2	1	1	3	1	8			1	3		4	2	1	2	6	1	12	29	16	30	116	17	208	22,305	15,161	27,568	102,486	14,827	181,413	769	948	919	884	872	872		
WI	ANE	Nepal	Apiculture	2	3	3	5	1	14	1		1		1	3	3	4	3	6	1	17	48	61	43	112	16	280	36,918	57,800	39,514	98,952	13,955	244,210	769	948	919	884	872	872		
WI	ANE	Nepal	Horticulture		3	3	7	3	16			3	3		6		3	6	10	3	22			43	101	156	56	356		40,744	92,813	137,826	48,842	310,496	769	948	919	884	872	872	
WI	ANE	Nepal	Medicinal/Aromatic Plants	2	2	2	2	1	9					2	2	2	2	2	4	1	11	43	28	32	61	12	176	33,073	26,531	29,406	53,894	10,466	153,503	769	948	919	884	872	872		
WI	ANE	Sri Lanka	Horticulture	1	4	4			9			2			2	1	6	4			11	23	107	122	10		262	17,690	101,387	112,111	8,835		228,511	769	948	919	884	872	872		
WI	ANE	Viet Nam	Horticulture	1	2				3					0	1	2					3	30	41				71	23,074	38,849			61,925	769	948	919	884	872	872			
WI	ANE	India	Flexible				1		1					0					1		1						14				12,369		12,210	769	948	919	884	872	872		
WI	ANE	Indonesia	Flexible		4		1	1	6			1		1		4		2	1	7			64		33	17	114		60,643		29,156	14,827	99,428	769	948	919	884	872	872		
WI	ANE	Nepal	Flexible		1		1		2			1		1		1		2		3			16		36		52		15,161		31,806		45,353	769	948	919	884	872	872		
WI	ANE	Sri Lanka	Flexible		1				1					0		1				1			18				18		17,056			15,699	769	948	919	884	872	872			
WI	ANE	Viet Nam	Flexible	1	1		2	1	5					0	1	1		2	1	5	15	22		35	15	87	11,537	20,846		30,923	13,083	75,880	769	948	919	884	872	872			
			Total	30	46	30	44	21	171	3	4	6	13	0	26	33	50	36	57	21	197	549	818	640	1016	381	3404	\$ 422,252	\$ 775,088	\$ 588,122	\$ 897,636	\$ 332,301	\$ 2,968,896	\$ 769	\$ 948	\$ 919	\$ 884	\$ 872	\$ 872		

Notes: Cost/volunteer day is estimated. Not all program expenses have been processed.

Table 1b Farmer-to-Farmer Program Funding Mobilized and Leveraged - FY 2004 - FY 2008

Implementing Agency	Geographic Region	Country	Focus Area	Value of Volunteer Professional Time (US\$)					Resources Leveraged by the Grantee/ Volunteers (US\$)					Value of Resources Mobilized by Host (US\$)					Estimated Value of Host Contribution (US\$)								
				Year 1	Year 2	Year 3	Year 4	Year 5	Five Year Total	Year 1	Year 2	Year 3	Year 4	Year 5	Five Year Total	Year 1	Year 2	Year 3	Year 4	Year 5	Five Year Total	Year 1	Year 2	Year 3	Year 4	Year 5	Five Year Total
				WI	ANE	Bangladesh	Apiculture	13,200	24,400		22,800	6,800	67,200	500	755		695	80	2,030		1,250	146,750		148,000	450	1,700	
WI	ANE	Bangladesh	Horticulture	34,000	42,400	37,200	14,400	29,600	157,600	720	3,120	655		525	5,020		4,240		3,760	8,000	3,090	4,950	2,500	950	3050	14,540	
WI	ANE	Bangladesh	Poultry & Livestock	16,400	17,200	33,600	28,800	37,200	133,200	1,590		150	230	400	2,370		1,740			1,740	850	1,970	3,050	3,710	4750	14,330	
WI	ANE	East Timor	Horticulture	7,600	9,600				17,200						-							1,270				1,270	
WI	ANE	India	Apiculture	19,200	14,000	8,800	13,600	6,400	62,000	310	150			500	50	1,010				565,590	565,590	1,875	1,240	825	1,475	715	6,130
WI	ANE	India	Organic Production	54,000	53,200	45,200	97,600	19,200	269,200	500	586	1,600	950	904	4,540				16,092	16,092	4,490	5,808	5,110	9,570	1872	26,850	
WI	ANE	Indonesia	Horticulture	11,600	6,400	12,000	46,400	6,800	83,200				1,200	1,000	2,200				2,400,000	2,400,000	1,580	7,005	2,795	8,005		19,385	
WI	ANE	Nepal	Apiculture	19,200	24,400	17,200	44,800	6,400	112,000	300	216	336	350		1,202						325	399	600	1,487	108	2,919	
WI	ANE	Nepal	Horticulture		17,200	40,400	62,400	22,400	142,400		61	570	3,815	1,884	6,330			8,142		8,142		615	1,087	3,318	1,156	6,176	
WI	ANE	Nepal	Medicinal/Aromatic Plants	17,200	11,200	12,800	24,400	4,800	70,400	4,142	27	70	570	100	4,909						398	372	230	467	50	1,517	
WI	ANE	Sri Lanka	Horticulture	9,200	42,800	48,800	4,000		104,800						-						544	3,318	592	282		4,736	
WI	ANE	Viet Nam	Horticulture	12,000	16,400				28,400						-							100				100	
WI	ANE	India	Flexible				5,600		5,600				300		300									650		650	
WI	ANE	Indonesia	Flexible		25,600		13,200	6,800	45,600				250		250							14,930		4,005	1305	20,240	
WI	ANE	Nepal	Flexible		6,400		14,400		20,800			138	320		458							113		2,594		2,707	
WI	ANE	Sri Lanka	Flexible		7,200				7,200						-											-	
WI	ANE	Viet Nam	Flexible	6,000	8,800		14,000	6,000	34,800						-						440	2,530		110		3,080	
			Total	\$ 219,600	\$ 327,200	\$ 256,000	\$ 406,400	\$ 152,400	\$ 1,361,600	\$ 8,062	\$ 5,053	\$ 4,581	\$ 8,980	\$ 3,943	\$ 30,619	\$ -	\$ 7,230	\$ 154,892	\$ 2,985,442	\$ -	\$ 3,147,564	\$ 14,042	\$ 46,320	\$ 16,789	\$ 37,473	\$ 13,206	\$ 127,830

Table 2 - Number of Volunteers by Gender and US State of Residence FY 2004 - FY2008

Regions	States	2004			2005			2006			2007			2008			Five Year Total		
		Year 1		Total	Year 2		Total	Year 3		Total	Year 4		Total	Year 5		Total	Male	Female	Total
		Male	Female		Male	Female		Male	Female		Male	Female		Male	Female				
Northeast	Connecticut			0			0			0			0			0	0	0	0
	Delaware			0			0			0			0			0	0	0	0
	Maine	2		2	1		1			0			0			0	3	0	3
	Maryland			0			0			0			0			0	0	0	0
	Massachusetts	2		2	2		2			0	2		2	2		2	8	0	8
	New Hampshire		1	1		1	1			0	1	1	2			0	1	3	4
	New Jersey	1		1	1		1			0	1	1	1			0	3	0	3
	New York			0			0			0		1	1			0	0	1	1
	Pennsylvania			0			0			0	1	2	3			0	1	2	3
	Rhode Island			0	3		3	1		1	1	2	1			0	5	0	5
	Vermont			0			0			0			0			0	0	0	0
	Washington, DC			0			0	1		1	1	1	2			0	1	2	3
	Subtotal	5	1	6	7	1	8	1	1	2	7	5	12	2	0	2	22	8	30
Southeast	Alabama			0			0			0	4		4			0	4	0	4
	Arkansas	1		1	6		6	4		4	7		7	7		7	25	0	25
	Florida	2		2	5		5	3	3	6	7	2	2	1		1	11	5	16
	Georgia	1		1	2		2	1		1			0			0	4	0	4
	Kentucky			0			0			0			0			0	0	0	0
	Louisiana	1	1	2			0			0	1		1			0	2	1	3
	Mississippi	3		3	1		1	1		1			0			0	5	0	5
	North Carolina	3		3	3		3	2		2	7		7			0	15	0	15
	South Carolina			0			0			0			0			0	0	0	0
	Tennessee			0			0			0			0			0	0	0	0
	Virginia	1	1	2	3	1	4			0	1	1	2			0	5	3	8
	West Virginia			0			0			0			0	1		1	1	0	1
	Subtotal	12	2	14	20	1	21	11	3	14	20	3	23	9	0	9	72	9	81
Midwest	Illinois			0			0			0			0	0		0	0	0	0
	Indiana	1		1			0			0			0			0	1	0	1
	Iowa			0			0			0			0			0	0	0	0
	Kansas			0			0			0			0			0	0	0	0
	Missouri	1	1	2	2		2			0			0			0	3	0	3
	Nebraska			0	3		3	1		1	1		1			0	5	0	5
	Ohio			0	1		1	2		2	1		1			0	4	0	4
	Subtotal	2	0	2	6	0	6	3	0	3	2	0	2	0	0	0	13	0	13
Upper Midwest	Michigan			0	1		1	2		2	1		1			0	4	0	4
	Minnesota			0			0			0	1		1	1		1	2	0	2
	North Dakota			0			0			0			0			0	0	0	0
	South Dakota			0			0			0			0			0	0	0	0
	Wisconsin	1		1			0	1		1	1		1	2		2	5	0	5
	Subtotal	1	0	1	1	0	1	3	0	3	3	0	3	3	0	3	11	0	11
Rocky Mountain	Colorado	1		1	1		1	1		1	1		1	0		0	3	1	4
	Idaho			0			0			0			0			0	0	0	0
	Montana			0	1		1			0	1	1	2			0	1	2	3
	Utah			0			0			0			0			0	0	0	0
	Wyoming			0			0			0			0			0	0	0	0
	Subtotal	1	0	1	0	2	2	1	0	1	2	1	3	0	0	0	4	3	7
West Coast	Alaska			0			0			0			0			0	0	0	0
	California	2		2	5		5	1		1	2		2	3		3	13	0	13
	Hawaii	1		1	1		1	3		3	1		1			0	5	1	6
	Oregon	3	3	3	3	3	3	3	3	3	1	2	2	3	3	3	13	1	14
	Washington			0			0	1	1	2	2		2			0	3	1	4
	Subtotal	6	0	6	9	0	9	8	1	9	5	2	7	6	0	6	34	3	37
Southwest	Arizona			0			0			0	1		1			0	1	0	1
	Nevada			0	1		1			0			0			0	1	0	1
	New Mexico	1		1	1		1	2		2	1		1			0	5	0	5
	Oklahoma			0			0	1		1			0	1		1	2	0	2
	Texas			0			0			0			0			0	0	0	0
	Subtotal	1	0	1	2	0	2	3	0	3	2	0	2	1	0	1	9	0	9
Other	other	1		1	1		1	1	1	1	2	2	4	0		0	4	3	7
	US Virgin Islands	1		1			0			0			0			0	1	0	1
	Puerto Rico			0			0			0	1		1			0	1	0	1
	Subtotal	2	0	2	1	0	1	0	1	3	2	5	5	0	0	0	6	3	9
	TOTAL	30	3	33	46	4	50	30	6	36	44	13	57	21	0	21	171	26	197

Table 3b: Farmer-to-Farmer Program Volunteer Assignments By Location in Commodity Chain - FY 2004 - FY 2008

