

Harnessing information and technology transfer for sustainable agricultural development in the ASPAC region: The FFTC report

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Introduction

Over the past 50 years, the Asian and Pacific (ASPAC) region has undergone an unprecedented transformation in terms of agricultural production, food security, and rural development. However, given that the per capita availability of land in the region is one-sixth of that in the rest of the world, and that nearly three-fifths of the future rise in world population will occur in this region, increases in food and agricultural production will have to be realized from its ever-shrinking and generally deteriorating land, water, and other production resources. Moreover, the increasing role of agriculture in the global economy amid technological innovation and globalization trends has placed the region's small-scale farmers in a more vulnerable state.

Information is vital in terms of enabling small-scale farmers to achieve improved agricultural productivity, make effective use of natural resources, raise their income, and produce food that is accessible, available and affordable to all. For the Food and Fertilizer Technology Center (FFTC) for the Asian and Pacific Region, serving small-scale farmers by bringing them information on improved agricultural technology is an evolving task and a continuing commitment.

FFTC was established in response to severe periodic shortages of both food and fertilizer in the 1970s. It was apparent at that time that a lack of technical information among farmers was the basis of the problem, compounded by an inadequate fertilizer supply and a shortage of improved seeds. The underlying motive for the creation of the Center was the concern about food shortages in the densely populated Asian countries.

Now, after more than three decades, the Center is faced with more daunting challenges, as well as vast opportunities, arising from the promise of globalization contrasting with the disquieting reality of the stubbornly high numbers of hungry and poor people in the region. Although a deficit in food and fertilizer is not anymore as serious as it was in the 1970s, the farmers' need for practical information about new technology has become greater than ever.

For the Center, the challenging task ahead is to explore the opportunities presented by the current technological and information revolution, to render Asian agriculture more competitive and productive, resilient, sustainable, and equitable toward the broad-based agricultural growth and overall development of the region.

Mission and purpose

FFTC is a regional information center with the mission to collect and disseminate practical and technical information in agriculture, toward contributing to the achievement of increased output and higher incomes for small-scale farmers. The Center has three main objectives:

1. To spearhead the transfer of matured technologies and information generated by scientists to the farmers;
2. To promote the sharing and exchange of agricultural information among countries toward enabling small-scale farmers to benefit from scientific and technological advancements in the region; and
3. To bridge the technology gap between developed and developing countries.

Organization and operation

The Center's operations are supported by annual contributions from the governments of Japan, Korea, the Philippines, Taiwan ROC, and Vietnam. These member countries are represented in the Center's Executive Board and Working Group. National research, educational, and extension institutes/organizations in Indonesia, Malaysia, Thailand, and some other countries in the region also provide support on a project basis, and are actively involved in the Center's various activities and work programs. Some of FFTC's activities are also funded by non-political foundations in the region.

The Center's policies are decided upon by its Executive Board, which also reviews and approves its budget and work programs. The Working Group assists the Board, which meets in advance of each board meeting to discuss technical aspects of the Center's work and to make recommendations to the Board (Fig. 1).

The Technical Advisory Committee (TAC), on the other hand, is made up of distinguished agricultural scientists in the region, and serves to provide policy and program advises to the Center. The TAC meets once every two years in one of the member countries, to identify agricultural information needs, evaluate the effectiveness of the Center's programs and activities, and make recommendations to further improve future work programs.

The Center's professional staff are specialists from various agricultural disciplines recruited internationally from countries in the ASPAC region, while the administrative staff are employed locally. Both are under the supervision of the Director, who is appointed by the Executive Board.

The Center works in close partnership with national and international agricultural organizations in the region. Most of its programs are carried out in collaboration with co-sponsors, which support these programs with funding, personnel, or both. It also consults other international agricultural research centers in developing its work programs to ensure that major regional problems are addressed and real regional needs are met.

Major strategies and activities

Mechanism for technology transfer

Over the past 35 years, FFTC has played an immensely important role in collecting, exchanging, and disseminating information on a very wide range of modern agriculture and agriculture-related topics, covering the full spectrum of small farm needs and activities relevant to the Asian and Pacific region. This integrated technology approach is what makes FFTC a unique international center. While most agricultural research centers are specialized, and study a single crop or a single agro-ecological zone, FFTC offers practical technologies that are matched to the reality of the region's small-scale farmers, whose farm incomes are determined by total farm production.

