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WORKSHOP ON THE UTILIZATION OF THE AGRICULTURAL TECHNOLOGY TRANSFER AND TRAINING NETWORKING SYSTEM

Medan, September 18 - 21, 2006

APEC Agricultural Technology Cooperation Working Group

December 2006

Note: Some of the terms used here do not conform to the APEC Style Manual and Nomenclature. Please visit http://www.apec.org/apec/ about_apec/policies_and_procedures.html for the APEC style guide.

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TENTATIVE AGENDA
WORKSHOP ON THE UTILIZATION OF THE AGRICULTURAL TECHNOLOGY
TRANSFER AND TRAINING NETWORKING SYSTEM
Medan, September 18 - 21, 2006

Date	Program	Speaker	Moderator	Venue
Sunday, September 17th ,2006 Arrival of participants at Polonia Airport Medan, Check-in Tiara Hotel, Medan				
16:00 – 21:00	Registration			**Tiara Hotel**
Monday, September 18th , 2006				
08:00 – 08:45	Registration			**Tiara Hotel**
	Opening Ceremony			**Tiara Hotel**
08:45 – 09:00	Keynote address by DG of IAARD	**Dr. Achmad Suryana** Director General of the Indonesian Agency for Agricultural Research and Development (IAARD)		
09:00 – 09:15	Keynote address by Co-Shepherd of ATT&T	**Mr. Nobuto Watanabe** Section Chief for Project Planning International Cooperation Division Ministry of Agriculture Forestry and Fisheries, Japan		

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Monday, September 18th, 2006				Tiara Hotel
Monday, September 18th, 2006 **Training on Development of the ATT&T Networking Systems**				
Date	**Program**	**Speaker**	**Moderator**	**Venue**
09:15 – 09:30	Opening Remark	**The Governor of North Sumatera**		
09:30 – 10:00	Introduction of Participants and Adoption of the Workshop Agenda	**Dr. Haryono** Secretary of IAARD		
10:00 – 10:30	Coffee-break			
10:30 – 10.50	Business Arangement	Organizing Committee		
10:50 – 12:00	**Topic 1**: Overview the role of e-commerce in agricultural production and marketing: the strength, the obstacles and the solution	Dr. Charles Nicholson (USA)		**Tiara Hotel**
12:00 – 13:30	Lunch – Break			
13:30 –14:30	E-commerce in Action (*Continued*): 1. Indonesian Experiences :	Dr. Charles Nicholson		
14:30 –15:00	Japan Experiences	Mr. Koichi Fukuda (Japan)		
15:00 –15:30	Coffee Break			
15:30 – 16:30	Discussions and Conclusion			

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Tuesday, September 19th , 2006				Tiara Hotel
Training on Development of the ATT&T Networking Systems				
Date	**Program**	**Speaker**	**Moderator**	**Venue**
08:00 – 08:30	**Topic 2**: How to establish and develop efficient networking systems for farmers' organizations, research institutions, extension services and private sectors	Ms. Chen Mei-Yueh (Chinese Taipei)		
08:30 –10:00	Discussions			
10:00 – 10:30	Coffee Break			
10:30 – 11:00	**Topic 3**: Current situation and future figure of agricultural information network system for farmers'use in Japan	Mr. Koichi Fukuda (Japan)		
11:00 – 12:30	Discussions			
12:30 – 13:30	Lunch Break			
13:30 – 14:00	**Topic 4**: General requirements for establishing networking system at national, regional and global levels	Mr. Luis Alejandre Ibasco Tamani (the Philippines)		
14:00 – 15:30	Discussion			
15:30 – 16:00	Coffee Break			
16:00 – 17:00	General Discussions and Conclusion			

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Wednesday, September 20, 2006 **Farmers to Farmers Training**				**Tiara Hotel**
Date	**Program**	**Speaker**	**Moderator**	**Venue**
08:00 – 09:30	Farmers to farmers sharing experiences and discussions	Farmers from Indonesia 1. Tohawi SH (P4S) 2. I Wayan Kanten (Farmer Group Microsoft Supervision)		
09:30 – 10:00	Coffee Break			
10:00 – 12:00	Farmers to farmers sharing experiences and discussions	Mr. Toshiro Takatsuka (Farmer from Japan) Ms. Vo Ngan Giang, DVM, MSc (Representative from Vietnam)		
12:00 – 13:00	Lunch Break			
13:00 – 15:00	Farmers to farmers sharing experiences and discussions	Mr. Chen Tai-an (Farmer from Chinese Taipei) Mr. Zulkifli Mohd. Zain (Representative from Malaysia)		
15:00 – 16:00	General Discussions and Conclusion			
16:00 – 16:30	Coffee Break			
16:30 – 16.45	**ATT&T Action Plans beyond 2006**			

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Thursday, September 21st , 2006 Field Trip and Closing Ceremony				
Date	**Program**	**Speaker**	**Moderator**	**Venue**
08:00 – 16:00	Visit Existing Networking Systems in the Agribusiness Private Enterprises			**PT SARI MAKMUR**
	Closing Ceremony	**Dr. Ato Suprapto** Director General of the Indonesian Agency for Agricultural Human Resources Development (IAAHRD)		**Sibayak Hotel, Berastagi**

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KEYNOTE ADDRESS

By Dr. Achmad Suryana
The Director General of The Indonesian Agency
for Agricultural Research and Development
The Ministry of Agriculture of The Republic of Indonesia

Bapak Gubernur Sumatera Utara,

Mr. Nobuto Watanabe, Representative of the Ministry of Agriculture, Forestry and

Fisheries – Japan,

Distinguished Resource Persons and Participants,

Ladies and Gentlemen,

Assalaamu'alaikum Warrahmatulloohi Wabarrakaatuh,

First off all, please allow me on behalf of the Steering Committee, to say HORAS. It is a local dialect of Bataknese people means greeting and warm welcome in Medan, the third biggest city of Indonesia located in the northwestern part. I would like also to express my deep gratitude and sincere thanks for your attendance and participation in the Opening Ceremony of the Workshop on Utilization of Agricultural Technology Transfer and Training Networking System.

Since the first ATT&T seminar in Yogyakarta in 2001, this is the third time for me to have a great honor and opportunity to stay before all of you. As possibly we remember, this is the sixth gathering of the APEC member economies to discuss many topics related to the problems encountered by each of us in increasing production of agriculture commodities to meet the world population's ever-increased demands and at the same time increasing farmers' income and welfare. We do believe that essentially, we have discussed deeply and thoroughly the topics then came up with concise strategies formulation for achieving appropriate farmers' income, and promoting farmers' self-reliance, particularly through assessing applicable technology from our own APEC networking.

Ladies and Gentlemen,

This Workshop attempts to address all of the recommendations of the last year Workshop, namely: (i) Establishing networking systems includes farmers' involvement, (ii) Managing networking includes farmers' participation, (iii) Capacity building for farmers organization and (iv) Farmers to farmers training.

In relation to this, obviously, it is noteworthy to observe that the focus of the first last three seminars were simply discussion on the application of the technologies. While began with the training workshop in Bandung in 2004, those focus gradually decreased and during this workshop will concentrate fully on training where farmers would dominate to participate in this activities and get direct benefit from making the APEC member economies' technologies accessible to the farmers that need those technologies.

The ATT&T method is shifting from seminar or workshop to training in order to satisfy farmers' thirsty on appropriate technologies. This includes exchange visits, apprenticeship and interactive discussion and intensive communication via networking and our own ATT&T website. I hope that through this efforts APEC member economies activities beyond ATT&T will be sustainable for the purpose of our farmers' welfare.

In this occasion let me congratulate all of the farmers who are attending now and willing to be more actively participate in this workshop. The Organizing Committee has provide time on Wednesday especially for farmers to farmers training where you can discuss everything from appropriate technologies, farmers organization and even deal business with your farmers colleague from other APEC member economies. I am sure that the future of the ATT&T activities beyond 2006 is really on your hand.

Distinguished Participants
Ladies and Gentlemen,

As I mentioned in the last year opening ceremony, the government of Indonesia have launched the blue print for the **revitalization of agriculture**, **including fisheries and forestry**. The concept is essentially embodied in the broad objectives of empowering the farm economy and rural communities through the development of rural and farm infrastructure.