Implementing Agency	Geographic Region	Country	Focus Area	Information and Input (pre-production) Support Services					On Farm Production Farmers					Processing (including primary and final product transformation, storage, transportation)					Marketing (including branding, advertising, promotion, distribution, sales)					Overall Total Number of Volunteer Assignments									
				Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5					
								Five Year Total					Five Year Total					Five Year Total					Five Year Total					Five Year Total					
W	ANE	Bangladesh	Apiculture		1				1	1	2		3		6					0	1	1			1	3	2	4		3	1	10	
W	ANE	Bangladesh	Hor iculture						0	6	6	6	2	2	22					1	1		1			1	2	6	7	6	2	4	25
W	ANE	Bangladesh	Poultry & Livestock				1		1	2	1	2	1	2	8	1	1	3	2	2	9					0	3	2	5	4	4	18	
W	ANE	East Timor	Hor iculture	1					1		1				1					0						0	1	1				2	
W	ANE	India	Apiculture	1					1	2	2	1	2		7					1	1					0	3	2	1	2	1	9	
W	ANE	India	Organic Production	5	7	4	4	1	21	2	1	3	7	2	15	1			2		3		1			1	8	9	7	13	3	40	
W	ANE	Indonesia	Hor iculture				2		2	1		2	1	1	5				1		1	1	1		2	4	2	1	2	6	1	12	
W	ANE	Nepal	Apiculture		2				2	3		1	4	1	9		1	2			3		1		2	3	3	4	3	6	1	17	
W	ANE	Nepal	Hor iculture			1			1		3	4	8	3	18						0			1	2	3		3	6	10	3	22	
W	ANE	Nepal	Medicinal/Aromatic Plants	1					1	1		2	3		6		1		1		2		1		1	2	2	2	2	4	1	11	
W	ANE	Sri Lanka	Hor iculture		1				1	1	4	4			9		1				1					0	1	6	4			11	
W	ANE	Viet Nam	Hor iculture		2				2						0						0	1				1	1	2				3	
W	ANE	India	Flexible						0				1		1						0					0				1		1	
W	ANE	Indonesia	Flexible		1				1				2	1	3						0		3			3		4		2	1	7	
W	ANE	Nepal	Flexible				1		1		1		1		2						0					0		1		2		3	
W	ANE	Sri Lanka	Flexible						0						0		1				1					0		1				1	
W	ANE	Viet Nam	Flexible	1			1		2		1			1	2				1		1					0	1	1		2	1	5	
			Total	9	14	5	9	1	38	19	22	25	35	13	114	2	5	5	7	4	23	3	9	1	6	3	22	33	50	36	57	21	197

Table 5: Farmer-to-Farmer Program Economic and Organizational Impacts - FY 2004 - FY 2008

Implementing Agency	Geographic Region	Country	Focus Area	Economic Impacts						Organizational Capacity Impacts					
				No. of Relevant Hosts ⁶	No. of Hosts Adopting Vol. Recommendations	No. Hosts Reporting Improvement	No. of beneficiaries associated with hosts reporting improvement	Increased incremental net income across all hosts adopting (US\$)	Increased gross value of sales (US\$)	No. of Relevant Hosts ⁶	No. of Hosts Adopting Vol. Recommendations	No. Hosts Reporting Improvement	No. of beneficiaries associated with hosts reporting improvement	Increased Revenue (US\$)	Increased Number of New Products and Services
WI	Asia	Bangladesh	Apiculture	6	5	5	2250	\$77,105	\$270,558	6	5	5	595	n/a	5
WI	Asia	Bangladesh	Horticulture	15	15	13	825	\$492,040	\$589,575	15	15	15	1171	n/a	12
WI	Asia	Bangladesh	Poultry & Livestock	10	10	8	400	\$1,871,288	\$23,506,801	10	10	10	349	n/a	10
WI	Asia	East Timor	Horticulture	1	n/a	n/a	n/a	n/a	n/a	1	n/a	n/a	n/a	n/a	n/a
WI	Asia	India	Apiculture	7	7	7	14000	\$64,013	\$374,075	7	7	7	891	n/a	18
WI	Asia	India	Organic Production	13	13	13	28005	\$195,711	\$188,462	15	15	15	49794	n/a	51
WI	Asia	Indonesia	Horticulture	1	1	1	2533	\$276,956	\$276,956	1	1	1	1178	n/a	20
WI	Asia	Nepal	Apiculture	12	12	12	2156	\$398,490	\$988,265	13	13	13	450	n/a	25
WI	Asia	Nepal	Horticulture	14	12	12	10734	\$2,119,410	\$418,431	5	5	5	433	n/a	6
WI	Asia	Nepal	Medicinal/Aromatic Plants	7	7	7	3808	\$23,904	\$28,582	8	8	8	190	n/a	10
WI	Asia	Sri Lanka	Horticulture	8	3	2	80	\$4,117	\$10,560	2	1	1	40	n/a	1
WI	Asia	Vietnam	Horticulture	2	n/a	n/a	n/a	n/a	n/a	3	2	2	28	n/a	n/a
WI	Asia	India	Flexible	1	1	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
WI	Asia	Indonesia	Flexible	1	1	1	2250	\$291,975	\$291,975	1	1	1	187	n/a	6
WI	Asia	Nepal	Flexible	1	1	1	36	\$2,544	\$5,767	1	1	1	151	n/a	2
WI	Asia	Sri Lanka	Flexible	n/a	n/a	n/a	n/a	n/a	n/a	1	n/a	n/a	n/a	n/a	n/a
WI	Asia	Vietnam	Flexible	3	n/a	n/a	n/a	n/a	n/a	1	1	n/a	35	n/a	n/a
			Total	102	88	82	67077	\$5,817,553	\$26,950,007	90	85	84	55492	\$0	166

Notes:

1. Following EGAT guidance, gross sales and net income are annual not cumulative figures
2. For Bangladesh, India, Indonesia, Nepal and Sri Lanka the hosts reported under organizational capacity impacts are also counted under economic impacts.
3. For Bangladesh Apiculture focus area, the number of relevant hosts exceeds the total number of hosts on table 4 due to the fact that relevant hosts worked across focus areas. Therefore, these hosts are counted only once in table 4, but counted multiple times across focus areas where relevant on table 5.
4. Number of beneficiaries associated with hosts under economic impacts reporting improvements in India under Organic focus area include 25,495 who have increased sales & income as a result of FTF assistance. These numbers have been reported by associated host organizations (NGOs) and certification agencies. Sales & income figures from these producers are unknown.
5. Number of beneficiaries associated with org capacity hosts reporting improvements in India under Organic focus area include 46,200 farmers under conversion who are pursuing organic certification, including 7,850 who have become certified to date.
6. In Indonesia, the host/partner for all assignments is the same, ICRAF. Beneficiaries represent different producer groups.
7. Number of hosts reporting improvement was defined as the hosts that reported economic impacts. Other types of improvements were not counted in this host number.

Table 6: Farmer-to-Farmer Program Financial Sector and Environmental Impacts - FY 2004 - FY 2008

Implementing Agency	Geographic Region	Country	Focus Area	Environment/NRM								
				No. of Relevant Hosts	No. of Hosts Adopting Vol. Recommendations	No. Hosts Reporting Improvement	Increased incremental net income (US\$)	Increase gross value of sales (US\$)	Area covered by improved natural resource management (ha)	Total number of hosts adopting one or more environmental technologies	People with improved safety and working conditions	People with improved environmental services
WI	Asia	Bangladesh	Apiculture	5	5	5	n/a	n/a	49919	3	165	290,000
WI	Asia	Bangladesh	Horticulture	13	13	13	n/a	n/a	693277	5	9570	900
WI	Asia	Bangladesh	Poultry & Livestock	10	10	10	n/a	n/a	6115904	1	5680	5,500
WI	Asia	East Timor	Horticulture	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
WI	Asia	India	Apiculture	8	8	8	n/a	n/a	120	6	52	650
WI	Asia	India	Organic Production	15	15	15	n/a	n/a	25546	11	4156	8,722
WI	Asia	Indonesia	Horticulture	1	1	1	n/a	n/a	2000	1	3500	14813923
WI	Asia	Nepal	Apiculture	1	1	1	n/a	n/a	0	0	30	15
WI	Asia	Nepal	Horticulture	4	4	4	n/a	n/a	0	4	982	172
WI	Asia	Nepal	Medicinal/ Aromatic Plants	5	5	5	n/a	n/a	68	3	92	20
WI	Asia	Sri Lanka	Horticulture	1	1	1	n/a	n/a	8	1	n/a	n/a
WI	Asia	Vietnam	Horticulture	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
WI	Asia	India	Flexible	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
WI	Asia	Indonesia	Flexible	1	1	1	n/a	n/a	86400	1	6500	9500
WI	Asia	Nepal	Flexible	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
WI	Asia	Sri Lanka	Flexible	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
WI	Asia	Vietnam	Flexible	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
			Total	64	64	64	\$0	\$0	6973242	36	30,727	15,129,402

Notes:

1. Improved financial services was not an objective of the program over the past five years
2. Hosts reported under environmental impacts are duplicates of hosts reported in Table 5

Table 7 - Increased Awareness in the U.S. Agricultural Sector Concerning International Agricultural Development

Implementing Agency	Geographic Region	Number of Volunteers Performing Public Outreach Activities						Number of Press Releases to Local Media						Number of Media Events by Implementors and Volunteers						Number of Group Presentations by Implementors and Volunteers					
		Year 1	Year 2	Year 3	Year 4	Year 5	Five Year Total	Year 1	Year 2	Year 3	Year 4	Year 5	Five Year Total	Year 1	Year 2	Year 3	Year 4	Year 5	Five Year Total	Year 1	Year 2	Year 3	Year 4	Year 5	Five Year Total
WI	ANE	8	10	16	13	11	58	0	0	0	0	0	0	3	3	7	10	12	35	7	4	17	14	9	51

Note: Original report for Year 2 Number of Press Releases to Local Media was reported as 3, this was reported wrong, it should have been 0.

Annex B

Volunteers / Assignments

Annex B. Volunteers / Assignments

Last Name	First Name	City	State	Assignment Country	Assignment Title
Abdel-Rahman	Mohamed	Durham	NC	India	Post Harvest Handling & Packing of Organic Produces
					Post Harvest Handling of Fresh Fruits & Vegetables
					Diseases/Insects Management of Peaches
				Nepal	Post-harvest Handling of Vegetables in Wholesale Market
				Sri Lanka	IPM for Vegetables in Nuwara Eliya
Abdo	Melissa	Miami	FL	Indonesia	Conservation-Livelihood Linkage Specialist
					Conservation-Livelihood Linkage Specialist - II
Alkire	Ben	Lafayette	IN	Nepal	Propagation, Nursery Mgmt & Cultivation of Medicinal Plants
Aselage	John	Green Forest	AR	India	Organic Apple Nursery Development In H.P.
					Improved Technology For Apple Orchard Development
					Apple Orchard Management
					Protecting Apple Crops From Hailstorm Damages
Bailey	Bruce	Sacramento	CA	Indonesia	Nilam Production and Processing Specialist
Bailey	James	Harrisburg	PA	Indonesia	Tree Seed Business Development Specialist
Balasubramanian	Ramkrishnan	Gainesville	FL	India	Quality Control for An Organic Certification Agency
					Training on Organic Certification and Processing-A
Blakley	Tim	Pahoa	HI	Nepal	Technical Support to Essential Oils Distillation Unit
					Essential Oils Extraction and Marketing Support
					Medicinal Herbs and Spices Processing, Packaging and Marketing
Blehm	Jack	Ventura	CA	Bangladesh	Developing Improved Sales and Marketing Program
				Viet Nam	Brand Development Consultant
Boles	Jack	Marble Falls	AR	Indonesia	Livestock (Pig and Chicken) Specialist
					Livestock (Pig and Chicken) Marketing Specialist
Brown	Allison	State College	PA	East Timor	Produce Farmers in East Timor Horticulture Survey
Brown	Andrew	Asheville	NC	Bangladesh	Vermiculture and Vermicomposting for Waste Management
					Nursery Production
					Training on Low-external Input Agriculture (LEIA) and Organic Farming Practices
				Sri Lanka	Promote Leafy Vegetable Cultivation
Burbano	Elsi	Honolulu	HI	Nepal	White Stem Borer Management of Coffee Plant
Burleigh	James	Santa Fe	NM	Nepal	Integrated Pest Management in Vegetable Crops
					Integrated Pest and Disease Management in Vegetable Crops (Burleigh)
					Integrated Pest and Disease Management in Fruit and Vegetable Crops
Burnham	John	Hingham	MA	Bangladesh	Ice-Cream Production, Quality Control and Marketing
					Improved Practices for Dairy Products Processing, Quality Control and Marketing
Burns	John	Washington	VA	India	Developing Inspection Manual and Training On Organic Standards - B
Cain	Mark	Huntsville	AR	India	Biodynamics Training for MPUAT Graduate Students
					Training on Organic Cut Flower Production
					Improved Production Technology for Exotic Vegetables
Carney	Michael	Seattle	WA	Nepal	Technical Assistance on Hailstone Protection and Plastic House Technology
Chapin	Roy	Amity,	OR	Bangladesh	Cattle Feed Formulation, Production and Marketing
					Improving Cattle Feed Formulation and Production
					Improving Dairy Cattle Feed And Feeding Regime