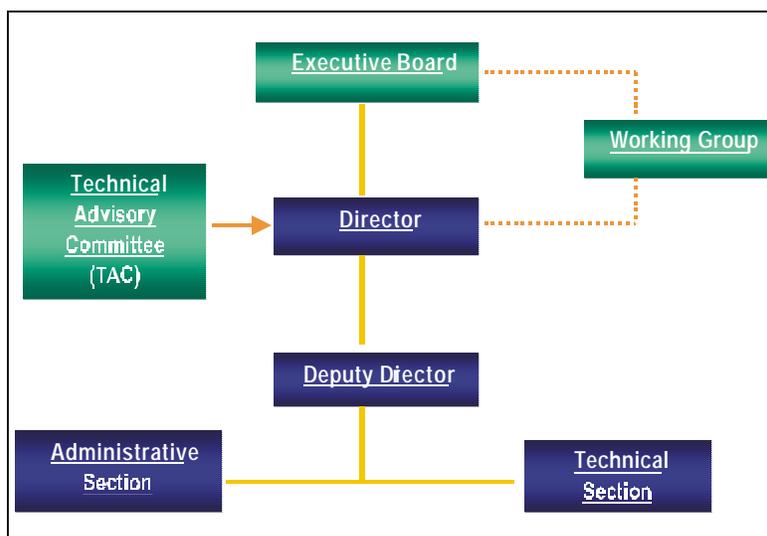


Fig 1. The FFTC organizational chart

For the last three decades, by far one of FFTC's most significant milestones, and for which it is now widely recognized, is laying the foundation for an established mechanism for technology transfer within the region. The Center's mechanism of

collecting, exchanging, and disseminating information on improved and advanced agricultural technology constitutes a systematic institutional cooperation and complementation among the ASPAC countries. Through its various activities like seminars and workshops, training courses and regional surveys, thousands of scientists, administrators, policymakers and extension workers not only had the chance to learn about the latest developments in the field of agriculture, but equally important, they had the opportunity to learn from their more advanced neighbors and to meet experts from other countries.

Through these activities, FFTC has accumulated a huge body of knowledge and information on agriculture made possible through the works of hundreds of people from member countries and partner institutions. Disseminated through publications, training courses and demonstration projects, and recently through its website and database, these knowledge and information have given countless resource-poor farmers and extension specialists in the region new opportunities and new solutions to their problems.

Major Activities

The major activities of the Center revolve around the identification, collection and dissemination of information on improved technology on every aspect of agriculture which are deemed important to the present and future needs of Asian farmers (Fig. 2). This involves:

1. Identification of problems and issues;
2. Collection, sharing and exchange of information; and
3. Dissemination and technology transfer.

The overall goal of these activities is to promote agricultural growth and sustainability in the ASPAC region, focused primarily on improved productivity, fostering the sustainable use of natural resources, and increased income and improved livelihood of small-scale farmers. Over the years, the Center has also taken on the task of assessing future trends based on the information it has collected, to meet the changing needs of the farmers. Following are FFTC's major activities:

1. **Regional field surveys.** Surveys, carried out in several countries of the region, are conducted to make an in-depth assessment of a particular problem. The aim is to clarify the causes of a particular problem and gather pertinent benchmark data as the basis for designing future programs and activities of the Center.
2. **Seminars and workshops.** The Center organizes seminars and workshops where

prominent researchers and extension workers deliberate on topics of major regional importance. These seminars and workshops are the Center's main sources of technical information. While seminars focus on results of scientific investigations, workshops are more concerned with the practical application of new technology.

Each year, the Center holds three to five seminars and workshops in different Asian countries. National and international agencies based in the countries where these meetings are held serve as cosponsors, providing the venue and other support. Over the years, the Center has built strong linkages with several agricultural organizations in the region through these international meetings.

3. **Training courses.** The Center conducts training courses that cater to scientists, laboratory technicians, extension agents, and farmer leaders who serve as multipliers of information. Training courses aim to equip the participants with practical techniques or management skills, intended to bring immediate benefit to the farmers they work with.