As the primary objective of the blueprint is to empower farmers, the focus should be on farmers' income. Farmers therefore need to shift to higher-value crops

such as horticulture and other cash/industrial crops, fisheries and livestock, but these farming concepts require inter-ministerial cooperation to develop infrastructure, marketing and processing facilities, cooperatives, farmer organizations and other instruments of trade facilitation. Consequently developing net-working, either by strengthening linkages among farmers organization, supplier as well as producer and buyer with government and non-government institutions or by developing supply-chain management is a must.

In this context, IAARD has started the program called Prima Tani. The main aims of the program are mobilizing resources and promoting agribusiness, and disseminating the technologies by providing more information closer to the farm. The preliminary results are encouraging. In one of our research location, we trained hundreds of farmers on how to get access to information using internet. Their responses were quite positive, and now they always "surfing" relevant website in order to get technology information they need. This is really in line with and justifies the objectives of the workshop. Therefore, this workshop is very important for us.

Distinguished Participants
Ladies and Gentlemen,

As usual and it seems obligatory for the OC to combine class discussion with field visits in order to have real picture of farming systems and surrounding socio-economic condition. It is my pleasure to tell you that in order to complement the technical and scientific discussions; you will visit several field of high-value agriculture commodities that utilize electronic networking systems for marketing. The participants will have more opportunity to observe how the Indonesian farmers' utilized information technology and networking in expanding their farm business. I do hope that you could optimize this opportunity to explore possibility to get business partners within APEC member economies.

Ladies and Gentlemen,

Please allow me to thanks Mr. Cho, Chae-ho, The ATCWG Lead Shepherd and Mr. Nobuto Watanabe Section Chief for Project Planning, International Cooperation Division International Affairs Department, Minister's Secretariat Ministry of Agriculture Forestry and Fisheries, Japan, APEC Secretariat, Mr. Rudolf Pardede, Governor of Sumatera Utara and the Organizing Committee for close cooperation in supporting this seminar.

Finally, in this opportunity I would like also say on behalf of the Organizing Committee, please accept our apologies for any inconveniences that might arise

during your stay in Indonesia. It is our pleasure and proud to have you here with us and hope all participants will enjoy the discussion, exchange of information and experiences as well as observation of farmers' activities and obtain fruitful results from the Workshop. I further wish that all of you would have a pleasant and memorable stay in this popular tourist and culturally rich city of Medan in particular and in Indonesia in general. It is my fervent hope that your attendance and active participation in the ensuing discussions will greatly contribute to the achievements of the objectives of the Workshop.

Thank you.
Director-General of IAARD
Dr. Achmad Suryana

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KEYNOTE ADDRESS

By

Mr. Nobuto Watanabe

Section Chief for Project Planning,
International Cooperation Division, International Affairs Department,
Minister's Secretariat,
Ministry of Agriculture, Forestry & Fisheries of Japan

Honorable Governor of North Sumatra,

Honorable DG of the IAARD,

Distinguished Guests,

Fellow Participants,

Ladies and Gentlemen,

I am very honoured to represent the Ministry of Agriculture, Forestry and Fisheries of Japan at this workshop and to exchange views with distinguished participants from Asia and Pacific economies.

First of all, my sympathies are with the calamity victims in Sumatra and Java as well as in the other Indonesian regions and neighbouring countries in recent years. I pay my sincere respects to the **honourable governor of North Sumatra** and his effort to rehabilitate the home island and its economy.

I would also like to express my sincere gratitude to the Indonesian Government and the provincial government of North Sumatra as well as to the Indonesian Agency for Agricultural Research and Development, **Dr. Achmad Suryana**, **Dr. Haryono** and many other people working at this Agency for their preparation to hold this workshop.

Ladies and Gentlemen,

We are facing with difficulties for improving of farm income and farmer's working conditions today because the competition is growing increasingly serious in the world's trade conditions.

Manifested as an accelerating flow of people, goods, money, and information across

national borders, "**Globalization**" is dramatically changing the international economy. With the international division of labour becoming increasingly common, emerging markets have attracted attention as new production sites and consumption markets as well as investment targets. In this context, the links between developed and developing countries are needed growing increasingly further strong.

On the other hand, **Food shortages** and **destruction of the environment** are a part of a wide range of fears concerning the effects of the steady growth of the world population. If the economic growth of developing countries does not keep up with their population growth due to stagnating productivity, it is expected that the levels of poverty will increase. In developed countries, the population will eventually begin to decrease, and this will result in serious problems relating to the aging of population. The global environmental problems directly affect each of us through the deteriorating situation of the water, the air, and the entire ecosystem.

In such situation, we should keep in mind that nothing has changed about the fact that "**food**" is **the most fundamental requirement for life** even in the 21st century and **various types of agriculture should coexist together in the world**. Now, how can we keep or increase our food production and its availability according to the farming conditions in respective member economies in the present world's situation?

Ladies and Gentlemen,

I would like to promote **the active service for the extension of improved farming techniques by administrative organisation** in respective APEC member economies.

Increasing food production and availability should be secured through the technological innovations in agriculture. Moreover, technological innovation in agriculture should be kept continuously and it should be also transferred to the users continuously. Therefore, improving farmer's technical and managerial ability is considered to be high priorities in many of APEC member economies today.

However, if a farmer tries to develop a new technique alone to apply it to his farm management, there is obviously a limitation. The farmers need the research institutes to develop new techniques and also need the administrative organisations for organising and involving farmers into the training or information system for technical transfer and production of value-added agricultural products in utilising transferred techniques. I expect that the administrative organisations take good initiative through the extension service not only in promoting local agriculture and community, but also developing the high-value producing areas in respective APEC member economies.

The administrative organisations usually play an important role in selecting the useful techniques at the first step of extension process. I believe that the definition of useful

techniques is user-friendly techniques that meet farmers' needs against the present conditions for production and sales.

In this workshop, we will exchange our own experience and immediate information in our real practices in respective economies and discuss mainly following three subjects, namely:

(1) The networking system aspect of the experiences in using the ATT&T Networking System
(2) The farmers access to information through the ATT&T Networking System, and
(3) The training aspects of how to develop and manage web-site in providing knowledge of technology and skills for users and operators via the ATT&T Networking System

This is because these problems are present in our extension service through the ATT&T Networking System in respective economies. I look forward to hearing your ideas in this workshop.

Ladies and Gentlemen,

Finally, I sincerely hope that our experience and expertise to be exchanged at this workshop will help our efforts to improve farm income and farmers' working conditions in respective mother countries.
I believe that activities of the Agricultural Technical Cooperation Working Group are indispensable for the future agriculture in Asia and Pacific economies.

Thank you for your attention. I am delighted to have been asked to speak here today.

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OPENING REMARK

By

North Sumatera Governor

All Delegates of the APEC Member Economies

Dr. Achmad Suryana, Director General of Indonesian Agencies of Agricultural Research and Development

Ladies and Gentlemen,

First please allow me to express my appreciation and sincere thanks to the *Steering Committee* of the workshop that have chosen Medan as a place to conduct **Workshop on Utilization of Agricultural Technology Transfer and Training Networking System**. It is really a great honor for the people of the province of North Sumatera. Thank you very much and welcome to all the member economies participants from USA, Japan, Korea, Thailand, China Taipe, People Republic of China, Malaysia and Indonesia for your attendance and participation in this opening ceremony of the workshop.

Ladies and Gentlement,

This workshop is quite important for us since agriculture plays important role in the life of the people. For the example: statistic data of the province on North Sumatera show that 76.96% of employment in the rural area, which comprise 61.90% of the total area, is provided by agriculture and even in the urban area 13.87% of employment is in agriculture activities. Those farmers are variedly enggaged in small traditional rice farming up to estate crop production of cashew nuts and coconut were mainly produced by small holders, and nearly to 50-90% of rubber produced by small holders, to 5-36% produces by private estate plantation, and the rest 5-14% produced by state owned plantation. In North Sumatera 46% cacao produced by state owned plantation, 34% by small holders and 20% by private plantation.

The other important estate crop production is oil palm where nearly all private plantations specialize in oil palm agribussiness. Since 1990, in North Sumatera volume of production of *smallhorder's* oil palm surpassed volume of all other *smallhorders* estate crops. Vegetables and fruit farming are also important in the province particularly in Brastagi, where we will visit. All of the commodities not only being used domestically but also exported. For this reason, some of the big farming is heaveily utilized networks.