Last Name	First Name	City	State	Assignment Country	Assignment Title
					Cost-Effective Dairy Cattle Feed Formulation and Feeding Regime
					Intelligent Formulation and Production of Cattle Feed
					Improving Cattle Feed Formulation and Feeding Regime
					Improving Cattle Feed Formulation Capability of QFL
					Dairy Cattle Feed and Fodder Options for Rural Poor Farmers
Cole	Steven	Lowell	MI	Nepal	Agriculture Produce Wholesale Market Development
Cole	Willie	Todd	NC	Bangladesh	Improving Beekeeping, Honey Production and Marketing Practices
				Nepal	Improved Methods of Honeybee Management
					Improved Technology for Beekeeping
Connaughton	Martin	Santa Fe	NM	India	Training on Organic Farm Management
				Sri Lanka	Floriculture Growing Techniques, Reproduction/Multiplication, Handling and Marketing
					Training for Small Cut Flower Growers
Correll	James	Fayetteville	AR	Nepal	Disease Management of Crucifers
					Preliminary - Integrated Pest Management in Vegetable Crops
					Clubroot Disease Management of Crucifers Follow-Up Assignment
					Integrated Pest Management Training for Vegetable Producers Group
					Improved Technology of Cultivation and Integrated Pest Management of Tomato Crop in Plastic House
Cuperus	Gerrit	Stilwater	OK	Sri Lanka	IPM for Vegetables in Nuwara Eliya
DeMarino	Yvonne	Plantation	FL	Nepal	Plant Quarantine and Phytosanitary Certification
					Pest Free Area Establishment for Tomato and Citrus Crops
Dreves	Amy	Corvallis	OR	Nepal	Integrated Pest and Disease Management in Fruit and Vegetable Crops
Dutter	Paul	Gainesville	FL	India	Internal Control System (ICS) & Organic Certification
Ebert	Richard	West Fork	AR	Bangladesh	Low-Cost Techniques for Oyster and Straw Mushroom Production
					Low-Cost Improved Techniques for Mushroom Production
				India	Organic Spawn & Mushroom Production
					Organic Mushroom Production
				Sri Lanka	Promoting Mushroom Cultivation among Farming Communities
Ellis	James, Jr.	Athens	GA	Bangladesh	Beekeeping for Sustainable Livelihood
Embrey	Michael	Greensboro	MD	Bangladesh	Improving Capabilities In Beekeeping And Honey Marketing Practices
					Queen Production, Colony Multiplication and Honey Marketing
					Improved Practices for Honey and Value Added Honey Products
					Improved Practices for Bee Breeding, Queen Production, and Honey Marketing
					Capacity Building for Beekeeping Training and Extension
Emery	Nathan	Maseru, MSU,	Lesotho	Bangladesh	Improving Bee Management and Honey Production Practices of BASA
				India	Development of Bee Keeping in Hills of Uttaranchal
					Honey Processing & Value Addition in Himachal Pradesh
					Beekeeping Training & Management at Bharatpur
					Business Plan for Honey Processing Unit
					Training on PHT, Processing & Value Addition of Honey
Fitzgerald	John	Clinton	AR	India	Apple Disease Management & Agronomic Package of Practices
Flaster	Patricia	Boulder	CO	Sri Lanka	Promoting Medicinal and Herbal Plant Processing and Marketing
Flores	Cesar	Denver	CO	Nepal	Technical Support to Quality Improvement of Honey
Foley	Mickey	Turner	OR	India	Training on Mushroom & Spawn Production
Fonsah	Greg	Tifton	GA	Indonesia	Smallholder Agriculture Products Marketing Specialist

Last Name	First Name	City	State	Assignment Country	Assignment Title
					Smallholder Horticultural Product Production and Marketing Specialist
					Smallholder Agriculture Products Production & Marketing Specialist
Fujiyoshi	Phillip	Davis	CA	India	Training on Laboratory Techniques for Soil Microbiology
Gerber	David	New Holland	OH	Nepal	Livestock Nutrition (Swine) Training for Women Farmers
Gilbert	Elon	Arlee	MT	India	Organic Farming Management in South Rajasthan
Govin	Ramana	Nashua	NH	India	Quality Control & MIS for Organic Food Processing
					Development of Low Cost Food Processing Technology
					Organic Food Processing and GMP
				Sri Lanka	Promoting Spice Industry Among Farming Communities
					Fruit Processing and Packaging
Goyme	Scott	Penngrove	CA	Viet Nam	Design a Steam Distillation Unit for Essential Oils Processing
Green	Arthur	Westmount	Quebec	Indonesia	Smallholder Market Opportunity Specialist
Griffis	John	Honolulu	HI	Bangladesh	Improved Tissue Culture & Hardening Procedures for Flowers and Ornamental Plants
					Production, Post Harvest Handling and Marketing of Cut Flowers and Ornamental Plants
					Nursery Production of Ornamental and Floriculture Plants and Export Marketing
				India	Tissue Culture -- Organic Herbal & Medicinal Plants
Guzman	Juan	Miami	FL	Indonesia	Smallholder Cacao (Theobroma Cacao) Production and Processing Specialist
Harman	Ann	Flint Hill	VA	Nepal	Improved Methods of Honeybee Management
					Improved Technology for Beekeeping
					Apis Cerana Honeybee Management Training
					Honey Based Value Added Products Development and Marketing
Hayes Jr.	Gerald	Williston	FL	Nepal	Honeybee Diseases and Parasites Management
Hazelrigg	Ann	Williston	VT	Nepal	Disease Management of Hybrid Tomato
Huang	Zachary	Okemos	MI	Nepal	Queen Rearing Training for Beekeeping Association Members
Hurst	James	Modesto	CA	India	PHT & Packaging of Fresh Fruits & Vegetables in H.P.
Huskey	Glen	Santa Clarita	CA	India	Training on Food Safety Management System with ISO-22000-2005
Hylton	Walter	Staunton	VA	Viet Nam	Dairy Cattle Reproductive Diseases Technical Assistance
Jackson	Roger	Oroville	WA	Bangladesh	Cheese Production, Quality Control and Marketing
Jackson	Sarah	Oroville	WA	Bangladesh	Cheese Production, Quality Control and Marketing
Jacobson	Michael	State College	PA	Indonesia	Tree Seed Business Development Specialist
Janita	Richard	Shawano	WI	Bangladesh	Milk and Milk-Based Products Processing and Quality Control
					Training on Dairy Products/Cheese Processing, Quality Control and Marketing
					Training on Cheddar and Processed Cheese Making
Johnson	Douglas	Pullman	WA	India	Honey Bee Pollination Management
Jordan Soto	Pablo	Cape Coral	FL	Bangladesh	Strengthening Banana Growers Through Training/Technology
					Improved Practices for Banana Production and Marketing
					Improving Capabilities in Banana Production and Diseases Control
					Improving Capabilities in Banana Diseases Control
					Improved Pineapple Production Techniques
Julian	Richard	Guelph	Ontario	Bangladesh	Poultry Diagnostic Laboratory Set Up and Operations
Juliano	Jorge	Salem	OR	East Timor	Mushroom Production
				Sri Lanka	Promote Mushroom Cultivation Among Farming Communities
					Quality Control in Mushroom Production

Last Name	First Name	City	State	Assignment Country	Assignment Title
Kloetzli	Cathryn	Charlottesville	VA	Nepal	Integrated Pest Management in Tomato Crop
Krupnik	Timothy	Santa Cruz	CA	Bangladesh	Solid Waste Management and Promotion Eco-Friendly Agriculture
Kumar	Lala	Lees's Summit	MO	Bangladesh	Improved Small-Scale Sapling Nursery, Vegetative Propagation And Affordable Micropropagation
Leh	Edward	Mohrsville	PA	Nepal	Honey Processing Plant Honey Processing, Packaging and Marketing Post-Harvest Management and Marketing of Honey
Leland Smith	Jodie	Poplar	MT	India	Marketing of Organic Products for UOCB Marketing of Organic Products
Levi	Edgar	Mountain View	AR	Bangladesh Nepal	Capacity Building for Profitable Honey Production and Marketing Improved Technology for Honeybee Management Hygienic Queen Production and Creamed Honey Production Honeybee Management Training for Women's Group Honeybee Training for Cooperative Members Improving Management of Indigenous Bee Colonies Improved Honeybee Management and Cooperative Structure
Litz	Richard	Homestead	FL	Bangladesh	Micropropagation Procedures Training Improved Training on Micropropagation Procedures for Mango and Other Tropical Fruit Trees Training on Micropropagation and Hardening Procedures for Tropical Fruit Trees Guidelines for Setting up a Tissue Culture Laboratory and a Green House
Lorish	Tom	Los Osos	CA	Nepal	Good Manufacturing Practice (GMP) for Herbal Products
Lovel	Hugh	Blairsville	GA	India	Training & Value Addition on Organic Farming
Mangum	Wyatt	Bowling Green	VA	India	Development of Hill Beekeeping Development of Hill Beekeeping Beekeeping & Disease Management Training Honey Bee Diseases Management in Bharatpur
Manners	Malcolm	Lakeland	FL	Bangladesh	Improving Nursery Production of Ornamental and Floriculture Plants Production, Post Harvest Handling and Marketing of Cut Flowers and Ornamental Plants Nursery Production of Ornamental and Floriculture Plants and Export Marketing
McClintock	Nathan	Oakland	CA	Bangladesh Nepal	Sustainable Agriculture Farming Practices Training Sustainable Farming Practices for CMES Organic Vegetable Farming Training on Micropropagation and Genetic Transformation Procedures of Grain Legumes
McHughen	Alan	Riverside	CA	Bangladesh	of Grain Legumes
Mignucci	Julia	Mayaguez	PR	India	Training on Organic Mushroom in Uttaranchal
Miles	Wendy	Boring	OR	Indonesia	Participatory Conservation Specialist
Miller	Susan	Arlee	MT	India	Organic Farming Management in South Rajasthan Medicinal and Aromatic Plants for Agricultural Diversification and Forest Enrichment
Morales	Mario	Beckley	WV	Viet Nam	
Morey	Nancy	Oxford	NY	Indonesia	Small Livestock (Goat and Chicken) Production Specialist
Morris	Robert	Las Vegas	NV	Viet Nam	Support Project for Trade Capacity Building
Morrow	W.E. Morgan	Raleigh	NC	Viet Nam	Training on Pig Husbandry Techniques
Motazedian	Iraj	Corvallis	OR	India	Training on Internal Control System for Organic Certification Development of MIS for Organic Production & Certification

Last Name	First Name	City	State	Assignment Country	Assignment Title
					Training on Organic Seed Production
					Training on Organic Seed Production
Neville	Robert	Westwood Greenwell	MA	Bangladesh	Improving Fruits' Juice Processing, Product Diversification, Branding and Marketing
Olcott	Bruce	Springs	LA	Bangladesh	Goat Farm Development and Management
Olcott	Donya	Sulphur	LA	Bangladesh	Goat Farm Development and Management
Olson	David	Spring Valley	WI	Bangladesh	Meat Processing, Quality Control and Marketing
Orban (Dr.)	Joseph	Shreveport	LA	Bangladesh	Improved Poultry Feed Formulation, Production and Quality Control
Oyazabal	Omar	East Lansing	MI	Bangladesh	Improved Broiler Processing Techniques, Quality Control & Marketing
					Improving Broiler Meat Processing, Quality Control and Marketing
Patwary	Mohsin	Jamaica Estates	NY	Bangladesh	Training on the Use of Molecular Genetics for Crops Improvement
Perez	Julio	Miami	FL	India	Training on Organic Certification and Processing - B
Prussack	Elizabeth	Putney	VT	Nepal	Nursery Management of Medicinal and Aromatic Plants
Prussack	Howard	Putney	VT	Nepal	Nursery Management of Medicinal and Aromatic Plants
Ramcharan	Christopher	St. Croix	VI	Bangladesh	Citrus-Fruit Cultivation Feasibility Study
Reisen	Matthias	Avoca	NY	Nepal	Propagation and Varietal Improvement of Medicinal and Aromatic Plants
Rimal	Arbindra	Springfield	MO	India	Curriculum Development for Organic Agriculture
Roberts	John	Gainesville	FL	Nepal	Training on Avian Influenza Surveillance Methods Designing
Rudd	William	San Diego	CA	Sri Lanka	Fisheries Feasibility Study / Fisheries Assessment
Sathasivan	Knagasapathi	Austin	TX	Bangladesh	Use of RNA in Crop Improvement
Schnelle	Michael	Stillwater	OK	Nepal	Integrated Management of Vegetables Pest and Potato Tuber Moth
Semida	John	Temple Hills	MD	Viet Nam	Strengthening Business Association
Shanklin	Donna	Elkton	KY	Nepal	Integrated Pest and Disease Management in Vegetable Crops
					Integrated Pest Management in Vegetable Crops
				Sri Lanka	IPM Training for Vegetable Growers
Shannon	Bernard	Scottsdale	AZ	Viet Nam	Improving Curriculum for Leaders of Agricultural and Rural Cooperatives
Sharma	Dushyant	Woodbridge	ON	India	Quality Control & MIS For An Organic Certification Agency
Skiles	Gerald	Shedd	OR	Indonesia	Farmer Marketing Association Specialist
Sorensen	Kenneth	Raleigh	NC	Nepal	Fruit Fly Management in Cucurbits
Swanson	John	West Linn	OR	Indonesia	Technical Assistance and Advisory Services on Information
Taufiq	Farook	Dracut	MA	India	ISO-22000-2005 for Honey Processing Plant
Thomas	Andrew	Monett	MO	Sri Lanka	Promote Makeshift Laboratories For Seed Potato Multiplication
Thomas	Michael	Honolulu	HI	Nepal	Medicinal and Aromatic Plants Herbarium Development (I)
					Medicinal and Aromatic Plants Herbarium Development (II)
					Management and Processing of Medicinal Plants
					Quality Upgrading of Herbal Products
Tramontano	Anthony	East Moriches	NY	India	Training On Vegetable Cultivation & Polyhouse Management
Tramontano	Louise	East Moriches	NY	India	Training On Vegetable Cultivation & Polyhouse Management
Webb	Carl	Clarkesville	GA	Bangladesh	Queen Breeding, Colony Multiplication and Honey Marketing
Welsch	Samuel	Lincoln	NE	India	Developing Inspection Manual and Training On Organic Standards
					Internal Inspection for Group of Farmers per NOP (USDA) Training
				Nepal	Organic Certification and Internal Control System Establishment
Whitlock	Kevin	Nevada City	CA	Indonesia	Smallholder Timber Production & Marketing Specialist
Wightman	Kevyn	Managua	Nicaragua	Indonesia	Farmer Field School (FFS) Tree Nursery Extension Specialist
Williams	Roger	Wooster	OH	India	IPM For Organic Fruits & Vegetables In Himachal Pradesh