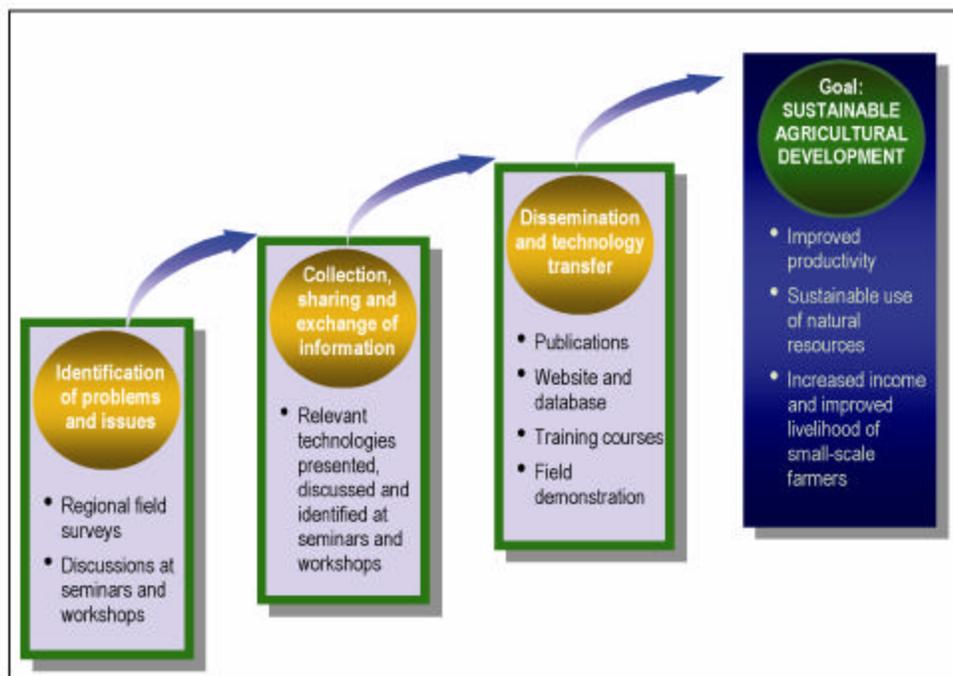


Fig. 2. Major activities of FFTC

4. **Publications.** Publication is a major work program of the Center. It includes technical and extension bulletins, a newsletter, leaflets on practical technologies and research highlights, annual report, books, proceedings, and electronic media. The Center's publications disseminate applied agricultural research, and give emphasis on practical technology for small farmers in the region.

Performance and achievements

The completion of the Center's more than three decades of service to small-scale farmers and dedication to the achievement of its goals as a regional information center for agriculture has been realized through the works of hundreds of people from member countries and partner institutions. It is their generous support and boundless cooperation these past three productive and rewarding decades, which has helped countless farmers and extension specialists in terms of improving agricultural production.

Collection and dissemination of information

Seminars and workshops, etc. In the tradition of a continuing commitment to sustainable agricultural development, the Center for the last 35 years has carried out a total of 184 seminars and workshops, 46 training courses, 23 regional surveys, and 9 field demonstrations, and 10 special projects (Table 1). More than 15,000 people working in agriculture in the Asian and Pacific region, including farmer leaders, extension workers, policy makers, scientists/researchers and students, have actively participated in these activities.

Table 1. FFTC activities, 1970-2005

Activity	No.
	1970-2005
Seminars and workshops	184
Training courses	46
Regional surveys	23
Field demonstrations	9
Special projects	10

These programs were carried out in more that eight countries all over the Asian and Pacific region. With the Center acting as a clearinghouse for information shared and exchanged during these activities, it makes each country's research available to its neighbors. Consequently, the number of practical technology and information filtered down to the ultimate users become insurmountable.

Ensuring the involvement of as much countries in the region gives more scope to collaborative work, helps avoid duplication, provides regional focus to technological advancement, and facilitates the delivery of benefits to farmers and consumers.

In the last three decades, most of the projects of the Center focused on rice and

other food crops (19%), soils and fertilizers (18%), agricultural development/ extension (18%), livestock (16%), and plant protection (15%), and diverse areas/disciplines covering the full range of small-farm needs and activities like multiple cropping, post-harvest, and horticulture (Fig. 3). This distribution reflects the evolution of the needs and concerns of the region's small-scale farmers in the tropical and subtropical Asian countries.

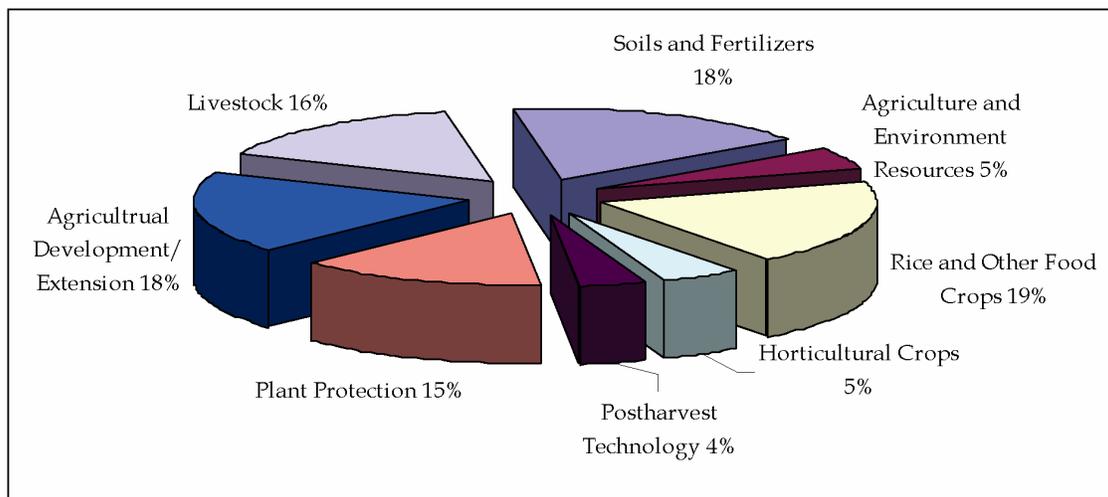


Fig. 3. FFTC programs according to area/discipline, 1970-2005

Publications program. The Center's publication program is committed to ensure that the collection and dissemination of information is focused on the right problem, is relevant and useful, is involving the right users, and is not duplicating the information disseminated by other organizations. The most recent and relevant agricultural technology and information collected by the Center through its various activities are documented and published in the forms of technical and extension bulletins, book series, newsletters, and a regular publication on statistical agricultural indices in the region.