Either in the form of the partnership will small farmers or use of information technology to keep in touch with the consumer abroad. Therefore, we welcome the workshop. We believe that farmers in North Sumetera as well as in Indonesia and in APEC member economies in general will appreciated, honor and try to accep the result of the workshop for their own benefit.

Regarding this matter let me congratulate all of the farmers who are attending now and willing to be more actively participate, collaborate, and even deal bussiness with your farmers colleague from other APEC member economies.

Distiguished Participants

Ladies and Gentlement,

Medan is not only capital of the North Sumatera province, but is well known as "The City that Culturally Rich and Abundance with historical old Building". Here in the city, you should visit Maimoon Palace, Historical Mosque and the third biggest city is a bustling, fascinating, modern and glamorous atmosphere. In this opportunity as a host, we also invite you to see beatiful scenery of Toba lake, Brastagi, and to watch Melayu and Tortor dances. Please enjoy your stay in Medan and its surroundings. Finally I declare this workshop officially open.

Thank you.

North Sumatera Governor

ACION PLAN 2007 – 2008

The previous seminar and workshops on the ATT&T Networking Systems underline the important of capacity building and farmers to farmers training. Consequently, it is the time to organize and to conduct series of training on appropriate APEC developed agricultural technology and agribusiness that have been proven able to increase income and self-reliance of the farmers. The propose training will be started in 2007 in order to achieve the following purposes:

1. To create awareness of the existence of indigenous local technologies among APEC member economies and to build farmers motivation to actively search, inform, adapt, use and exchange those technologies.
2. To exchange and transfers the recent appropriate agricultural technology and agribusiness, which are developed by APEC member economies, and its implementation among member economies to uplift the knowledge and skill of farmers in accelerating of achieving the ultimate goal of increasing farmers' income and self-reliance.
3. To sustain APEC activities beyond the 2006 ATT&T workshop via strengthening the role of farmers in organizing joint activity of establishing and managing website and possibility of self-funded APEC farmers meeting and exchange visits.
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Referring to those targets, the action plan for 2007-2008 could be:

1. Disseminate the results of the workshop to all stakeholders and interested parties of each APEC member economies.
2. Establishing networking includes farmers' involvement in utilizing networking system such as mobile phone and internet depend upon the needs and the availibility of the communication system on the area where the farmers are doing their activities
3. Sustaining the networking system among APEC member's economic esspecially farmers
4. Initiate farmers to farmers training through exchange visits to increase knowledge, skill and capacity building of the farmers.

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CLOSING REMARK

By
Director General, The Agency of Agricultural Human Resource
Development
The Ministry of Agriculture of The Republic of Indonesia

Distinguished participants, Ladies and gentlemen,

First of all, please allow me to thank Allah SWT for His blessings by which we can have this   Workshop on Utilization of Agricultural Technology Transfer and Training Networking Systems. After 3 days of intensive discussion and training, and one day field visit, finally we have come to the end of this important event. It is a great honor and pleasure that Indonesia again has been selected six time for being the Organizing Committee of the ATT&T Workshop.

We have spent 4 days to fulfill all of the requirements of the Workshop. We have started with a one-day Seminar on e-commerce where we could learn and share experience on how this animal could spur agrobusiness either in a develop country as USA or in a developing country like Indonesia. After that, we used 2 days for training on developing and managing electronic networking in which we learned how to build, to manage and to utilize and to solve problem faced on using the systems. And then we spent one day on the farmers forum where we can share exoperiences and teach each other and even explored the possibility to arrange agrobusiness and its marketing. I do hope that all participants got fruitfull knowledge and skill on those matter, and disseminate to our farmers colleague within APEC member economies. Fiinally we come up with the recommendation to be discussed further, hopely in the next gathering in the year of 2007.

Ladies and gentlemen,

Of course, to evaluate whether the Seminar has successed to achieve the target we should compare it with the foreseeable target mentioned in the proposal as: First, Farmers will have more accessible to information than before. Second, ATT&T Networking System established soon, and third the role of farmers including women on managing website will increase and sustainability activities of APEC member economies occurred.

I am sure that all of us have worked hard to achieve those target by discussing and learning intensively related invited 4 training manuals.   Several farmers activities that supported the topics being discussed have been visited and we agreed that intensive discussions during the Workshop have remarkable enriched the content of the papers and I am sure that we have gained fruitful result from the   Workshop and have successfully taken another one step closer to the ultimate goal of "increasing farmers' income and self- reliance"

Ladies and gentlemen,

From the benefit of the first five seminar/workshops, and this workshop, we found out that experiences, methods and strategies on how to utilize e-commerce in promoting agribusiness in the village and how to reduce the distance between farmers and consumers, understanding technological transfer and training aspect on how to make efficient network, how to develop and to manage ATT&T networking systems that appropriate locally, nationally and globally and useful for farmers to cope with the impact of the globalization on agriculture businesses should be shared and examined deeply among farmers' leaders, researchers and extension personnel of the APEC member economies.

     We do hope and we propose that this lessons learned' will be followed-up by each participant to disseminate all of the knowledge, skill and shared experiences get from the Workshop.

     Alhamdulillah, we have agreed that the propose objectives for the next gathering are:
1. To create awareness of the existence of indigenous local technologies among APEC member economies and to build farmers motivation to actively search, inform, adapt, use and exchange those technologies.
2. To exchange and transfers the recent appropriate agricultural technology and agribusiness, which are developed by APEC member economies, and its implementation among member economies to uplift the knowledge and skill of farmers in   accelerating of achieving the ultimate goal of increasing farmers' income and self-reliance.
3. To sustain APEC activities beyond the 2006 ATT&T workshop via strengthening the role of farmers in organizing joint activity of establishing and managing website and possibility of self-funded APEC farmers meeting and exhange visits.

Ladies and gentlemen,

Finally, I gratefully appreciate all of you for actively participating, sharing experience and contributing your brilliant ideas during the Workshop particularly to the farmers who was being active on farmers to farmers training and come up with the action plan for the future. Without your support, the Workshop will not be a success. Let me congratulate also the Organizing Committe for successfully organizing this Workshop. On behalf of the Steering Committee, I officially declare the Workshop closed.

Thank you and we hope that we could get together again next year in the other occasion, what ever the event name of the APEC member economies.

Director General

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A Brief Essay of Issues Related to E-commerce, the Internet and Developing Countries

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Introduction

Some have speculated that the industrial age is coming to a close and that a new age is dawning. This new age of economic development is referred to as the digital age and has, as its backbone, e-commerce. E-commerce represents a new way of transacting between sellers and buyers. By utilizing information and communication technologies (ICT), transaction costs between buyers and sellers can be greatly reduced. However, the form and nature of those technologies are still under development. Some applications of information and communication technology have been helpful, while others have failed miserably. Through the crash of "dot com" enterprises the world learned more about what applications were relevant to the digital age and what applications could not reduce transaction costs. In general, with the advent of the Internet huge advantages in efficiency are possible although numerous obstacles still exist. This paper briefly highlights some general issues related to the development of e-commerce in the U.S. However, the paper will also highlight some of the potential pitfalls and put forth a general strategy that utilizes an existing infrastructure that is much different than the infrastructure that exists in developed countries. It is the author's hope that this paper might stimulate discussions that could ultimately lead developing countries to capitalize on ICTs and to begin a process of innovation that could lead to reduced transaction costs and enhanced economic efficiency.

A. Definitions and notions

In the United States the commerce has reached a point where virtually any commodity can be purchased by virtually anyone in the United States. The only exceptions to this are very specialized products whose owners do not have access to the Internet. A person with Internet access in America can purchase any good with only a few minutes of searching

on the web. In other words, a person, sitting in his own home and wishing to make any purchase, needs only to turn on his computer, search the web and within moments can place an order for that good to be delivered to his home. A personal computer in America represents a portal through which he or she can purchase any good or commodity of his or her choosing. Never before in the history of the world has it been possible to make transactions as quickly and effortlessly as it is in developed countries where Internet access abounds and where financial institutions are equipped to make secure financial transfers.