Last Name	First Name	City	State	Assignment Country	Assignment Title
					IPM On Organic Vegetable Production In Rajasthan
					IPM on Fruits and Vegetables
Williams III	C. Bruce	Wilmington	NC	Nepal	Improved Technology of Tomato Cultivation
Winogron	Henry	Washington	DC	Bangladesh	Improved Banana Production and Marketing Practices
				Indonesia	Small Farmer Fruit Production, Processing, & Marketing
					Assessing the Market and Export Potential for High Value Horticulture
Wollmering	Rita	Salisbury	MA	Nepal	Cultivation and Processing of Medicinal Plants
				Sri Lanka	Medicinal and Herbal Plants Cultivation, Production and Processing
Zehren	Leo	Denmark	WI	Bangladesh	Training on Cheddar and Processed Cheese Making

Annex C

Hosts and Partners

Annex C. Hosts and Partners

The following list summarizes the hosts and partners for the Asia FTF Program. In several cases, organizations that were initially hosts also became host implementation partners to support FTF assignments with other organizations.

Host Organizations

Bangladesh

- 1 Agrofresh Limited (Snow Bee)
- 2 AP (Dhaka) Ltd.
- 3 Apiculture Network Bangladesh (ANB), Dhaka
- 4 Bangladesh Association for Social Advancement (BASA)
- 5 Bangladesh Institute of Apiculture (BIA)
- 6 Bangladesh Milk Producers' Cooperative Union Ltd. (BMPCUL / MilkVita)
- 7 BRAC Broiler Processing Center (BBPC)
- 8 BRAC Dairy & Food Project (BDFP)
- 9 BRAC Feed Mill
- 10 BRAC Plant Biotechnology Laboratory (BPBL)
- 11 BRAC University Department of Biotechnology
- 12 CARE Bangladesh
- 13 Centre for Mass Education in Science (CMES)
- 14 Church of Bangladesh Social Development Programme (CBSDP)
- 15 Dhaka City Nursery Owners Association (DCNOA)
- 16 East West Seed (Bangladesh) Limited
- 17 Gaira Banana Growers Association (GBGA)
- 18 Hunger Free World (HFW)
- 19 Integrated Nature Farming Ltd. (INF)
- 20 Intermediate Technology Development Group - Bangladesh
- 21 Kazi Farms Limited
- 22 Northern Agriculture Industrial Company Limited - NAICOL
- 23 Paragon Agro Limited
- 24 Plant Breeding & Tissue Culture Lab
- 25 PRAN Agricultural Marketing Company Ltd. (AMCL-PRAN)
- 26 Premium Seeds Limited
- 27 Quality Feeds Ltd. (QFL)
- 28 Synergy Conservation Ltd
- 29 The ACME Agrovet & Beverages Ltd (AABL)
- 30 University of Dhaka - Department of Botany
- 31 University of Dhaka - Genetic Engineering and Biotechnology
- 32 WAVE - Welfare Association of Village Environment

East Timor

- 33 East Timor Horticulture Survey
- 34 World Vision East Timor

India

- 35 Aajeevika Bureau
- 36 Agriculture and Processed Food Products Export Development Authority (APEDA)
- 37 Ajmer Organic Grower Group
- 38 Ashok Honey Inc.
- 39 Brij Healthcare
- 40 Hari Bagh Organic Apple Orchards
- 41 HIFEED - Himalayan Institute for Environment, Ecology, & Development
- 42 Himalaya Consortium for Himalaya Conservation (HIMCON)
- 43 HIMOARD - Himalayan Organization for Organic Agri-Product Research & Development
- 44 ICRAF, the World Agroforestry Center
- 45 Indo-Dutch Mushroom Project
- 46 Institute of Himalayan Environmental Research and Education (INHERE)
- 47 International Medical Corps
- 48 Kalasan Nursery Farm
- 49 Kangra Honey Processing Plant
- 50 Karsog Valley Farmers Group
- 51 Kaushal Mehta Farm
- 52 Lupin Human Welfare & Research Foundation
- 53 M.R. Morarka - GDC Rural Research Foundation
- 54 Mountain Research and Development Associates (MRDA)
- 55 MPUAT - Maharana Pratap University of Agriculture & Technology
- 56 National Beekeeping Centre
- 57 OneCert Asia Agri Certification (P) Ltd
- 58 Organic Agriculture in Shimla District
- 59 RMI, Indonesian Institute for Forests and Environment
- 60 Seva Mandir
- 61 Sherawat Krishi Farm
- 62 Shri Prayag Dutt Tiwari
- 63 SNS Foundation
- 64 Sukhder Ram Private Farm
- 65 Uttaranchal Organic Commodities Board (UOCB)

Nepal

- 66 Agricultural Produce Wholesale Market Committee
- 67 Bahubali Herbal Essence and Extract Pvt. Ltd.
- 68 Beekeepers Group of Syangja
- 69 Beekeepers of Karmaiya Village
- 70 Bluebell Herbal Products
- 71 Chisapani Jadibuti Prashodhan Udyog Pvt. Ltd.
- 72 Collective Beekeeping Service Center (CBSC)
- 73 Dadeldhura Farmers Cooperative Society (DAFACOS)
- 74 Daman Palung Main Farmers Group / Rkhisewor Farmers Association
- 75 Department of Livestock Services (DLS)- Nepal
- 76 Dhikurpokhari Community Development Organization (DCDO)

- 77 District Agricultural Development Office - Lumbini Zone
- 78 Gandaki Bee Concern
- 79 Gautam Nursery
- 80 Gorkha Ayurved Company (P) Ltd.
- 81 Gorkha Bee Farm - Chitwan District
- 82 Grahmin Mahila Bahuudheshiya Sahakari Sanstha
- 83 Gupteshwor Vegetable Production Group
- 84 Institute of Forestry - Pokhara
- 85 Jagannath Cooperative Society (JACOS)
- 86 Jagriti Fresh Vegetable Production Group
- 87 Kalika Off-Season Vegetable Production Group
- 88 Koshi Multipurpose Cooperative Ltd. - Dhankuta
- 89 Madhyabarti Community Beekeeping Farmers Group
- 90 Medicinal Plant Cultivators' Group
- 91 Mount Everest Honey Product
- 92 Nanabu Farmers Association
- 93 National Plant Quarantine Program
- 94 Navsrijana Fresh Vegetable Production Group
- 95 Nepal Beekeepers Association - Hakimchowk, Bharatpur
- 96 Nepal Beekeepers Association - Sarlahi
- 97 Panchakanaya Agriculture Cooperative Ltd.
- 98 Plastic Tunnel Association
- 99 Raniban Community Forest User Group (RCFUG)
- 100 Rapti Beekeepers Association (RBA)
- 101 Sagar Bee Pvt Ltd (SBPL) (formerly: Sagar Bee Hive Industry (SBHI))
- 102 Satya International
- 103 Shreejana Beekeeping Group
- 104 Sundari Community Forest User Group (SCFUG)
- 105 Sungava Cooperative and Belhara Cooperative
- 106 Suryamukhi Beekeeping Cooperative Ltd.
- 107 Vrindavan Botanical Garden
- 108 Women's Pig Farming Group

Sri Lanka

- 109 Dimuthu Sarvodaya Shramadana Society
- 110 Industrial Development Authority - Central Province
- 111 Lahiru Food Industries (LFI)
- 112 Nadee Marketing
- 113 Nuwara Eliya Vegetable Farmers
- 114 Ornamental Plant Growers Association
- 115 SEEDS (Gte) Ltd. - Moratuwa Sri Lanka
- 116 Small Cut Flower Growers of Badulla
- 117 The Competitiveness Program

Vietnam

- 118 CMARDII - The College of Management for Agriculture and Rural Development N
- 119 Dragon Fruit EUREPGAP Cooperative
- 120 International Development Enterprises, Vietnam (IDE)
- 121 My Linh Fragrances & Flavours Co., Ltd
- 122 Song Hau Farm (SOHAFARM)
- 123 Vietnam Competitiveness Initiative (VNCI)
- 124 Vietnam Fruit Association (Vinafruit)

Host Implementation Partners

Bangladesh

Agrobased Industries & Technology Development Project (ATDP)
Bangladesh Agriculture Program, Winrock International
Bangladesh Institute of Apiculture (BIA)
Bangladesh Society for Waste Management (BSWM)
Church of Bangladesh Social Development Programme (CBSDP)
Gaira Banana Growers Association (GBGA)

East Timor

National University of East Timor

India

Kalasan Nursery Farm
M.R. Morarka - GDC Rural Research Foundation
Mr. Atul Kumar
Rajesh Thakur Private Farm

Indonesia

WATALA

Nepal

BDS-MaPS
District Agricultural Development Office - Bagmati Zone (DADO)
District Agricultural Development Office - Bhaktapur
District Agricultural Development Office - Koshi Zone
District Veterinary Service Office - Makawanpur
Dr. Balram Bhatta, Lecturer
Everest Consultancy and Research Center Nepal
FORWARD - Forum for Rural Welfare and Agricultural Reform for Development
Mountain Botanical Garden
Nepal Agricultural Research Council (NARC)
Nepal Beekeepers Association - Hakimchowk, Bharatpur
Nepal SIMI
Private Sector Promotion - Rural Finance Nepal Deutsche
Sahakarya

SAHAMATI
Sewa Foundation Nepal
SOLVE-Nepal
Ujayalo

Sri Lanka

Industrial Development Authority - Central Province
SEEDS (Gte) Ltd. - Gampaha Sri Lanka
SEEDS Guarentee Ltd. - Badulla, Sri Lanka

Vietnam

Dragon fruit EUREPGAP Cooperative
Winrock International - ARBCP (Asia Regional Biodiversity Conservation Program)

Annex D

Major Reports and Studies

Annex D. Major Reports and Studies

Flores, Cesar, October 2007, Nepal. *Marketing Strategy for Nepal Honey.*

Emery, Nathan, June 2004, Bangladesh. *Beekeeping Project Proposal for Bangladesh.*

Kripnik, Timothy, December 2007, Bangladesh. *Improving Health and Recognition of Environmental Services Pilot Project.*

Winogron W., Tukan, J.C., Roshetko, J.M., Budidarsono, S., & Manurung, G.S., 2005, Indonesia. *Market Chain Improvement: Linking Farmers to Markets in Nanggung, West Java, Indonesia.* Bogor, Indonesia: World Agroforestry Centre (ICRAF) ISHS Acta Horticulturae 699: I International Symposium on Improving the Performance of Supply Chains in the Transitional Economies

Annex E

Key Staff

Annex E. Key Staff

Asia FTF Program Director, David Norman, October 2003 - September 2008

Asia FTF Program Manager, Erin Hughes, October 2003

Demetria Arvanitis, October 2003 - September 2008

Bangladesh FTF Country Manager, Pranata Kamura Barua, October 2003 - September 2008

India FTF Country Manager, P. S. Srinivasan, October 2003 - March 2008

Nepal FTF Country Manager, Bhimendra B. Katwal, October 2003 - December 2006

Vrigu R. Duwadi, December 2006 - September 2008

Annex F

Success Stories

Improved Cattle Feed Means Increased Milk Production



Dairy cattle are an integral part of rural farming systems, with Bangladesh ranked 3rd for cattle population (24 million) in Asia. However, farm productivity and the availability of livestock products (milk and meat) are extremely low in Bangladesh compared to other developing countries in the region. A major reason is poor livestock nutrition due to scarcity of land for fodder production and expensive and inadequate feed. Bangladesh lacks skills in feed formulation and adequate lab capacity for testing feed, feed ingredients, and vitamin and mineral premixes.