The Center's information services focus on the dissemination of practical technology, with the region's extension workers and small-scale farmers as the prime beneficiaries. From 1970 to 2005, the publications released and distributed by the Center include 562 extension bulletins, 169 technical bulletins, 64 books, 150 issues of the newsletter, 34 annual reports, 163 practical technology leaflets, and 40 research highlight leaflets (Table 2) (Fig. 4).

Of these publications, 24.64% is in the area of soils and fertilizers, 18.98% in livestock production, 11.24% in vegetables and fruits, 10.75% in grain and rootcrop production, and 10.40% in plant protection (Table 3).

Since 1970, the Center has distributed 706 free agricultural bulletins, a total of over one million copies, and about 200 extension leaflets, as well as books and other extension materials. All these are given free to about 1,500 libraries of agricultural institutions and universities, public libraries, and individuals in 52 countries, mainly from the Asian and Pacific region (Philippines, 27%; Japan, 12%; Korea, 12%; Taiwan, 8%; Thailand, 8%).

Table 2. Publications released and distributed, 1970-2005

Publication	No.
	1970-2005
Extension bulletins	562
Technical bulletins	169
Books	64
Issues of Newsletter	150
Annual reports	34
Leaflets	
Practical technologies	163
Research highlights	40



Fig. 4. Selected FFTC publications.

Table 3. Distribution of publications by area/discipline

Area/Discipline	Extension Bulletin	Technical Bulletin	Book	Total	Percentage
GRAIN AND ROOT CROP PRODUCTION					(10.75)
Production and cultural practices (including irrigation)	95	20	1	116	8.15
Breeding and seed production	16	16	5	37	2.60
VEGETABLES AND FRUIT					(11.24)
Production and cultural practices	91	18	8	117	8.22
Breeding and seed production	23	17	3	43	3.02
SOIL AND FERTILIZERS					(24.64)
Fertilizers, soil fertility, plant nutrition	141	34	5	180	12.65
Soil and water conservation and management	97	13	4	114	8.01
Soil microbiology	12	11		23	1.62
Soil survey and classification	16	16	23	34	2.39
PLANT PROTECTION					(10.40)
Insects and diseases	56	55	8	119	8.36
Weed control	20	7	2	29	2.04
LIVESTOCK					(18.98)
Animal diseases	15	7		22	1.55
Pasture, forage and feed	70	7	2	79	5.55
Production and breeding of cattle and buffalo	63	6	4	73	5.13
Production and breeding of poultry, swine, goat	45	3	48	96	6.75
PLANT PHYSIOLOGY					(2.81)
Plant physiology	16	23	1	40	2.81
FOOD PROCESSING/ POST-HARVEST					(3.58)
Food processing and post-harvest technology	42	8	1	51	3.58
INSTITUTIONAL SUPPORT					(17.08)
Extension training	17	1	3	21	1.48
Marketing and finance	55	1	1	57	4.01
Agricultural organizations and cooperatives	45	1	1	47	3.30
Farm management and farm mechanization	25	1	1	27	1.90
Agricultural development planning and land tenure	82	4	5	91	6.39
AQUACULTURE AND FISHERIES					(0.35)
Aquaculture and fisheries	4		1	5	0.35
EXPERIMENTAL TECHNIQUES	2			2	(0.14)
TOTAL				1423	100.00

As stated in the FFTC External Evaluation Report 1992, "FFTC publications have provided most valuable and reliable sources of information for students, teachers, technicians, agronomists, and farmer leaders in the region. Few organizations in the world can match FFTC in the output of good publications if the size of the staff and the budget is used as a yardstick."

Some FFTC publications are now translated into local languages by the national extension systems to widen the reach and practical use of such by the small-scale farmers. By providing and promoting the sharing of technology and information, the

Center hopes to continue to contribute in narrowing the gap not just between research and extension, but between developed and developing countries as well.

Development of a regional extension network

The success or failure of development programs often depends as much on the quality of extension support as on the technology itself. Hence, a large number of the Center's work programs, especially during its early years, were designed to support and strengthen the region's national extension services. These programs included not only extension techniques, but the training of extension workers and the strengthening of extension systems.

The role of FFTC as an international information center for agriculture, however, has evolved and broadened with time. In an effort to establish a new system for the collection and dissemination of practical technologies, the Center in 2000 has taken advantage of the strength of existing national extension systems in the Asian and Pacific region. An FFTC survey team visited national organizations in charge of extension in eight Asian countries, to deliberate on the creation of new channels for the collection and dissemination of agricultural information.

The survey led to the establishment of a regional extension network in 2001, covering eight countries in the region, namely, Indonesia, Japan, Korea, Malaysia, Philippines, Taiwan, Thailand, and Vietnam. With the cooperation of the eight country coordinators, FFTC began publishing the *Research Highlights* and *Practical Technology* leaflets containing practical technical information that will serve as useful information resource for extension systems in each country.

The Research Highlights (RH) leaflets contain a summary of significant research findings. They are intended for scientists/researchers in the region, to help them keep abreast with recent technological development in neighboring countries. The Practical Technology (PT) leaflets, on the other hand, contain practical technical information for use by extension workers and farmers.