When commercial transactions are facilitated between willing buyers and existing sellers, then transaction costs are lowered and efficiency is enhanced. There are at least two ways in which efficiency is enhanced through the Internet.   First, through the Internet sellers who have products that need to go to market cannot only advertise but can also devise means and mechanisms by which seeking buyers can purchase directly from them. For instance, on two occasions when I have had to purchase a personal computer, I simply went to the website of the manufacture of my choice. On the website, I could purchase a computer that was ready-made or I could purchase one that had special features that would take a weak longer. After making the choice, I provided my credit card number and elected to have the computer delivered by parcel post to my door. Within minutes of turning on my computer, getting on the web, looking through their web site, making some selections, I had ordered a personal computer to be delivered to my door. This sort of scenario happens a million times a day in developed countries. Thus, the Internet is now a powerful tool in the hands of everyday consumers to purchase within minutes any commodity of their choosing directly from the manufacturer.

Secondly, through the Internet a market environment can be created by which multiple sellers can meet multiple buyers and pass messages to one another in such a way that real time matches between sellers and buyers can be made such that both buyer and seller mutually benefit. In essence the Internet has created an open cry auction environment in a way that literally, encompasses the entire globe. Not only can any individual buy any good on the Internet, it is also true that any individual can sell any good on the Internet. The website called Ebay has created an environment where anyone with a commodity to sell can post the commodity along with many other individuals who are trying to sell the same type of commodity. In this way, high levels of market efficiency can be obtained because multiple sellers and buyers can congregate in the same location in cyberspace.

Using the Internet as a means to conduct commercial transactions is only the narrowest view of e-commerce. A broader view of e-commerce includes the provision of all sorts of business information through the Internet. Web sites are now designed and created by businesses to promote products, announce prices, provide product support and customer service. Because business activity is not limited only to transactions, the Internet is a tool that is used for more than just transactions. Information that is readily available on the Internet used to costs thousands, even millions, of dollars to obtain by an individual from the previous generation. For instance, product information from France, America and China can be readily compared. With proper product information the appropriate supplier can be identified and a business relationship can begin through email correspondence. In

the past the search for business partners was a complicated search procedure that involved extensive networking. With the Internet the search process can be greatly simplified and suitable business partners can be identified at a fraction of the costs that was required in previous generations.

B. Facts about US e-commerce

E-commerce in the United States greatly depends on the availability of Internet services. E-commerce has made noteworthy gains in recent years as U.S. Internet service has expanded in reach, increased in quality, and lowered in price. Indeed, the rapid increase of household usage of Internet services represents a fundamental social shift that makes the growth of e-commerce possible in the U.S. Figure 1 shows the exponential growth of household Internet use. The trend shows no signs of reversing in the near future. Clearly, in a society where using the Internet is as common as reading the newspaper, the prospects are very good that e-commerce will continue to grow.
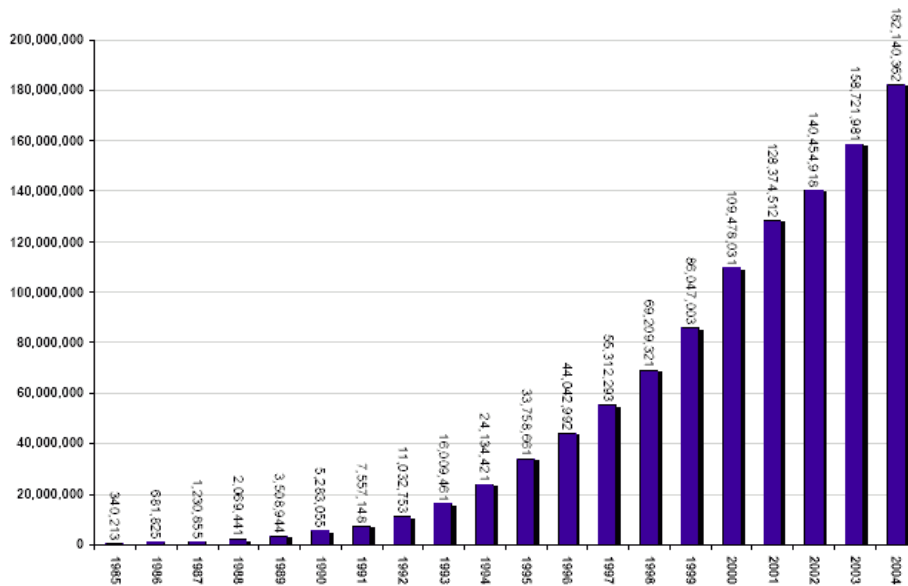
Figure 1. Household Internet use in the U.S. (taken from the CTIA survey report)

C. Experience in US agriculture

The trend of increased Internet use in the U.S. is also apparent in the agricultural sector. Although rural areas were among the last regions to obtain reliable Internet service, the extensive range of Internet services into even remote areas is allowing farmers to access the Internet as well. Table one shows that farmers in the United States have made rapid advances in Internet use. By the year 2001 nearly half of farmers in the United States had access to the Internet. Currently, the proportion is much higher.

Table 1. Internet access in rural U.S.

	1997	1999	2001
Farm households with Internet access	13%	29%	43%

Source: McFarlane, et al. (2003) and Henderson, et al. (2000)

Within the agricultural sector in the U.S., the growth of e-commerce has resulted in strengthening relationships in the supply chain. It does not appear that existing supplier relationships have been disturbed by the growth of the Internet. Rather than creating increased competition among farmers, e-commerce has instead increased competition among supply chains. That is, it may be the case that the existing relationships in the supply chain now compete with another set of existing relationships in the supply chain in a way that has not happened before (Leroux, et al. (2001)).

D. Limitations and weaknesses

E-commerce in America did not have a smooth start, nor did the growth of e-commerce experience a smooth upward trend. Rather, e-commerce experienced various fits and starts that exposed the limitations and weaknesses of conducting commercial transactions using the Internet. One of the early limitations of e-commerce was the absence of a formal legal framework by which claims of fraud could be prosecuted. Without clear laws dictating who is liable for a breach in a contractual agreement established via the Internet, it was impossible to stimulate public confidence in the use of e-commerce as a normal way of conducting business. Gradually, the necessary legal framework began to emerge in the U.S. and proper liabilities were assigned when fraudulent activity occurred. Now, very specific laws dictate various aspects of conducting commercial transactions by the Internet. In addition, an effective legal system is available to process nearly all allegations of fraudulent activity.

In addition to a legal framework, it was necessary also for the U.S. to develop new perceptions regarding the purchase a products. The traditional view of purchasing products involved traveling to a retail outlet, making the transaction with an acceptable financial instrument and then bringing the product home. The notion of buying a product that is not first examined represented an obstacle for many consumers in the U.S. In addition, the notion of going to a computer to make a purchase instead of going to your car to make a purchase was similarly an obstacle for many consumers. The transition to e-commerce in the U.S. has been made a bit smoother because U.S. consumers had already experienced transactions by phone. Using a product catalog, telephone orders can be made by the consumer with the seller, who would ship the product directly to the consumer's home. Nevertheless, using a keyboard to make a transaction is much different than using a telephone to make a transaction. Unlike in developing countries, U.S. consumers have grown accustomed to multiple methods of making purchases, which assists the effort of exposing U.S. consumers to e-commerce. Nevertheless, purchasing notions embodied in e-commerce are not readily embraced by U.S. consumers. Rather, a shift in perception about purchasing products is necessary if U.S. consumers are to

transition into more and more e-commerce. Transacting over the Internet requires perceptions that take time to develop.

E. Information and communication technology (ICT)

A closer examination of e-commerce reveals two fundamental elements, including information and communication. The Internet provides advanced technologies of both information and communication. Business information is available on the web. Communication is possible through the web. Bringing those two elements together-information and communication, the Internet has made it possible for transactions to occur. However, the Internet is not the only way to utilize information and communication technologies. ICT is the more general notion that encompasses the Internet as only one specific technology.

It is possible for the growth of ICT to take many paths of development. In the U.S. the Internet has emerged as the primary technology of ICT. A vast telecommunications system that utilizes an extensive cable network made it possible for the Internet to emerge as the primary application of ICT in the U.S. Later, as the demand for Internet services increased, usage of the Internet depended on the pre-existing cable networks of entertainment providers, specifically cable television, who could provide users with broadband Internet. Because of the cable infrastructures in the U.S., provided first by the telecommunications industry and then by cable television providers, Internet use has now become a fundamental part of life in America. In other words, the cable infrastructure made it possible for the U.S. to manifest the shift toward widespread Internet use.