Since 1999, USAID's Farmer-to-Farmer (FTF) Program has been working with cattle feed with the help of Volunteer Dr. Roy E.

Chapin, a US animal nutritionist, who completed nine assignments to help improve dairy cattle nutrition.

To achieve a sector-wide impact of this volunteer technical assistance, FTF Bangladesh worked with host/partner organizations that have country-wide commercial/development programs in livestock including Bangladesh Milk Producers' Cooperative Union Ltd. (BMPCUL), popularly known as Milk Vita, currently the largest dairy cooperative of the country with a membership of about 160,000 ; three large commercial feed companies - Quality Feeds Ltd. (QFL), Saudi-Bangla Fish Feed Ltd. (SBFFL), and BRAC Feed Mills; Dhamrai Dairy Ltd. (DDL), the top commercial dairy farm located near the capital city, Dhaka; and Bill & Melinda Gates Foundation-supported Strengthening the Dairy Value-Chain (SDVC) project, implemented by CARE Bangladesh.



The principle forage is nutritionally-low rice straw because it's cheap and available. Farmers didn't realize that a good quality ration could maximize production and profits.

During his six trips to Bangladesh (three for multiple assignments), Chapin formulated dairy rations for different weight categories (250, 400 and 600 kg) of lactating cows eating either green grass, rice straw or a combination using various protein supplements for six levels of milk production. He also provided a formula for producing a dairy premix locally that supplies a generous and balanced amount of vitamins and trace minerals.

Upon adoption of the recommendations for using feed rations, farmers benefited from immediate results. For example, farmers supplying BMPCUL/ Milk Vita's dairy processing plant in Baghabari in North Central Bangladesh had an average 58% increase in milk production from 1,800,000 liter/month to 2,850,000 liter/month. In just six months from the date of the assignment, gross value of sales from increased milk in the sample milk pocket increased by 66% from US\$7,941,176/year to US\$13,191,429/year with a resultant net income increase of around 308% from US\$317,647/year to US\$977,143/year. The increase in milk yield and gross sales value will be manifold when considering the changes/improvements occurring in all other milk pockets served by the cooperative.



Dr. Chapin interviewed by a local television channel during in January

Following are more impacts from Dr. Chapin's assignments:

Dhamrai Dairy Ltd (DDL): Following Chapin's two assignments, DDL had an average 71% increase in milk production from 21,000 liter/month to 36,000 liter/month and body weight gain in the range of 750 – 1250 gm/cow/ day against a Bangladesh national standard of maximum weight gain of 500 gm/cow/day. In just eight months from the date of the assignment in 2006, gross value of sales from milk increased by 88% from US\$6,150/month to US\$11,550/month with a net income increase of around 30% from US\$2,435/month to US\$3,130/month.

BRAC Feed Mills: At the time of Dr. Chapin's first of three assignments with BRAC Feed Mills in February 2005, the plant produced only 62 MT/month of cattle feed. As a direct outcome of Chapin's trainings, from February 2006 to July 2007, BRAC's dairy feed production volume experienced an average 25% increase from 200 to 250 MT, monthly gross value of sales increased by 27% from US\$48,615 to US\$61,594, and monthly net income was up by 47% from US\$2,461 to US\$3,623. Feeding trials of the volunteer-formulated feeds showed a 25-35% increase in milk yield.

Quality Feeds Limited (QFL): During his recent assignment in Bangladesh in May-June 2008, Dr. Chapin worked closely with the QFL staff to formulate dairy cattle rations for launching commercial production. QFL has already started large scale production of cattle feed with field trials and commercial marketing in several strategic milk pockets of the country. QFL is making significant contributions to the dairy industry as measured by increased milk production and profit as reported by their dairymen.

Saudi-Bangla Fish Feed Ltd. (SBFFL): Working with this pioneering feed mill, Dr. Chapin helped introduce balanced cattle feed concentrate for the first time in Bangladesh in 2000. Feed produced following Dr. Chapin's formula showed highly encouraging results with an average increase in milk production of around 35-40% at the dairy farmers' end. As part of this assignment with SBFFL, Dr. Chapin created spreadsheets for formulating lactation rations to be fed with rice straw, a calf starter ration, and a replacement heifer grower ration. Chapin provided a formula for vitamins and trace minerals and spreadsheets to compare milk response from various rations with the ability to price the milk to see the economic returns. These valuable outputs of the assignment are helping SBFFL to formulate feed rations, plan production schedules, and market feeds leading to increased management efficiency and higher profits.

Gates' Foundation-supported SDVC project of CARE-Bangladesh:

Recently in June 2008, Chapin wrote a 30 page article for CARE-Bangladesh with his ideas for improving the Bangladesh dairy value chain. Chapin's inputs have influenced CARE-Bangladesh to concentrate their efforts on how to support the Bangladeshi dairy farmers to produce more milk rather than just looking at improving the value chain for the final product. Through CARE-Bangladesh, FTF has impacted the 35,000 small dairies that CARE-Bangladesh works with by suggesting the SDVC project organize small-scale milk producers into co-ops or associations to buy good quality feed to increase their milk production.



FTF Volunteer Strengthens Broiler Processing Value-chain

BRAC Broiler Processing Center (BBPC), an agro-enterprise of BRAC, the largest NGO of Bangladesh, was established as a semi-automatic broiler processing facility in 2003 in Tongi/Gazipur, near Dhaka. BRAC has been in broiler processing since 2000, but initially most of the processing was done manually and only after the establishment of BBPC in 2004 did they use hygienic meat processing. Because BBPC was one of the first such broiler processors in Bangladesh, the staff faced numerous challenges. They didn't have the technical and management expertise required for hygienic processing; lacked adequate freezing, storage and transportation facilities; and had inefficient cooling and refrigeration systems. In May 2005 and September 2006, the FTF Program fielded Dr. Omar Oyarzabal, a highly experienced broiler processing specialist, to help improve BBPC's



processing facilities and upgrade staff technical and management capabilities. He worked with them to identify best processing approaches to fulfill the requirements of the international fast food chain KFC outlets in Dhaka, other fast food chains (Pizza Hut, A&W, Wimpy, Nandos), and the five star hotels.



During his assignment, Dr. Oyarzabal made recommendations to improve the plant's processing facilities, including the stunner, de feathering, carcass washers, refrigeration space, and centralized air-conditioning units, product handling and cleaning, and sanitation and disinfection of processing areas and cooling rooms. In addition, he conducted a short training course on the seven basic principles of HACCP for the plant's production and quality control staff, and on good manufacturing practices (*GMP*) with emphasis on HACCP manual and enterprise team development.

The biggest issue Dr Oyarzahal identified was the need of refrigeration to ensure the chicken would be refrigerated on time and to adequate temperatures. The second pressing issue for BBPC was to ensure constant refrigeration (have workers handle the chicken in a refrigerated room) after it's initial cool down to ensure a better shelf -life of the processed product. Based on these critical observations, BBPC instituted the following important changes/ modifications in the plant's technical facilities to bring about tangible improvements in the entire broiler processing value-chain:

- installed a new blast freezing system to significantly enhance carcass freezing efficiency;
- improved air-conditioning of the processing and grading spaces to maintain room temperatures at $<15^{\circ}$ C;
- upgraded freezer and chiller rooms to allow more space to hold the processed products before refrigeration;
- reorganized stunning/ bleeding areas, relocated head removal machine, and adjustments made in the position of carcass washers;
- improved maintenance of chill tanks, and made changes in the practices of carcass storage.



In addition to these important changes, the volunteer's suggestions helped achieve marked improvements in receiving, handling, hanging, and evisceration of poultry birds, cleaning and disinfection of contact surfaces, ice making, and most importantly, making critical assessments of each processing step. Also, steps have been taken for proper chlorination of water, used for washing and final processing purposes. All these changes have led to improvements in the entire broiler processing value-chain in line with international standards.

The most important impact of this FTF assistance is that BBPC has now emerged as one the leading broiler processing enterprises in the country, and the Dhaka outlet of the internationally reputed fast food chain KFC is



now fully dependent on supply from BBPC. Additionally, the flight catering service of Bangladesh's national airline, the Bangladesh Biman, Dhaka city's five star hotels, and some other international fast food chains like A&W, Wimpy, Nandos, and others are regularly placing orders for BBPC processed broiler meat. Apart from supplying to all these international fast food chains and five star hotels, BBPC started providing home services to selected consumers in Dhaka city, and also distributing product through the supermarket chains and grocery stores with refrigeration facilities. All of these notable achievements were possible due to Dr. Oyarzabal's timely technical assistance to BBPC.

As an outcome of these important improvements, quality and quantity of processed broiler meat at BBPC has increased: 63% from 80 MT/month to 130 MT/month in production volume as of August 2008; 128% in monthly gross value of sales from US\$148,235 to US\$338,382; and 97% in monthly average net income from US\$16,471 to US\$32,500.

In Bangladesh, demand for processed broiler is increasing and to meet the growing consumer demands, BBPC has already installed additional freezing and refrigeration equipment to raise production volume to 250 MT/month. It is expected that with the installation of additional equipment, and expansion of marketing, BBPC's productivity and profits will increase further, and poultry farmers raising broiler chicken will have an expanded market for their products.



Lower Certification Costs Benefit Small-Scale Organic Farmers

In recent years, organic production has gained momentum in India in a bid to access international organic markets and to meet growing domestic demands. To support this effort, producer organizations, individual farmers, NGOs, and state governments are focused on formalizing organic production and certification systems. In the absence of competent local certification agencies, international organizations like SGS, SKAL, Ecocert, and a few other organizations started offering organic certification but at a very high cost that prevented small- and medium-scale farmers from using their services.



FTF Volunteer Samuel Welsch trains Morarka Staff on Internal Control System for Organic Production

FTF India proposed to work in the organic sector to help small- and medium-scale farmers build their capacity in organic food production techniques, resource optimization, and value addition, and most importantly, to assist in developing a low-cost Internal Control System (ICS) for facilitating a group organic certification program. In addition, FTF India also proposed to assist in developing organic farm management systems and an MIS and quality control system to facilitate third party certification at an affordable cost. To achieve these program goals, FTF India implemented several organic assignments with highly qualified volunteers working with selected NGOs, government agencies, and producers' organizations in Rajasthan, Uttaranchal, and Himachal Pradesh.

Highlights from the FTF India organic assignments:

- Dr. Iraj Motazedian, from Oregon Extension and Seed Certification Services, Oregon State University, worked with M.R. Morarka – GDC Rural Research Foundation, an NGO based in Jaipur, Rajasthan, in April 2004 and February 2006. He helped develop a working manual and guidelines for an Internal Control System (ICS) for low-cost group certification for small- and medium-scale farmers. The host fully adopted the volunteer's recommendations and following Dr. Motazedian's assignments in 2004, 250 farmers enrolled under Morarka's group certification program. As of 2008, that number has grown to around 10,000. In addition to bringing thousands of farmers under the group certification program, Morarka Foundation also set up an organic soil testing lab, trained evaluators on internal controls, and developed a software-supported MIS system for recording farmer data. Following Dr. Motazedian, FTF volunteer Mark Cain helped the foundation to enter into an agreement with Multicultural Exchange for Sustainable Agriculture (MESA), a US-based voluntary organization, to establish a student exchange program for six students each year.
- In 2005, Samuel K Welsch, CEO of the US certification agency, *OneCert Inc., USA*, worked with Morarka Foundation to assist in developing the Organic Inspection Manual, a prerequisite for becoming an accredited certification agency. During this assignment he established *OneCert Asia* in partnership with Morarka to help reduce the farmers' group certification costs.



Organic lettuce farmer

Subsequently, the Agricultural and Processed Food Products' Export Development Authority (APEDA) under the Ministry of Commerce, accredited *OneCert Asia* with authorization to issue certificates as per the European Economic Commission Regulation 2092/91 and the United States Department of Agriculture - National Organic Program.