Under this special project, country coordinators have sent about 332 topics for RH from 2001-2004, published in 41 leaflets and two CD-ROMs. Two hundred copies of each of the RH leaflets were sent to coordinators in each of the eight countries, for distribution to national research institutes.

For the PT leaflets, an estimated 300 topics were contributed by the country coordinators from 2001-2004, published into 163 leaflets. Through the system developed by FFTC and the cooperators, topics for the PT leaflets were selected based

on regional significance or wide adaptability so that they can be used in several countries, or can provide recommendations to local extension workers and farmers on how certain problems can be addressed. Two hundred copies of each of the PT leaflets were sent to cooperators in each of the eight countries. The English-language versions are distributed to extension workers, researchers, and university and agricultural institute libraries in each country. Those leaflets which are evaluated by coordinators as being appropriate for their own country are translated into local languages and published locally for extension use.

The translation of the PT leaflets into local languages is a direct indication that technologies developed in laboratories are filtered down for the direct use of the small-scale farmers. Topics of the PT leaflets address immediate problems of farmers, as well as open new opportunities for marketing activities and improvement of their livelihood. Some titles of PT leaflets have been translated into local languages, distributed to farmers, farm households, extension workers, university and institute libraries, and the general public (Table 3). The mode of distribution among the cooperating countries varies – from local newspaper to website – in order to reach as wide audience as possible and hence, maximize benefit from the valuable practical technological information.

Enhanced information service through website and database

FFTC, as a regional information Center for the Asian and Pacific region, must be able to attain strong international web presence to better serve as a show window of the region's sustainable agricultural development. Through the web, it must also be able to create better networking and facilitate collaboration and partnership, disseminate and exchange information efficiently and cost-effectively, and deliver all functionality required for the Center to realize its mission as a regional information center.

Five years ago, the Center has made available free of charge on its website and database the full text of its publications for the last 15 years. Since then, the FFTC website and database has become an important information resource on Asian agriculture, particularly by the national extension systems of the region (Fig. 5).

In the five years since it first came on-line, the level of use has tended to double each year. The website registered 76,000 requests in 2000; 417,000 requests in 2001; 822,472 in 2002; 1.6 million requests in 2003; 2.3 million requests in 2004; and 3.02 million requests in 2005 (Fig. 6). This growing use of the FFTC website and database gave a larger number of people access to the Center's technical information, at no extra cost to the Center.