How might ICT develop in developing countries where there is not a preexisting cable infrastructure? Is it necessary for developing countries to make heavy investments in the cable infrastructure so that Internet services can be made available to the entire population at low cost? Is there existing communication infrastructure that might provide both information and communication in a way that can make commercial transactions possible? What should we call such transactions? Should we call it e-commerce? Or should we call it ICT-commerce?

In most developing countries it is far less expensive to construct towers of cellular service than it is to lay cable for telecommunications. Consequently, even in some of the poorest cities of the world cellular service is available. In fact, remote rural areas often have fairly reliable cellular service. Because the preexisting infrastructure consists of a network of cellular towers and not a network of telecommunications cable, ICT in developing countries will develop in a different way than what happened in the U.S. In particular, ICT in developing countries should utilize wireless, not cable, infrastructures.

F. ICT in Indonesia

The situation in Indonesia is worth considering. In Indonesia only a fraction of the population has access to Internet services. The underlying infrastructure in Indonesia

does not adequately support the growth of Internet use. Telephone lines service only a portion of the total population. Cable-based entertainment providers are also rare and exist only in urban areas. So, a cable infrastructure that can support widespread Internet use does not exist in Indonesia. It is not surprising then, that Internet use in Indonesia is low[1] and that e-commerce in Indonesia is virtually nonexistent.

Suppose Internet access was widely available in Indonesia. In order to enable the development of e-commerce a legal framework needs to be constructed to secure the rights of both buyers and sellers. Without clarity about prosecutable contract breaches, legislation that dictates commercial transactions via the Internet, and the enforcement of relevant legislation, e-commerce in Indonesia will never develop significantly. The possibility of cyberfraud will scare people away from e-commerce. Consequently, because of the absence of both a cable infrastructure and an appropriate body of laws, Internet-based commercial transactions, i.e. e-commerce, cannot develop in any meaningful way.

Although a cable infrastructure does not exist in Indonesia, a cellular infrastructure does. Hand phone use is widespread in Indonesia. Multiple providers of cellular service compete for market share in Indonesia. Telkomsel, as the nation's largest provider of cellular services, provides service into nearly every location in Indonesia. Because cellular services can also provide both information and communication, it is possible for transactions to be facilitated through the existing infrastructure in Indonesia. By developing the appropriate ICT applications it is possible to facilitate ICT-commerce in Indonesia.

REI-Indonesia has developed an ICT application that utilizes a GSM modem to send and receive text messages as a means for buyers and sellers to communicate with one another, using the existing infrastructure. Although still in its infancy, the technology has already produced enhanced revenues for participating farmers. REI-Indonesia expects that several more years of development are necessary before an application is ready for widespread deployment that would result in community-wide efficiency improvements. It is the author's hope that such applications might prepare the way for more sophisticated applications of ICT-commerce. Only as developing countries experiment with ICT and innovate new applications of ICT-commerce, which utilize the existing wireless communication infrastructure, can they hope to keep pace with the global move into the digital age.

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[1] As of the year 2002, household internet use in Indonesia reached only one million, representing about 0.5% of the population (see "Suram, Pertumbuhan Internet Indonesia 2003" by Donny B.U.). Although that statistic has undoubtedly risen, it remains a very low number compared to neighboring countries.

Bibliography

Abate, Gretachew and Colletta Moser; <u>E-commerce and Internet use in small businesses: trends and issues</u>. Staff Paper 2003-04. Michigan State University. January 2003.

Bourgeois, Robin, ed.; <u>A Preliminary Assessment of the Potential Role of Information and Communication Technology in Support of Poverty Alleviation Policies for Rural Populations</u>, AGRI-ICT Project Report, UNESCAP-CAPSA, Centre for Alleviation of Poverty through Secondary Crops' Development in Asia and the Pacific, 2003

Chowdhury, Nuimuddin; "Information and Communication Technologies" in <u>Appropriate Technology for Sustainable Food Security.</u> International Food Policy Research Institute. Washington, D.C. August 2001.

"Digital Divide Gombal!" by Donny B.U., in <u>Djakarta!</u>, April 2004

Henderson, Jason; Frank Dooley and Jay Akridge; "Adoption of e-commerce strategies for agribusiness firms". Selected paper at the American Agricultural Economics Association Annual Meeting, July 30-August 1, 2000.

Leroux, Nicole, Max S. Wortman Jr. and Eric D. Mathias; "Dominant factors impacting the development of business-to-business (B2B) e-commerce in agriculture". <u>International Food and Agribusiness Management Review</u>. Vol. 4, 2001, pp. 205-218

McFarlane, Dionne, Duncan Chembezi and Joseph Befecadu; "Internet adoption and use of e-commerce strategies by agribusiness firms in Alabama". Selected paper at the Southern Agricultural Economics Association Annual Meeting, February 1-5, 2003.

Reiner Doluschitz, Markus Emmel, Fabian Kaiser, Jens Pape and Michael Roth; "The emerging role of e-agribusiness- state of the art and perspectives in Germany". 15th Congress: Developing Entrepreneurship Abilities to Feed the World in a Sustainable Way. August 2005.

"Suram, Pertumbuhan Internet Indonesia 2003" by Donny B.U. , in <u>Kompas,</u> 16 January 2003

Wheatley, W. Parker, Brian Buhr and Dennis DiPietre; <u>E-commerce in Agriculture: Development, Strategy, and Market Implications</u>. Staff Paper Series. Dept of Applied Economics, University of Minnesota, July 2001

World Bank and infoDev; <u>The Network Revolution and the Developing World</u>, Analysys Report # 00-216, 17 August 2000

E-commerce: Strengths, Obstacles and a Solution for Developing Countries

A brief presentation

Definitions

- E-commerce – commercial transactions conducted via the Internet

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Definitions

- E-commerce – commercial transactions conducted via the Internet
- Information technology – ways and means to disseminate and process information
- Communication technology – ways and means to send and receive messages
- The Internet – a collection of servers throughout the world that allows rapid messaging and information processing

Reducing transactions costs with the Internet

- Providing powerful information and communication technology

Reducing transactions costs with the Internet

- Providing powerful information and communication technology
- Facilitating the search and purchase of goods by consumers

Reducing transactions costs with the Internet

- Providing powerful information and communication technology

- Facilitating the search and purchase of goods by consumers

- Facilitating the emergence of new markets by bringing together multiple buyers and multiple sellers

Business information on the Web

- E-commerce relies on massive amounts of business information

Business information on the Web

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- Businesses use the Internet to service customers with information