- *OneCert Asia* started providing certification services at 30-35% less than the European certification bodies present in India. Beginning with 5,800 farmers covering 6,200 hectares in 2005-06, by March 2008, *OneCert's* certified (for both group and individuals) more than 55,000 farmer members in more than 27 states, 44,000 hectares, and 150 private participating organizations. The reduced costs enabled more than 7,000 small- and medium-scale farmers and producer organizations with average land holdings of 1.8 hectares increase product value in domestic as well as export markets. In 2006-07, OneCert-certified farmers traded goods worth US\$60 million in the domestic market and exported products valued at US\$250,000. Apart from significantly reducing the farmers' certification costs, OneCert Asia also created employment for fifteen agriculture graduates and support staff and four hundred internal inspectors. In 2008, OneCert began working internationally when they certified organic farms in Nepal.
- INHERE, an NGO in Uttaranchal, fully adopted FTF volunteer Iraj Motazedian's recommendations and developed an ICS through which they converted 42 villages (3,000 farmers) to 100% organic farming. INHERE also established a small food processing unit for organic processed products such as jam and dried spices which they started promoting in various exhibitions in Uttaranchal and New Delhi, and also through organized retail marketing chains, such as FabIndia, Navdanya, and WholeFood. HIMOARD, another NGO from the state of Himachal Pradesh brought 2,200 farmers into a small holders' group certification program.
- With the help of FTF volunteers, M.P. University of Agriculture and Technology, Udaipur, Rajasthan, started a post-graduate diploma course in organic management.



Tree Nurseries Help Restore Tsunami-Damaged Land and Incomes

The December 2004 tsunami had a catastrophic impact on Aceh province of Indonesia and its local economy. The tsunami killed approximately 200,000 people and destroyed rice paddies (75%), upland farms (48%), tree crops (59%), and livestock (67%). Following two years of post-tsunami rescue and relief activities, Arthur Green, FTF Indonesia Smallholder Market Opportunity Specialist, implemented an assignment *to contribute to agro-economic rehabilitation by identifying market opportunities and challenges for smallholder farmers, with specific emphasis on high-value horticulture*. Green conducted market surveys, observations, interviews with key respondents, farmer group discussions, and reviewed relevant secondary data by meeting 55 local residents, including: farmers, vendors, collectors, traders, government officials, and development workers. Some of his key recommendations included: i) improve the quality of tree germplasm available in Aceh; ii) provide tree nursery establishment and management training and support to communities; and iii) document tree seedling market demand in Aceh.



Grafting training at NOEL Nursery

Kevyn Wightman, FTF Indonesia Tree Nursery Extension Specialist, addressed the first two recommendations by providing training to 260 farmers and host staff in tree nursery management, production, and extension; and helping the host design its subsequent technical assistance activities. Following Wightman's assignment, the host provided training to 3600 individuals in nursery management, vegetative propagation, compost/charcoal production, fruit garden management, rubber and cacao garden management, farmer group management, and tree seedling marketing. In addition, the improved land use management suggested by Wightman directly enhances the natural resource management practices applied to 67,700 hectares,

leading to improved environmental services such as watershed protection, soil conservation, biodiversity protection, and carbon sequestration for the 22,400 people living in the 38 affected villages.

Following FTF technical assistance, a total of 50 community-based tree nurseries have been established, producing a total of 377,000 tree seedlings as of July 2008. The commercial value of those seedlings is US\$647,000, based on average local market values of US\$0.96/grafted rubber seedling; US\$0.38/cacao seedling; and US\$2.68/grafted fruit seedling. Nursery operators plan to use 73% of the seedlings to rehabilitate farm land; the other 27% are intended for commercial sale. As of July 2008, approximately 17,800 seedlings had been planted on 31 hectares. Projections indicate that once all seedlings are planted by early 2009, approximately 2,100 hectares will be reforested with viable commercial tree crops that will help the communities reestablish tree gardens destroyed or damaged by the tsunami. Through the end of July 2008, seven community nurseries composed of 73 individuals have sold 7,250 seedlings for a net income of US\$2400. Assuming 27% of seedling production is sold by early 2009, projected income for farmer nurserymen will be US\$175,000. Recent studies document an annual tree seedling market demand of 5,000,000 in Aceh for the next few years. Thus the establishment of these market-oriented community nurseries in line with volunteer recommendations is based on a solid economic foundation.

Additionally, some farmers have produced compost and charcoal from agricultural by-products as taught by the volunteers. Compost is used to improve nursery and farm production. So far 600 kg of charcoal have been sold

for a total income of US\$652. Tree nurseries and charcoal are new commercial enterprises for the farmers. Previous to the FTF Indonesia assignments, income from tree seedlings and charcoal production/sales was nil.

With assistance from FTF Indonesia, the host staff has secured an additional US\$85,000 grant to strengthen the development of community-based tree nurseries and related agro-forestry enterprises.



Integrated Pest Management for Sustainable Agriculture

Nepal's varied elevation micro-climates offer favorable growing conditions for off season vegetables. In recent years, adoption of input-intensive agriculture practices has led to haphazard pesticide use with potential health hazards to combat an average 30% loss in yields due to pests and diseases. Excessive pesticide use is more common with off-season vegetables. The USAID-funded Farmer-to-Farmer (FTF) Program Nepal has supported this key subsector with an emphasis on IPM technologies to promote sustainable agriculture practices with reduced dependence on pesticides.



Volunteer Jim Burleigh with growers of Nanabu Farmers Association at Sipadole Bhaktapur discussing clubroot disease management techniques

For example, FTF volunteers provided technical assistance to help farmers tackle the serious problem of clubroot disease in cauliflower, cabbage, radish and broadleaf mustard. The disease caused by fungus *Plasmiodiphora brassicae* created an alarming situation for farmers in main vegetable production areas in Bhaktapur and Makwanpur districts with reported yield losses between 40 and 60%. The disease was noticed first in 2001 on cabbage and cauliflower crops and then spread rapidly resulting in huge production losses.

In December 2004, volunteer Professor Jim Correll worked with the vegetable growers of

Sipadol, Bhaktapur and Professor James Burleigh conducted a follow-up assignment in September 2005. Later, Correll completed two more assignments with Palung valley farmers. The volunteers helped the vegetable growers to understand and use appropriate technologies such as construction of raised nursery beds, low-cost soil solarization technique for disease-free seedling production, and use of agricultural lime on fields to reduce soil acidity and inhibit disease growth. In addition, the volunteers provided two disease-resistant varieties of cauliflower and cabbage to farmers to conduct field trials. Correll also managed to disseminate recommended IPM-based technologies on clubroot management through a workshop to senior level bureaucrats, policy makers, researchers, and extension workers to gain support and commitment from the concerned government agencies.

A local FM radio station at Palung, interviewed Correll about clubroot management recommendations for the benefit of the vegetable growers. The holistic approach helped to successfully reduce disease incidence by over 80% in a span of 2-3 years.

The FTF program developed and completed 13 IPM assignments fielding 15 volunteers in the high-value horticulture sub-sector, assisting 10 host organizations, and benefitting a total 10,361 farm families. To date, results show incremental sales of US\$822,775 and incremental net income of US\$292,986 thanks to volunteer assistance. FTF Nepal has emphasized collaboration with other stakeholders including District Agriculture Development Offices (DADOs), other mission projects, and Nepal Agriculture Research Council (NARC) to ensure dissemination of volunteer recommendations and continuity of support to farmer groups - all contributing towards sustainable agricultural practices in Nepal.



Tomato Crop Helps Reduce Seasonal Migration of Village Youth

USAID-funded Farmer-to-Farmer (FTF) Program volunteer Dr. Bruce C. Williams worked with the smallholder farmers of *Kalika Off-season Vegetable Production Group* in Surkhet, one of the insurgency-impacted districts of mid-west Nepal in June - July 2007. The assignment, developed in collaboration with the Smallholder Irrigation Market Initiative (SIMI) Program, focused on improving tomato farming technology to benefit 207 vegetable growers in Sano Harre village.



Volunteer Dr. Bruce Williams with tomato growers of Kalika Off-season Vegetable Production Group at Sanoharre, Surkhet discussing tomato nursery bed management techniques

Williams provided practical training to the growers that included seedbed preparation techniques, proper trellising and pruning of tomato plants to prevent stems and fruit from coming into contact with soil, mixing different varieties of the same crop and/or mixing with other crops to minimize pests and diseases, judicious use of pesticide after diagnosis of pest problems, methods and time intervals for fertilizer application, compost and fertilizer mixing techniques, and maintaining correct plant-to-plant and row-to-row spacing to allow proper aeration.

After the volunteer assignment, members of the farmer production group approached the local USAID Mission-funded SIMI project, District Development Committee (DDC), and District Soil Conservation Office for support to construct a road linking their vegetable collection center with the main Surkhet-Kohalpur highway. Work on the road is in progress.

Six months after the assignment, gross value of tomato sales increased from US\$53,428 to US\$213,057 because of improved production and pest management techniques adopted by the farmers as well as increased area under tomato crop - from 7.5 ha to 12.5 ha. As a result, the combined net income increased 53.7%, from US\$40,071 to US\$74,560, representing an increase of US\$166 per beneficiary grower.

In addition, expanding the area under tomato cultivation has allowed the production group to create employment opportunities for village youth. Historically, unemployed youth from the poverty stricken villages of mid-west Nepal have had no option but to migrate as seasonal laborers to India. Labor intensive high-value crops such as tomatoes demonstrate potential to change this situation as seen in Sano Harre village, where migration dropped from 40 to 10 persons, by enhancing the local employment opportunities and thereby contributing to poverty alleviation.



Over 6,000 Beekeeping Families Benefit from FTF Assistance



Volunteers Ann Harmon and Willie Cole conduct hive management training

Nepal's varied ecosystems provide habitat for four species of indigenous honeybees: *Apis cerana*, *Apis dorsata*, *Apis florea* and *Apis laboriosa*, and one exotic bee species *Apis mellifera*. Of these, the well-known *Apis mellifera* is confined primarily to lowland Terai and mid-hill regions.

Beekeeping requires little capital investment, is appropriate for small and marginal farm households, and provides landless farmers with supplementary cash income. To achieve higher productivity the USAID-funded Farmer-to-Farmer Program (FTF) Nepal has worked with beekeeping cooperatives, federation of beekeepers associations, private entrepreneurs, and women's beekeeping associations by introducing improved management practices to

achieve sustainable growth of the honeybee sub-sector in Nepal.

Major constraints in this sub-sector include low beehive productivity; lack of appropriate processing, packaging, and marketing; and lack of quality control to meet the standards of honey importing countries, especially the EU countries. FTF Nepal has supported beekeeping with a value chain-based approach by assisting primary honey producers on improving beehive management and hygienic queen rearing; and processors and exporters on improved honey processing, packaging methods, value-added product

development, and developing marketing linkages. Volunteer Edward Leh completed two assignments (2006 and 2007) to one of Nepal's largest honey processors, Gandaki Bee Concern (GBC), based in Kathmandu on processing, packaging, and marketing of honey. From this knowledge GBC increased their processing capacity. The knowledge gained by the host on maintaining honey quality including proper handling, bottling, storage, transportation, and marketing was passed on to a large more than 2,500 beekeepers who sell raw honey to GBC. They sell more than 80% of GBC's annual total processed honey of 325 MT. With its increased processing capacity, GBC is able to respond to increased demand for bottled honey in the domestic market. Small beekeepers have benefited by increasing the number of hives, honey production, and sales. Over 1,800 beekeepers from 28 districts benefited by increased sales of raw honey to GBC.



Graduates of the Honey Quality Improvement Training

The FTF program developed and completed 16 honeybee assignments in total, fielding 18 (14 male and 4 female) beekeeping volunteers, assisting 13 host organizations, and benefitting 6,605 beekeeping families. Their contributions include:

- Improved beehive management - colony management through bee stimulation by changing feeding ratios, frame manipulation to minimize swarming, and supplying artificially prepared pollen during slack periods.
- Queen rearing - production of hygienic queens by grafting.
- Selective breeding - selection of hygienic behavior traits and minimizing inbreeding of stock by working cooperatively.

- Disease and pest control - adopting genetic selection in the form of disease resistant and hygienic behavior of queens and using screen bottom boards to create a healthy environment by reducing chalkbrood and noseama diseases and varroa mites population.
- Honey processing - avoiding over-heating and moisture absorption during processing and storage and assuring hygienic bottling and storage.
- Marketing - quality standards for export and domestic consumption and educating consumers about the product.



The combined data of 16 impact surveys shows that 2,156 beekeeping families have achieved incremental sales of US\$972,386 and incremental net income of US\$400,491, volunteer assistance directly created 12 jobs. The FTF program emphasized collaboration with other stakeholders including District Agriculture Development Offices (DADOs), local USAID/Nepal-funded projects such as Ujjyalo, Private Sector Promotion - Rural Finance Nepal PSP, GTZ, NGO Sewa Foundation, and the Beekeeping Development Section of the Department of Agriculture, Government of Nepal, to ensure dissemination of volunteer recommendations and continuity of support to beekeepers. These efforts have contributed in a significant way to the sustainable growth of the honeybee sub-sector in Nepal.