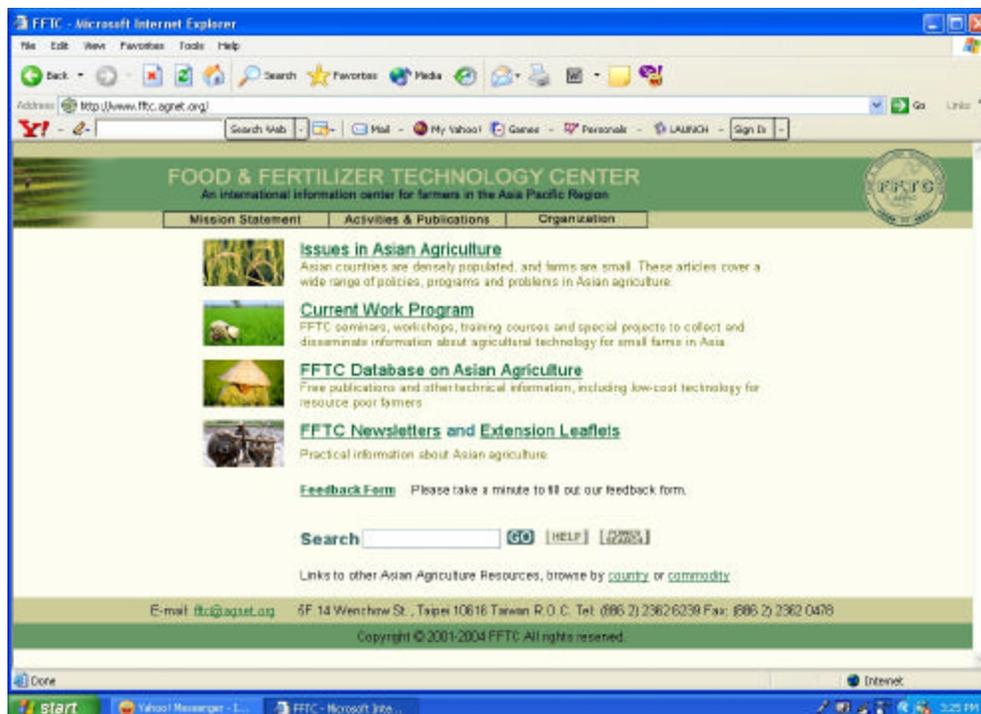


Fig. 5. www.fttc.agnet.org

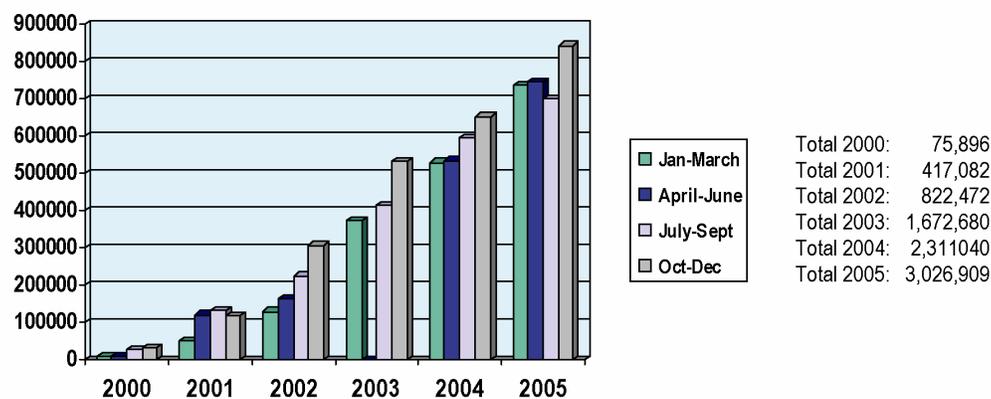


Fig. 6. Use of the FFTC website and database, 2000-2005

The FFTC website is currently being re-designed to enhance the Center's international presence; facilitate interaction and networking among partner institutions within the region; and make possible a more cost-effective way of disseminating practical information to its users.

Strengthened regional agricultural cooperation

FFTC's impact on the region's agriculture, considering that it is relatively small in

scale, budget and human resources, had been immense. This has been possible because FFTC works in close cooperation with agricultural centers all over the region. Over the past 35 years, these organizations have provided ideas and help the Center to identify important priority concerns of the region's small-scale farmers, which in turn form the basis of its annual work programs. Many of these organizations have also acted as cosponsors to particular activities, providing staff, funding and various facilities. Since 1970, 15 international and 72 national organizations in the region have acted as cosponsors of FFTC activities.

Since 1983, Memoranda of Agreement (MOA) have likewise been signed with more than 20 national and international agricultural organizations in the region. Most recently, FFTC has forged new agreement with: the Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) based in the Philippines, to collaborate in undertaking capacity and institution building programs, projects, and other activities related to agriculture within the Asian and Pacific region; and the Department of Agriculture (DA), Philippines for technology transfer programs in agriculture. It has also recently agreed to establish mechanisms to strengthen cooperation between the Center and the Indonesian government.

The FFTC work program

In the face of profound changes in the structure of the region's agriculture for the last 35 years, the Center's work program has evolved to better respond to emerging needs and challenges, such as: ensuring sustained agricultural development, improved production of more food of better quality and safety, and attainment of increased incomes and better livelihood opportunities for small-scale farmers.

In the past, the Center's work programs have emphasized on sustainable agriculture, in response to the diminishing natural resource base attributed to the rapid growth of populations and the corresponding rise in resource consumption and standards of living in the region. Sustainable agriculture is based on the efficient management of agricultural resources, allowing the resource base to remain productive indefinitely with a minimum of outside inputs, so that it can support future generations.

Some important programs of the Center for the last 35 years include:

Improvement of crop production. The Center continues to enhance its efforts to promote improved crop production to meet the increasing demand for more diversified and better-quality food through the following program:

- ?Increasing rice yield through improved varieties, rational use of fertilizers and control of pests and diseases
- ?Intensive use of paddy field and greater diversification
- ?Promoting production of upland farms, including multiple cropping and new high-value crops, combined with the use of low-cost conservation techniques
- ?Programs on horticultural crops such as breeding of improved varieties, pest and disease control, use of low-cost plastic shelters and greenhouses, and post-harvest treatment
- ?Organic farming for sustainable agriculture and environmental conservation

Soil and fertilizer management. With soil as a basic resource of agricultural systems, sustainable agriculture is impossible without soil management. Meanwhile, overuse of fertilizer has become a problem in many industrialized countries in Asia. For the last three decades, the Center implemented the following soil and fertilizer programs primarily focused on technological improvements to maintain or enhance the fertility of the soil in a cost-effective and environment-friendly way:

- ?Fertilizer recommendations for farmers according to soil type and crop
- ?Efficient use of fertilizer based on soil testing and plant analysis
- ?Extension of improved composting method and application of compost
- ?Use of microorganisms such as mycorrhiza and rhizobium

Plant protection. The Center likewise gave emphasis on the development and adoption of plant protection strategies, particularly the integrated pest management (IPM) of pests and weeds. The important components of the plant protection program are as follows:

- ?Rational use of chemical treatment for the control of crop pests and diseases
- ?Integrated pest and weed management system
- ?Analytical methods to detect residual chemicals in harvested crops disseminated in training courses
- ?Control of plant virus diseases covered through surveys, a series of workshops and training courses, and establishment of demonstration orchards

Improvement of animal industry. The Center has also been working on the promotion of long-term policies and scientific and technological advancement to improve livestock production, in order to meet consumer demand, improve nutrition, direct income growth to those most in need, and alleviate environmental and public health stress. Following are work programs implemented for the improvement of the animal industry:

- ?Promotion of buffalo production techniques

- ?Information programs on breeding of livestock, diagnosis and treatment of major diseases, and improved feeding management.
- ?Use of local breeds and feed resources, and low-cost disease control methods, particularly preventive methods such as efficient vaccination program and quarantine procedures
- ?Integration of livestock and crop production

Food processing and marketing. Marketing has been a major problem for the region's farmers for decades now, as they have moved from producing commodities for selling rather than for subsistence. More recently, the opening up of agricultural trade within the global economy has posed tremendous challenges to Asian farmers in terms of competing and taking advantage of trade opportunities created by these trade reforms. Following are programs implemented by the Center to enable small-scale farmers to cope with times:

- ?Food safety and quarantine inspection
- ?Improving agricultural marketing under trade liberalization
- ?Post-harvest technology for horticulture crops
- ?Food processing enterprises for small-scale farmers

Small farm economy. With the ushering in of a new era of global free trade, Asian countries can no longer protect their domestic market from cheap imported food, and are also restricted in giving subsidies and other production support to farmers. Hence, the region's farmers should enhance their competitiveness through more efficient farming activities involving not just technical improvements but structural adjustments as well. Following are programs implemented related to these concerns:

- ?Leaflet project for the collection and dissemination of practical technologies and research highlights
- ?Multi-functionality of agriculture
- ?Integration of agricultural and environmental policies; and
- ?Farm credit issues.

For the last two years (2005-2006), the work program of the Center is summarized below:

Work Program 2005

- 1. Whitefly management and control.** Shared and exchanged knowledge, information and technology on recent advances in the ASPAC in the area of crop protection toward effectively controlling whitefly pests and the diseases they transmit.

- 2. Technology development for Good Agricultural Practice (GAP) in Asia and Oceania.** Aimed to promote the adoption of GAP and production schemes that will ensure the preservation of the agricultural environments, and at the same time guarantee food safety or the protection of food products from any form of hazard or contamination.
- 3. Small farm mechanization systems development, adoption and utilization.** Discussed the status and directions of small farm mechanization in the ASPAC region; factors that lead to the successful development, adoption, and utilization of mechanization systems; and problems, issues, and constraints in developing and introducing small farm machineries to farmers.
- 4. Effective methods of disseminating new technology considering the viewpoint of farmers.** Addressed major issues in the adoption of technologies by farmers, such as technological and extension needs in consideration of economic improvement, health, speed, efficiency variables, limitations of the farmers, as well as their working environment.
- 5. Improving total farm efficiency in swine production.** Shared and exchanged technology and information on: genetic approaches to improving efficiency and quality of swine production; sustainability of livestock production through optimal nutrition; animal health and welfare in sustainable systems; environmental management of livestock systems; and other related concerns such as public health issues specifically food safety and policy-related issues.
- 6. Newly developed innovative technologies for soil and water conservation.** Provided a forum to deliberate on recent developments and experiences in the application of innovative techniques on soil and water conservation, especially in consideration of the environmental condition and culture in the Asian region.
- 7. Health management in the production and cultivation of pathogen-free citrus and banana seedlings.** Shared recent technologies and experiences in the cultivation of pathogen-free seedlings, management of insect vectors, and disease diagnosis of citrus and banana.
- 8. Evolution of citrus greening pathogen (HLB) strains in ASPAC (Y1).** Under this collaborative project, basic research on the following topics was performed: pathogenicity identification of citrus greening (HLB) pathogen strains collected from Taiwan and southeast Asian countries; susceptibility test of jasmine orange to HLB pathogen; and disease resistance of important citrus cultivars.

- 9. Establishment of farmers' self-help agricultural marketing units in Indonesian villages.** Aimed to help Indonesian farmers in setting up efficient marketing units and self-help marketing organizations to give them a direct economic role in the society, and thereby improve their income and livelihood opportunities.

Work Program 2006 (completed and ongoing)

- 1. Agricultural cooperatives in Asia: innovations and opportunities in the 21st century.** Aims to provide a venue for identifying emerging needs and challenges for agricultural cooperatives and their diversified roles, as well as future directions in the 21st century.
- 2. Area-wide management of plant insect pests.** To exchange and share information on current status and successful practices on area-wide approach as integrated into insect pest management, which will be particularly useful to small-scale farmers in the Asian and Pacific region.
- 3. Innovative technologies and management schemes for the production of eco-friendly and safe aquaculture products.** Seeks to cover major issues, recent technological advancements, and monitoring for the presence of pathogenic bacteria, chemical contaminants, and drug residues in aquaculture products.
- 4. Urban/peri-urban agriculture in the Asian and Pacific region.** Identified recent urban/peri-urban agriculture (UPA) trends, experiences and technologies, with focus on the needs of farmers, city dwellers and the government on the development of UPA in different country settings.
- 5. Modern corn cultivation technology transfer in Caraga Region, Philippines.** Aims to extend modern cultivation techniques and introduce hybrid corn in order to raise the average yield and the farmers' interest to grow corn in Caraga region.
- 6. Sustained management of soil-rhizosphere system for efficient crop production and fertilizer use.** To collect information and develop strategies to ensure good soil fertility, effective fertilizer use, good microorganism population, and crop quality in the soil-rhizosphere system.
- 7. Development of database for biological invasion.** To continuously improve the functionality and promote the utilization of the Asia-Pacific Alien Species Database (APASD) as a tool for information sharing toward a more effective

management and control of biological invasions.