Business information on the Web

- E-commerce relies on massive amounts of business information

- Businesses use the Internet to service customers with information

- Like: product promotion, announcing prices, product support, customer service

The US experience

- Exponential growth of household Internet use
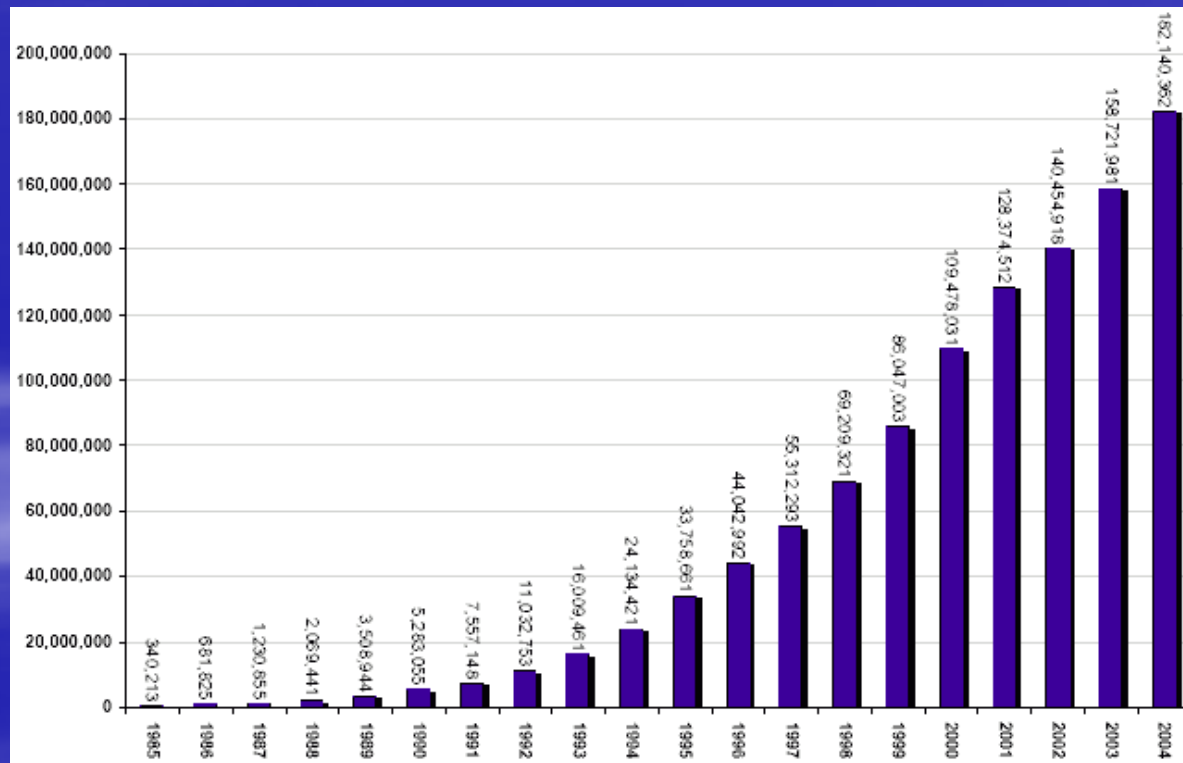
Experience in Rural US

- Delayed growth but catching up
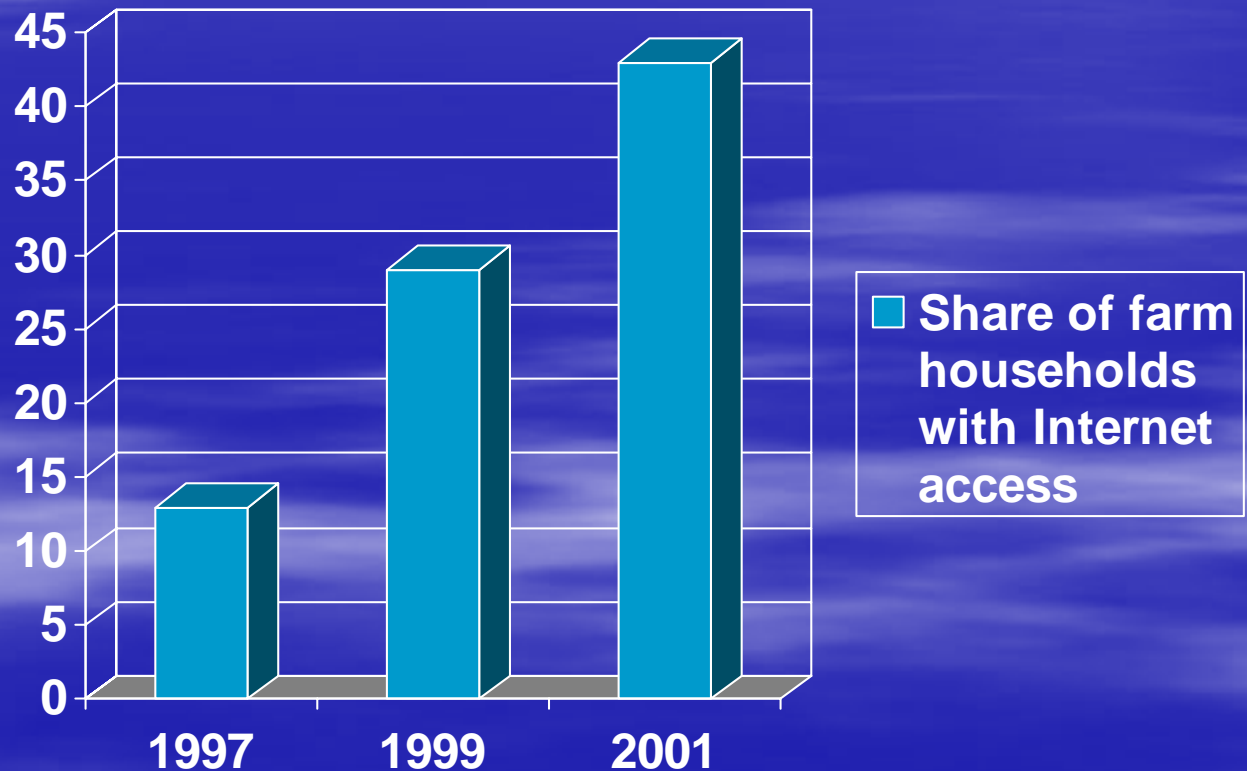
Share of farm households with Internet access

What fueled the growth?

- Early growth utilized pre-existing telecommunications cable network

What fueled the growth?

- Early growth utilized pre-existing telecommunications cable network
- Subsequent growth utilized infrastructure of cable entertainment providers

What fueled the growth?

- Early growth utilized pre-existing telecommunications cable network
- Subsequent growth utilized infrastructure of cable entertainment providers

- Conclusion: A vast cable infrastructure made widespread Internet use possible.

Implications for E-commerce

- Without widespread Internet use, a conducive environment for the growth of e-commerce may not exist

- An appropriate legal framework must also develop so that both buyers' and sellers' rights are protected

- Conclusion: E-commerce must be both feasible and appealing

ICT in developing countries

- Internet use is very low – an extensive cable infrastructure does not exist

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- Use of cellular service is very high – the construction of cellular towers is a low cost alternative to a cable infrastructure

ICT in developing countries

- Internet use is very low – an extensive cable infrastructure does not exist
- Use of cellular service is very high – the construction of cellular towers is a low cost alternative to a cable infrastructure

- Conclusion: Developing countries must create appropriate ICTs that utilize wireless communication

ICT in Indonesia

- Telkomsel provides cellular service in nearly every location in Indonesia

ICT in Indonesia

- Telkomsel provides cellular service in nearly every location in Indonesia
- High quality telephone cables in rural areas not common

ICT in Indonesia

- Telkomsel provides cellular service in nearly every location in Indonesia
- High quality telephone cables in rural areas not common

- Conclusion: Appropriate ICT will use the inexpensive wireless infrastructure

ICT in Indonesia

- Using existing *information technology*, we in Indonesia can reduce <u>transactions costs</u>.

ICT in Indonesia

- Using existing *information technology*, we in Indonesia can reduce <u>transactions costs</u>.

- Using existing *communication technology*, we in Indonesia can reduce <u>transactions costs</u>.

Conclusion

ICT-commerce can be made technically feasible in Indonesia right now!

REI-Indonesia

- The "SMS Gateway for Agriculture" is an attempt by REI-Indonesia to develop ICT-commerce to benefit farmers

- "Mobile Fresh" is the brand name of a service that markets fresh vegetables for local farmers

SMS Gateway for Agriculture

Marketing Channel

Farmer Empowerment

Mobile Fresh

Information Technology

Business Process

Challenges and Constraints
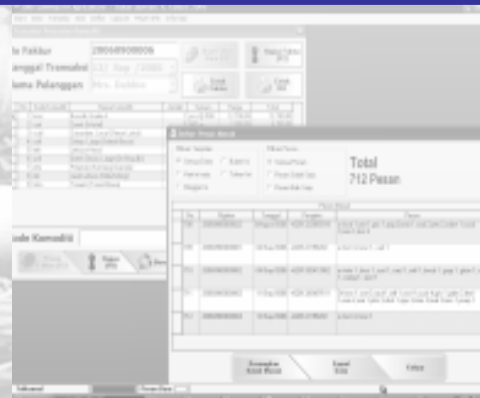
Marketing Channel