Volunteer Ed Leh working with beekeepers



Annex G

Volunteer Impact Summaries

Volunteer Impact Summary: Bangladesh

Winrock Expert: John M. Burnham
Host Enterprise: BRAC Dairy & Food Products (BDFP), Gazipur, Bangladesh (popularly known as the *Aarong* Dairy)
Dates at site: 12-26 February 2007

Assignment Objectives: Major tasks of the dairy specialist John Burnham were to critically evaluate the host's technical and operating capabilities and make recommendations to enhance plant operations efficiency, leading to increased productivity and profits. Specifically, the tasks were to:

- i) recommend ways for increasing supply of fresh milk to meet the plant's growing requirements;
- ii) investigate raw milk temperature variance all the way from the collection/ chill centers to the processing facilities to protect milk quality;
- iii) suggest improvements in raw milk filtering from chill/ collection centers to the processing plant to reduce bacterial growth, and improve quality of fresh milk;
- iv) suggest ways for improving plant sanitation and hygiene, and overall quality issues of the factory, chilling centers, and chill tankers; and
- v) make recommendations for future potential growth and new product opportunities.

Volunteer Profile: John Burnham has a B.S. degree in dairy science from the University of New Hampshire, and an MBA from the American International College. He has over twenty five years of experience in dairy and food processing industries in the USA, and former Soviet Union. Burnham's expertise include manufacturing, distribution, administration, and bank workout resulting in a solid record of profit achievement, people development, and business leadership. He is currently the CEO of Massachusetts based John Burnham Consulting, a company engaged in professional consulting for dairy, food processing, and distribution companies in the New England, and Central America. The assignment with BDFP was Burnham's first volunteer work with Winrock International in Bangladesh.

Host Background: BRAC Dairy & Food Project (BDFP) is a commercial venture of BRAC, the largest NGO in the world with more than 100,000 employees (72% women) working with twin objectives of "poverty alleviation and empowerment of the poor". BDFP is a fully integrated dairy product manufacturing and distribution project, designed to operate as an independent profit making business venture to help support the humanitarian goals and activities of the parent organization. In 1983, BRAC started an integrated livestock sector development program that included support for breed development, veterinary health care, technical services, vaccination and financial services to help rural poor increase income through improved livestock farm productivity. As a result, milk production in BRAC's program areas increased substantially, but milk being a perishable commodity and in the absence of an organized marketing system, the farmers had been facing enormous problems in selling their milk. Sensing the vulnerability of the farmers, middlemen came into the scene and started buying milk at throwaway prices depriving the farmers of fair prices. To help farmers overcome the marketing problems, BRAC decided to set up an integrated dairy plant to facilitate milk collection, processing, and marketing in an organized manner. Subsequently, the BDFP was commissioned in January 1998, and started producing dairy products (pasteurized and UHT fresh milk, yogurt, flavored milk drinks, skim and whole milk powder, butter, and ghee) under the brand name "Aarong".

Principal Impacts: As part of the assignment tasks, the volunteer made critical assessments of the host's capabilities that included observations on existing systems of milk collection at the chilling centers, cool chain maintenance, transportation of milk to the processing plant, processing of dairy products, plant sanitation, and CIP systems. He then came up with a number of valuable recommendations to help the host improve the dairy value chain (milk collection-storage at chill centers-transportation-processing-marketing). In line with volunteer recommendations, the host has made following significant changes:

- Installed an additional 15 chill/collection centers to increase the fresh milk procurement volume from 60,000 to 100,000 liters per day to achieve the target set for 2007-2008. Arrangements are underway to reach 125,000 liters daily by the end of 2009 by installing more chill/ collection centers. Currently, a total of 75 chilling centers are collecting milk from an estimated 100,000 rural dairy farmers. By the end of 2009, the host plans to raise the number of chilling center to 100 to bring more farmers under BRAC's milk procurement network. This is all done in line with the updated business plan suggested by the volunteer.
- Steps have been taken for proper maintenance of cool chain throughout the entire dairy value chain. This is done through monthly checking of temperature reading devices used in chill/collection centers against a correctly calibrated thermometer as suggested by the volunteer.
- Filters of appropriate mesh sizes are put into use to enhance filtration efficiency and improve quality of fresh milk at the chill/collection centers. This has helped to ensure that all incoming raw milk arrive at the plant properly filtered with appropriate acidity level (<0.16 titration acidity test level). Besides, improvements have also been taken place in acidity and butter fat testing due to volunteer guidance.
- To increase the plant's daily production to 125,000 liters by the end of 2009, a 35,000 liter capacity silo tank has been added to the existing milk storage capacity. Also, four chill tankers, each 9,000 liters capacity, bought and put into operation to enhance fresh milk transportation capacity.
- Installed fine stainless steel mesh filter in the bulk milk pick-up tank to ensure proper filtration of raw milk at the receiving/ chill centers, washed after each use, as suggested by the volunteer.
- Started cooling of bulk milk pick-up truck tanks before the trucks leave the dairy plant to collect milk from the chill centers, helps remove latent heat build-up from inside of the milk tank.
- The plants' clean in process (CIP) system and cleaning inspection methods have undergone marked improvements, which helped to significantly enhance product quality

In addition, the volunteer conducted short training sessions on basic principles of HACCP, Good Manufacturing Practices (GMPs), and Standard Operating Procedures (SoPs) to sharpen skills in procurement of fresh milk, and dairy products' processing maintaining the highest standard of quality. Introduction of HACCP, GMP and SoP is critical to enhancing the enterprise competitiveness, and volunteer training in these areas have been helpful in building the host staff capabilities to meet the requirements of food safety standards.

As a result of the volunteer assignment, there have been marked improvements in almost all critical aspects of the dairy value chain (milk collection-transportation-processing-marketing), and volume of processed dairy products increased by about 75%, which at the time of this impact survey stood at average 30,000,000 liters/ year against 17,100,000 liters/ year before volunteer assignment. As a result, average annual gross value of sales increased by about 110%, from US\$9,052,941 to US\$18,970,588 and average annual net income increased by 163% from US\$502,941 to US\$1,323,529 in just one and half year after the assignment.

Apart from achieving improvements in processing and marketing of existing products (pasteurized and UHT fresh milk, yogurt, flavored milk drinks, skim and whole milk powder, butter, and ghee), the host is considering, as part of product diversification, to incorporate some of the volunteer suggested new dairy products (such as Added Vitamin D&E fresh milk, Calcium added to milk/ juice combination products, low fat sugar, and specialized high fat and carbohydrate nutritional recovery food for hospital patients' use) in the product line in near future.

Direct Beneficiaries:

Female: 25
Male: 35

Volunteer Impact Summary: Bangladesh

Winrock Expert: Geoffrey Neville
Host Enterprise: ACME AgroVet & Beverages Ltd. (AABL), Dhamrai, Dhaka
Dates at Site: 23 November – 08 December 2007

Assignment objectives: Major objectives of volunteer Jeff Neville were to:

- i) Assess technical capabilities and infrastructural facilities including juice production lines, juice formulation/ blending techniques, processing techniques and technologies used, and quality control standards maintained by the host company;
- ii) Assess sanitation and hygiene standards, quality control lab capabilities, HACCP and other quality issues to verify that they are in line with Good Manufacturing Practices (GMP) to ensure production of high quality juices;
- iii) Provide training on food safety, GMP, HACCP, and quality assurance to the production and quality control staff leading to building capability for certification by accredited certification companies; and
- iv) Provide training in the latest concepts of marketing and market development for consumer food items.

Volunteer Profile: Jeff Neville has an MBA degree from the Harvard Business School and a Bachelor of Arts degree in Chemistry from the Princeton University. He is the founder and current chairman of Concord Foods Inc., a food packaging company based in Brockton, Massachusetts, USA. He started the company with only US\$10,000 self-financing and US\$40,000 bank loan and over the last 39 years expanded the company to US\$54 million sales without giving up the equity. Mr. Neville also worked as an independent consultant with numerous companies developing sales and marketing strategies as well as solving management and organizational problems. He completed numerous volunteer assignments in the NIS countries working with other FTF implementers. This assignment with AABL was Neville's first volunteer work with Winrock International in Bangladesh.

Host Background: ACME is one of the leading private sector business conglomerates of Bangladesh engaged in diversified business activities including pharmaceuticals, information technology, software development, knitting, import-export and trading. As part of business diversification, the ACME AgroVet & Beverages Ltd (AABL) commenced operation in 2005 as a sister concern of ACME group with the objectives of producing high quality fruit juice, bottled drinking water, tea, spices, candy and other consumer goods to meet the increasing demands of the domestic consumers initially, and later exporting to other countries.

AABL's fruit juice processing plant is located at Dhamrai, about 40 km northwest of Dhaka, the capital city of Bangladesh. While designing and constructing the plant, proper attention was paid to the latest concept of modern juice processing technology. One of the major tasks of the ACME management is to include long-term environmental considerations in all decision making process and accordingly, the AABL plant design and construction incorporate all elements of safe and environment-friendly production of high quality food items.

Principal Impacts: As part of the assignment tasks, volunteer Robert Neville conducted critical assessments of the host's technical and professional capabilities and infrastructural (plant machinery and equipment, quality control lab) facilities and recommended adjustments in juice formulation/ blending process to enhance product quality, reduce production cost and minimize product recalls/rejections. The volunteer also provided basic training to the production and quality control staff covering issues such as food safety, quality assurance, GMP, HACCP, and standard operating procedures, leading to building host capabilities for certification by accredited certification companies. Also, in order to help the host

enter into export markets, volunteer Neville shared information on the latest concepts of marketing and market development for consumer food items, and conducted training on SPS (sanitary and phyto-sanitary) requirements and other non-trade barriers that hinders developing country products' access to sophisticated markets.

As an outcome of the volunteer Neville's training, the host management and technical staff were able to significantly sharpen theoretical knowledge and practical skills required for improving juice formulation/ blending, quality control, and marketing of finished products. Volunteer training helped the plant to address major production problems, such as inconsistencies in juice mixing, viscosity increases and jelling problems, which helped in reducing product recalls/ rejections to a minimum level. Before volunteer interventions, product recalls due to juice processing inefficiencies were as high as 6-8% of the total packages supplied to the retail markets. Besides, blending/ mixing adjustments suggested by the volunteer helped the host to reduce production cost significantly. The volunteer also provided valuable suggestions on devising ways for getting a greater share of the domestic market, and suggested new products for adding to the AABL production line to further improve plant productivity and increase profits.

As a result of all of the above-mentioned improvements, in less than one year from the date of the assignment, juice production cost reduced by an estimated 20% (from US\$106,975/year to US\$85,615/year), and product recalls/ rejections dropped to a negligible level, leading to an average 6% annual increase in gross value of sales (from US\$1,376,819 to US\$1,464,701) with a resultant average annual net income increase of around 370% (from US\$93,113 to US\$437,318).

Direct Beneficiaries:

Female: 2
Male: 15

Volunteer Impact Summary: India

Winrock Expert: Paul Dutter
Host Enterprise: Himalayan Organization for Organic Agri-Product Research and Development (HIMOARD)
Dates at Site: 30 September – 10 October 2007

Assignment Objectives: Major objectives of the assignment were to:

- i. help establish an Internal Control System (ICS) for organic certification, and train the host staff in the process of preparing ICS documents, and validating the ICS findings
- ii. provide training to the staff on organic inspection procedures as a prerequisite to preparing ICS document that would help the host to apply for third party organic certification, and to prepare an ICS manual for reference and future use

Volunteer profile: Paul Dutter is an experienced organic certifier who has been in the certification industry for past 8 years with various degree of responsibility. His experience spans from managing organic farming operations of fruits, vegetables, and field crops like wheat and soy to organic certification and administration. Being educated and trained as an animal husbandry specialist, he has experience of working as an inspector of organic livestock and processing farms. He also worked as sales representative and dairy cattle evaluator for the American Breeder Service. He made several presentations and conducted numerous trainings for the organic certification and sales programs.

Host Background: HIMOARD is a cooperative, and a not for profit organization supported by member farmers and agriculture technocrats, which is working in remote and interiors of the northern Indian state of Himachal Pradesh (H.P.) since January 2000. It is working for the welfare of small and marginal farmers directly as a facilitator to arrange markets for their produce so that the farmers can sell with minimum or no middlemen intervention. The organization works in 12 districts of H.P. with more than 1800 registered members, with a primary focus on organic farming. It provides many services to the farmers for the promotion of horticulture, especially organic farming of selected fruits, and vegetables in the state. It operates a *Plant Health Clinic* to provide diagnostic services through the identification of pests and diseases, and nutritional deficiencies in soils; a *Tissue Analysis Lab* to analyze leaf and soil samples to advise the farmers on supplemental nutrients to improve soil fertility. Besides, the chairman of HIMOARD is the president of *Stone Fruit Growers Association*, an association promoted by the ministry of agriculture, government of India, to assist the fruit growers of the state.

HIMOARD has trained more than 4,500 farmers in organic farming practices. It participates in horticulture trade fairs for promotion and marketing of organic products on behalf of the farmer members. For direct marketing, HIMOARD developed marketing linkages with several private sector food processing industries in India.