8. Enhancing the FFTC on-line database on sustainable agriculture.

Website renovation envisioned to enhance the Center's international presence; facilitate interaction and networking among partner institutions within the region; and make possible a more cost-effective way of disseminating practical information to its users.

9. Evolution of citrus greening pathogen (HLB) strains in the ASPAC (Y2).

To conduct pathogenicity identification of HLB pathogen strains collected from southeast Asian countries, and identify disease resistance of important citrus cultivars against HLB virulent common strains.

10. Establishment of pathogen-free citrus germplasm repository for the improvement of the citrus industry in the ASPAC.

To develop and transfer integrated techniques for the improvement and development of the citrus industry in southeast Asian countries.

11. Artificial reproductive technologies for buffaloes.

To promote advanced reproductive technologies for buffaloes such as superovulation techniques; in vitro maturation, fertilization, and culture; embryo transfer; and nuclear transplantation.

The FFTC strategic plan for 2007-2011

The status and roles of agriculture have greatly changed in the last decade, and more changes are expected toward the next decade because of two vital factors – technological innovation and globalization in the agriculture sector. These changes, such as the introduction of high- and bio-technology, trade liberalization, agricultural restructuring, and government policy adjustments have undoubtedly affected small-scale farmers in the Asian and Pacific region, and have forced them to adapt to the new environment.

In the past, small-scale farmers were chiefly concerned with the volume of production, such that all they needed were technologies to increase production, which brought them higher income. However, nowadays, global conglomerates, which segment agricultural markets and consumers, are much more concerned with various issues such as safe food, environment-friendly production, sustainability, and globalization. Large-scale farmers easily adapted to the new trend, while the state of small-scale farmers remain unchanged. Considering the conditions in each country, some small-scale farmers are still producing for self-sufficiency, while others are

incorporated into domestic markets, or international markets.

In view of these circumstances, the needs of small-scale farmers for state-of-the-art, but practical technologies have become diverse and even stronger than before because they are unable to meet the market-segmented technological requirements in the new environment. In the immediate future, they will have to face the challenges posed by international standard organizations to meet food safety requirements. In the domestic market channel, they are forced to meet the standard of market distributors. This trend will become more serious to small-scale farmers in this region.

Based on the above consideration, FFTC reviewed its strategies and work program to fittingly integrate the needs of the current global agricultural environment. Armed with a greater resolve to effectively and efficiently address the plight of small-scale farmers in the ASPAC region, FFTC came up with this Strategic Plan for the next five years, outlining four Strategic Missions as follows:

1. Increased income and improve livelihood of small-scale farmers;
2. Improved food safety;
3. Enhancement of environment-friendly technology; and
4. Sustainable use of natural resources.

For the next five years, the overall policy of the Center is to intensify its technology collection and transfer activities toward achieving the above four strategic missions, specifically by identifying the targeted topics and technological needs to be addressed, integrating the main goals of farm profitability and competitiveness, environmental stewardship, and prosperous farming communities (Fig. 1). Hence, over the next five years, it will strive to improve its information and technology collection and dissemination activities under its Operational Strategy to:

- Improved productivity, quality and competitiveness through enhanced information and technology collection and dissemination/transfer.

The *FFTC Strategic Plan for 2007-2011* will henceforth serve as the Center's blueprint in identifying its annual work programs for the next five years, as well as in crafting its policy and institutional strategies toward strengthening its international collaboration and partnerships within the ASPAC region.

Conclusion

For the last 35 years, FFTC had, as the clearinghouse of agricultural information in the region, somehow contributed in its own little way to the increasing trends in agricultural and food production, as well as the preservation and sustainability of the natural resource base for agriculture in the region, as reflected in the Center's activities pertaining to these themes. Its programs and activities during the last three decades hopefully had left a significant mark in terms of contributing to the overall attainment of sustained agricultural development, for the benefit of the small-scale farmers and the vulnerable people of the region.

However, FFTC's mission is continuously evolving. The *FFTC Strategic Plan for 2007-2011* is a renewal of the Center's commitment to respond to the technological needs of small-scale farmers amid the changing global environment. In addressing current agricultural development issues in the region, the Strategic Plan outlines the focus of FFTC's work programs for the next five years, toward ensuring higher standards of farming, thereby, improving farm incomes and increasing farm stability.

This is where FFTC hopes to make a difference. There are millions of small farms in the Asian and Pacific region, and those who farm them speak a variety of local languages and are sometimes unable to read. Our commitment revolves around how the Center might best be able to help them, in the best way we can.

Lastly, the Center gives full credit to all the people involved in its operations for the past 35 years, for their keen foresight, dedicated service and willingness to help, learn and respect ideas from others with only one thing in mind... "to improve Asian agriculture and their people."