Farmer Benefits

Customer Benefits

Teknologi Informasi

SMS Gateway for Ag Marketing Software

Utilization of Cellular System

Farmer Empowerment

1. Strengthening nstitutions

2. Providing technology

3. Providing market access

Business Process

Farmers → ← **Mobile Fresh** → ← **Customers**

Farmers	Mobile Fresh	Customers
1. Registration	1. Conduct registration of farmers and customers	1. Registration
2. Filling orders according to quality standards	2. Process customer orders	2. Customers submit orders
3. Delivery to MF	3. Receive orders and make payment to farmers	3. Receive the goods and make payment to MF
4. Immediate payment	4. Deliver orders to customers	
	5. Receive payment from customers	

Delivery Vehicle

Appropriate design features

Marketing service area

Challenges and Constraints

Farmer challenges and constraints

Market challenges

Map of Bandung
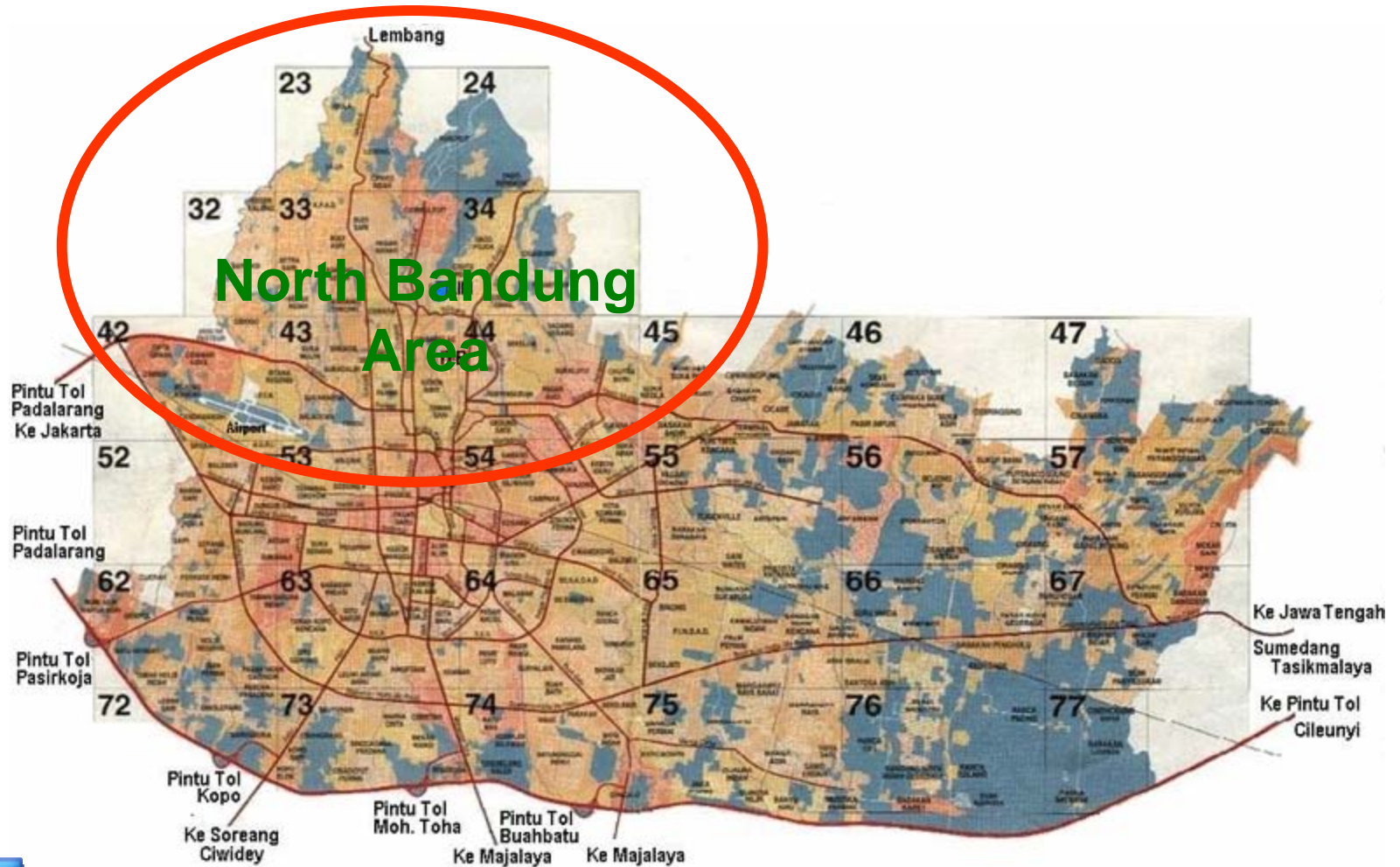
Delivery Vehicle

Specifications:

Honda Mega Pro 160cc

Box Dimension : 62x55x57cm

Volume : 0,19 m3

Weight Capacity : 40 kg

Commodity Samples

Utilization of Cellular System

- Represents a familiar type of communication technology

- Creates convenience for the purchase of fresh vegetables

- Orders can be place any time and from any place

- Ordering is nearly free (only the cost of a text message)

Eat your vegetables ...

use your phone ...

SMS Gateway for Agriculture Software

(c) 2005 By RADEMAR Comp.,

Quality Standards

- Size, physical features and quality must conform to information communicated to customers.

- Proper packaging to protect the commodity

- By reducing the time required for marketing, freshness is maintained

- Customers can return goods that do not conform to their quality expectations.

INVOICE

Mobile Fresh
Jl. Cihampelas 212B
Bandung
SMS Gateway Number: **081 220 380 50**
Customer Service Number: **081 220 451 45**

Invoice Date : 12/Sep/2006

Sold To : Mrs. Debbie
Jl. Ranca Bentang No. 70
Ciumbuleuit - Bandung

Customer PO	Payment Terms	Due Date
20060900006	Cash	12/Sep/2006

Quantity	Code	Comodity	Unit Price	Extension
1	broc	Brocolli, Grade A	12.700,00	12.700,00
2	cart	Carrot (Wortel)	2.350,00	4.700,00
1	ccbl	Cucumber, Local (Timun Lokal)	1.900,00	1.900,00
1	cell	Celery, Large (Seledri Besar)	5.950,00	5.950,00
1	leth	Lettuce Head	3.900,00	3.900,00
1	onll	Green Onion, Large (Dn Bwg Bs)	2.250,00	2.250,00
2	ptto	Potatoes (Kentang Granola)	2.800,00	5.600,00
1	rlet	Leaf Lettuce (Slda Kriting)	1.550,00	1.550,00
1	tmto	Tomato (Tomat Biasa)	2.450,00	2.450,00

Receiver

Sub Total	Rp	41.000,00
Sales Tax		-
Total Invoice Ammount		41.000,00
Payment Received		-

(   )

T O T A L   Rp   41.000,00

Registration

Registration can be carried out with a text message as follows:

Format: reg<nama>*<alamat rumah>*<nomer telepon rumah>

Example: reg Kartika*Jl. Pajajaran 25*0222034015
(send to 081.22038050)

If the message conforms to the proper format, the following message will be sent:

Thank you for registering. Your request will be processed and we will contact you shortly.||Mobile Fresh

After verification, the customer receives the following message:

Congratulations! You are the newest member of Mobile Fresh! Your membership number is: xxxxx.||Mobile Fresh

Procedures for submitting an order by text message

To place an order by text message, the customer follows the following simple steps:

First, check the price

Format : cek<space>commodity code (unlimited number)

Example: Check the price of potatos, tomatoes and brocolli

type: cek ptto,tmto,broc (send to 081.22038050)

A moment later the customer will receive the following message:

ptto:,0 2800|tmto:, 0 2450|broc;, 0 12700||Mobile Fresh

Procedures for submitting an order by text message
Second, place an order

Format : or<space>commodity code<space>amount

Example: Order 5 units of potatos, 2 units of tomatoes, 2 units of brocolli
Type: or ptto 5,tmto 2,broc 2 (send to 081.22038050)

A moment later the customer will receive the following message :

(If the format is correct)
Thank you for your order.||Mobile Fresh

(If the format is incorrect)
The format of your message is incorrect.||Mobile Fresh
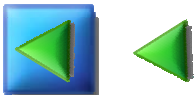
List of Commodity Codes