Principal Impacts: Working on this assignment, volunteer Paul Dutter conducted detailed training in the process of preparing ICS documents, and validating ICS findings, leading to organic certification. He also provided training on ICS manual preparation. Following his training, HIMOARD staff assisted a total of 643 farmers to be organic certified. In addition, 2,200 farmers became new members of HIMOARD, whose farms are currently under conversion process. The host along with selected member farmers participated in the Indian Organic Trade Fair and Horti Expo in New Delhi, and sold certified organic dry fruits worth US\$16,215. Besides, the host on behalf of the member farmers received orders worth US\$1.4 million from domestic buyers to supply organically produced and processed products.

Direct Beneficiaries:

Female: 150

Male: 450

Volunteer Impact Summary: Indonesia

Winrock Expert: Bruce Bailey
Host Enterprise: ICRAF- the World Agroforestry Center, Indonesia (*Nurseries of Excellence Program*, Aceh, Indonesia)
Dates at Site: 22 March – 6 April 2008

Assignment objective: Volunteer Bruce Bailey's assignment objective was to develop recommendations for improving smallholder nilam (*Pogostemon cablin*) production and increasing profitability.

Volunteer Profile: Bruce Bailey holds a MS degree from the University of California, Davis in International Agricultural Development and Plant Science. He has 37 years of international and US experience in agribusiness development. The focus of Bruce's career is to utilize his unique educational background, global experience, and innovative expertise to confront the agricultural issues of production, marketing and development that challenge economically emerging and reconstructing countries. From 1971 to 1973, Bruce was the agribusiness division manager at the Uniroyal Plantation in Sumatra, Indonesia. He has completed several Farmer-to-Farmer assignments.

Host Background: The International Central for Research in Agroforestry (ICRAF) is an autonomous, non-profit, international organization established by charter and headquartered in Nairobi, Kenya. ICRAF's mission is to work towards 'mitigating tropical deforestation, land depletion and rural poverty through improved agroforestry systems.' It established a Southeast Asia Regional Research Program in Bogor, Indonesia in 1992. The objective of this regional program is to 'implement ICRAF's mission in the unique agroecological and institutional circumstances of the nations of Southeast Asia.' ICRAF has been working in Aceh since 2005.

Principal Impacts: The tasks of the assignment were to: i) visit and hold discussions with relevant smallholder farmers, market agents, and local government officials; ii) review existing smallholder nilam production, harvesting, processing and marketing systems and identify ways to improve production and profitability (with emphasis placed on crop establishment and insect/disease management); iii) investigate/ discuss the potential and possibility of collective action as a win-win approach for farmers and market agents, and iv) provide nilam production and processing training to smallholder farmers in focus villages.

During his assignment, Bruce met 180 farmers, processors, traders, government officials and researchers discussing nilam cultivation, processing and marketing and looking for ways to improve existing systems and linkages. Specifically, he encouraged farmers to adopt integrated nilam-based agroforestry systems that include multiple species and crop rotations, opposed to the deforestation-based nilam monoculture system commonly practiced in Aceh. The agroforestry systems diversify farmers' livelihood streams, reduce risk, and improve agro-bio-diversity by including multiple species on the farmers' land. Agroforestry systems also improve soil-water conservation because woody perennials are maintained on the land and cultivation is minimized. Aceh contains unique biodiversity of global significance, which is threatened by widespread illegal logging. Nilam farmers agreed to use the new knowledge from Bruce to rehabilitate underutilized agricultural lands, and not convert natural forests. Bruce's recommendations have been adapted in 9 villages, improving natural resource management on 13,650 ha, and benefiting 4,000 people with enhanced environmental services.

Based on farmers willingness to implement the recommendations above, the host ICRAF/Winrock arranged a US\$4000 in-kind grant enabling 92 farmers to establish 5 ha (82 rante¹) of nilam agroforestry systems on underutilized agricultural land. At the time of this reporting, the new plantings were being designed and established. The new nilam plantings will serve to demonstrate recommended practices and enhance farmer incomes. Harvesting and processing will occur 6-7 months after establishment. Based on standard yields under local conditions, the new nilam plantings are expected to yield US\$602 per rante in gross income and US\$428 per rante in net income. Total net income from expand nilam production is expected to be US\$35,101 or US\$382 per farmer.

Direct Beneficiaries:

Female: 30

Male: 150

¹ 1 hectare = ~16.5 rante

Volunteer Impact Summary: Indonesia

Winrock Expert: Jack C. Boles, Jr
Host Enterprise: ICRAF- the World Agroforestry Center, Indonesia (Yayasan Dian Tama staffs and smallholder livestock production farmers in Tumbang Titi site, West Kalimantan province)
Dates at Site: 8-21 March 2007 and 3-17 March 2008

Assignment objectives: The objectives of Boles' assignment were to recommend ways of enhancing smallholder farmers' livestock production and marketing practices as a component of their integrated agro-forestry systems. This was to be addressed directly through interaction with farmers, and indirectly by enhancing the capacity of the host staff to provide technical support on livestock production and marketing. The initial assignment (8-21 March 2007) was very well received; and the host and the community members requested Boles to return for a follow-up assignment (3-17 March 2008).

Volunteer Profile: Jack Boles is a County Extension Agent in Newton County, Arkansas. He is responsible for the development and implementation of the University of Arkansas, Cooperative Extension Service educational programs in Newton County, with emphasis on agriculture and natural resource management issues. This calls for a close working relationship with local leadership, grass roots organizations, state and federal agencies, and other local stakeholders. These assignments were his first and second volunteer assignments with Winrock's Farmer-to-Farmer Program in Indonesia.

Host Background: Yayasan Dian Tama (YDT) is an Indonesian non-profit organization, established in Pontianak, West Kalimantan in 1987 to develop and promote appropriate technology for rural development. Its supporters include: Center for International Forestry Research (CIFOR), Tokyo based International Charcoal Cooperative Association (ICCA), OXFAM-GB, ICRAF and European Union (EU). From 1987 to 1992, YDT focused on 'green' charcoal production for rural income generation. In 1992, YDT developed programs that integrate community-based forest management with enhanced rural livelihood and environmental conservation. Those programs operate in the six districts: Pontianak, Landak, Sanggau, Sintang, Kapuas Hulu and Ketapang. YDT initiated the *Communal Management of Tropical Forest and Reforestation of Degraded Grasslands as an Integrated Strategy for Rural Development in Tumbang Titi – Ketapang Project* with EU funding in 2004. The project is relevant to the community's key environmental challenges of deforestation, grassland fires, and overall land degradation.

Principal Impacts: During his assignments, Boles provided technical assistance regarding: i) general pig management, ii) improved animal feed using local resources, iii) animal health, iii) market evaluation and marketing, and iv) livestock extension methods. The specific tasks of the assignment were to: i) review existing smallholder livestock (pigs and chicken) systems and identify ways to improve management and production; ii) provide livestock management and production training to YDT staff and smallholder farmers; iii) provide marketing and extension methodology trainings to YDT staff and smallholders; iv) visit and hold discussions with relevant market agents; and v) review progress since the first assignment.

The assignments' primarily focused on pig production and marketing, as the market potential for pigs is great in the local villages, the district, and the province. Boles employed the following methods during his assignment: farm visits, focal group discussions, sharing experience from his career, formal trainings (with minimal lecture and a lot of discussion), informal information sessions, market visits, and field interviews. He visited 16 villages and numerous individual farmers, conducted 4 formal trainings (pig management, pig health, pig marketing and extension methodology), multiple informal information session, and numerous interviews with farmers and market agents. Nutrition, reproduction, health and utilization of local resources were the main issues stressed by the volunteer to help improve smallholder

livestock systems. Following volunteer training, YTD staffs and farmer associates have demonstrated an increased knowledge of pig and chicken production, as well as a better understanding of the fundamentals of livestock production. They now have a better understanding of the linkages between all aspects of pig and chicken production, and the impact of nutrition on animal health and productivity.

The marketing and extension trainings conducted by the volunteer focused on enhancing the capacity of YTD staff and farmer leaders to facilitate an increase in livestock production and profitability. As a result of the trainings, the staffs and farmer leaders have a much broader awareness of the marketplace. The marketing training focused on: 1) know your market, 2) know your customers, and 3) know your product. YTD staff and farmer leaders enhanced their understanding of negotiation methods specially when dealing with traders. Staff and farmers now understand that marketing information is more important than price.

Also, the YTD staff increased their knowledge of extension methods. They now feel confident in their abilities to discuss and employ various extension methods. They appreciated the analogy that extension methods are like “a tool box”. Each tool has specific uses. Every method is not intended to be used every time – use only the ones appropriate for the situation. Through the group farm visit, staff were able to observe how a successful farm visit can take place; the questions that can be asked and the appropriate ways of asking and answering questions. Staff members are now viewed by the farming community as respected livestock (and agroforestry) extension professionals who have the international linkages, not just lone individuals voicing their own opinions.

Significant economic impact resulted from Boles’ assignments. Approximately 1000 families improved their pig production and marketing capacities from the combined efforts of Boles and YTD. Many farm families have increased pig production by a factor of 1 to 4; other families that previously produced few or no pigs have also expanded/ started production. YTD estimates that average pig production has doubled, from 5-6 mature pigs and 5 piglets/year/family to 12 mature pigs and 10 piglets/year/family. The commercial value of the increased pig production is US\$284 per family, or a total of US\$284,000. Sixty to seventy% of the increase has been or will be sold. That amount can easily be absorbed by markets, because demand far exceeds current supply. The remaining 30-40% of the increase in production is intended for home consumption and will improve family nutrition and health.

Direct Beneficiaries: (based on YTD records and 26% female participation – over two assignments)

Female: 72
Male: 200

Volunteer Impact Summary: Nepal

Winrock Expert: Blakelythy Blakely
Host Enterprise: Chisapani Jadibuti Prashodhan Udyog Pvt. Ltd., Nepal
Date at Site: 12 – 25 September 2007

Assignment Objectives: The objectives of the volunteer were to: i) increase yield of quality essential oils; ii) improve capabilities and practices of people running the distillers; iii) provide recommendations on improved distillery technologies as appropriate for Nepal situation, and iv) identify areas to increase profit (revenue minus expenses)

Volunteer Profile: Blakely Blakley holds a Bachelors degree in Botany and Horticulture from Antioch, West University. Blakely has been involved with the medicinal herb industry for over 25 years. Presently he works as an assistant manager of Oneota Food Co-op in Decorah, IA, and as a consultant for farmers and herb companies with focus on medicinal herbs, spices and essential oils. Previously, Blakely worked for a number of companies engaged in production and marketing of herbs, aromatic and medicinal plants in Ohio, Oregon and California. He is an educator, grower, quality specialist, distributor and salesperson and knows nearly every facet of this industry. One of his greatest strengths is helping to create new growing and production operations. He has the ability and knowledge to create a growing operation and have a good understanding of the sales and marketing of MAPS industry.

Host Background: Chishapani Jadibuti Prashodhan Udyog Pvt. Ltd. (CJPUGL) was established in January 2006 and commercial production started in July 2006. The plant was established by Brindaban Community Forest Users' Group (BCFUG) to process medicinal and aromatic plants available/ cultivated within local Brindaban Community Forest (7 ha.), other community forests (10 ha.) and private land (8 ha.), in total raw materials obtained from about 25 hectares of forest/private land for higher value addition and increased income for poor resource users living in the vicinity of the community forest. Most resource users belong to the economically disadvantaged Tharu community. A total of 58 households are direct beneficiaries and an additional 760 households are indirect beneficiaries of the enterprise. The plant was established at a total cost of US\$14,085. Grant from Nepal Government (90% of total cost) was used to cover the capital cost of boiler unit and tube well for water supply and related other equipment. The plant is owned by BCFUG and operated as a private limited liability company. CJPUGL is providing additional income to local resource users through higher value addition of medicinal and aromatic plants. Poor resource users are now benefiting from the use of fallow and marginal land by cultivating aromatic plants for the processing plant. The plant has provided regular employment to four persons including one manager.

Principal Impacts: As part of the assignment tasks, the volunteer provided useful training to the community growers on improved methods of cultivation and processing of aromatic and medicinal plants. As a result of volunteer training, 101 aromatic plant growers, and two distillation enterprises run by the aromatic plants producer communities, have increased farming area from 45.3 ha to 53 ha. Quality of aromatic oils and efficiency of the distillation units increased significantly. The volunteer also taught techniques to help expedite the distillation process leading to increased production of oils. Gross value of sales increased from US\$14,519

to US\$17,388, an increase of 19.8%. Net income for the 101 farm families increased from US\$11,980 to US\$14,343 in six months after the assignment.

Direct Beneficiaries:

Male: 71

Female: 30