Brocolli grade A **code broc**

Granola Potato **code ptto**

Large Tomato **code tmto**

No	Item (English)	Item (Indonesia)	Unit	SMS Code	Note
NON ORGANICS					
1	Asparagus	Asparagus	500gr	aspg	
2	Baby Caisim	Baby Caisim	500gr	bcai	
3	Baby Carrot	Baby Wortel	500gr	bcrt	
4	Baby Pak Choy	Baby Pak Choy	500gr	bpcy	
5	Beetroot	Beetroot	500	btrt	
6	Brocolli Grade A	Brokoli Grade A	Pcs	broc	1 pcs @ 0.5kg +/- 50gr
7	Brocolli Grade B	Brokoli Grade B	Pcs	brcb	1 pcs @ 0.5kg +/- 50gr
8	Cabbage, Red	Kol Merah	Pcs	cabr	1 pcs @ 1kg +/- 100gr
9	Cabbage, White	Kol Putih	Pcs	cabw	1 pcs @ 1 kg +/- 100gr
10	Cabbage, White, Small	Kol Putih Kecil	Pcs	calw	1 pcs @ 0.5kg +/- 50gr
11	Cailan	Kailan	500gr	cail	
12	Caisim	Caisim	500gr	cais	
13	Carrot	Wortel	500gr	cart	
14	Cauliflower	Kembang kol	Pcs	caul	1 pcs @ 0.5kg +/- 50gr
15	Celery (large)	Seledri Besar	500gr	cell	
16	Celery (small)	Seledri Kecil	250gr	cels	
17	Chili, Green, Large	Cabe Hijau Besar	100gr	grcl	
18	Chili, Green, Small	Cabe Rawit Hijau	100gr	scgr	
19	Chili, Red, Large	Cabe Merah Besar	100gr	recl	
20	Chili, Red, Small	Cabe Rawit Merah	100gr	scrd	
21	Chinese Cabbage	Sawi Putih	Pcs	ccab	1 pcs @ 1 kg +/- 0.1kg
22	Chinese Cabbage, Small	Baby Sawi Putih	500gr	bwcb	
23	Cucumber	Timun Acar	500gr	cucb	
24	Cucumber Local	Timun Lokal	500gr	ccbl	
25	Cucumber, Japanese	Kyuri/Timun Jepang	500gr	ccbj	
26	Eggplant, Purple	Terong Sayur Unggu	Pcs	eggp	1 pcs @ 0.5kg +/- 50gr
27	Garlic	Bawang Putih	500gr	gric	
28	Ginger	Jahe	100gr	gngr	
29	Green Bean (mini)	Buncis Mini	500gr	grbm	
30	Green Bean (underripe)	Buncis Muda	500gr	grbu	
31	Green Onions, Large	Daun Bawang Besar	250gr	onll	
32	Leaf Lettuce	Selada Keriting	250gr	rlet	
33	Lemon, Local	Jeruk Lemon Lokal	250gr	leml	
34	Lettuce Head	Lettuce	Pcs	leth	1 pcs @ 500gr +/- 25gr
35	Lime	Jeruk Nipis	250gr	lime	
36	Mint Leaves	Daun Mint	100gr	milv	
37	Mushroom	Jamur Kuping	100gr	mshr	
38	Mushroom, Shitake	Jamur Shitake	100gr	mshs	
39	Okra	Okra	500gr	okra	
40	Onions	Bawang Bombay	500gr	onin	
41	Onions Red	Bawang Merah	500gr	onir	
42	Pak Choy, Green	Pak Choy Hijau	500gr	pkcg	
43	Peanuts	Kacang Tanah	500gr	pnts	
44	Pineapple	Nanas Cabang	Pcs	pnap	1 pcs @ 1.5kg +/- 0.1kg
45	Potatoes	Kentang Granola	500gr	ptto	
46	Potatoes, Small	Kentang Baby	500gr	ptts	
47	Pumpkin (large)	Labu Parang	Pcs	pmpl	1 pcs @ 1 kg +/- 0.1kg
48	Pumpkin, (small)	Labu Air	Pcs	pmps	1 pcs @ 0.5kg +/- 50gr
49	Radish	Lobak Merah/Radish	250gr	rdsh	
50	Red Beans (peeled)	Kacang Merah Kupas	500gr	rbep	
51	Red Beans (whole)	Kacang Merah Kulit	500gr	rbew	
52	Red Paprica	Paprika Merah	Pcs	rppr	1 pcs @ 250gr +/- 25gr
53	Spinach, Green	Bayam Hijau	250gr	spig	
54	Spinach, Red	Bayam Merah	250gr	spir	
55	Sweet Potato	Ubi Jalar Merah	500	spot	
56	Tomato	Tomat Biasa	500gr	tmto	
57	Tomato, Apple Large	Tomat Apel Besar	500gr	tmal	
58	Tomato, Red Cherry	Tomat Cerry Merah	500gr	tmrc	
59	Water Crest	Selada Air	250gr	wacr	
60	Water Morning Glory	Kangkung	250gr	wamg	
61	Zuchini	Zukini	500gr	zuch	
ORGANICS					
62	Brocolli Organic B	Brocolli Organik B	500gr	brob	
63	Lettuce, Endives	Selada Endives	250gr	leno	
64	Lettuce, Leaf	Selada Keriting	250gr	llto	
65	Lettuce, Lororosa	Selada Lororosa	100gr	lrso	
66	Lettuce, Romaine	Selada Romaine	250gr	rlto	

Strengthening Institutions

1. Providing incentives for collective action in production and marketing, resulting in the creation of new farmer groups and the expansion of existing groups.
2. Creating a forum for group problem solving.
3. Creating networks among farmers and between farmers and input suppliers

Providing Technology

1. Training participating farmers in the use of cell phones and the marketing system
2. Training to increase product quality in order for farmers to obtain higher prices.
3. Training and assistance in processing and packaging so that farmers can obtain added value

Providing market access

1. Creating a connection between vegetable producers and end consumers.
2. Shortening the distribution chain distance between farmer and consumer so that farmers can obtain a greater share of the marketed value.
3. Creating more marketing options for farmers, thus empowering farmers in the marketplace.
4. Establishing profit sharing with farmers by giving back a portion of the marketing margin.

Farmer challenges and constraints

1. Farmers hope to sell all their produce in one transaction, whereas the marketing capacity of MF is still small
2. Farmers have difficulty maintaining quality and consistency.
3. Ongoing debt has made it difficult for farmers to establish new marketing relationships.
4. Farmers expect that every commodity planted will be sold immediately in the market.

Market challenges

1. Consumers have many retail options for buying vegetables, like traditional markets, supermarkets and convenience stores.

2. Use of text messaging to make purchases is regarded by many customers as an inconvenience.

3. For customers that cannot schedule purchases, the lead time is difficult to manage. (Delivery is made the day after the order is submitted.)

4. The limited selection is surpassed by competing retailers.

Farmer Benefits

1. Access to an alternative marketing channel in addition to the traditional marketing channel

2. Exposure to new methods and technologies to increase their success in new markets.

3. Market feedback that can allow farmers to adjust planting decisions and marketing decisions.

Customer Benefits

1. Alternative purchasing method to obtain fresh vegetables at discount prices.
2. Supermarket quality vegetables.
3. Convenience of having produce delivered to the home.
4. Fresh produce that has been recently picked.

Country Report of Taiwan

1. Background

Along with the continued development of the economy, the cost of land and labor has risen swiftly. Taiwan's agricultural products usually lack competitiveness on the market; thus the investment of 833,000 hectares (roughly 23.1% of the nation's land) and 591,000 employed personnel (about 6.0% of the entire working population) comprise only 1.70% of the nation's GDP(Table1). Because Taiwan's agricultural economy is a small-scale agribusiness model based on the family farm, it lacks economy of scale and there is no way to optimize technical efficiency. In addition, Agriculture agencies have always placed more value on production-oriented technological innovation rather than consumer-based agricultural production and marketing events. It also aims for lower value-added manufacturing and processing efficiency in the industry value chain, and overlooks high value-added items such as innovation, R&D, marketing and services. Thus, it feels pressure in the face of internationalization and free competition.

Year	Total nation's land area (1000 hectare)	Cultivated Land Area (1000 hectare)	National working population (per 1,000 people)	Number of employed agricultural workers (per 1,000 people)	Gross Domestic Product (GDP) (billion US$)	Agriculture Product share in GDP (%)
2000	3,600	851	9,491	740	321,230	1.98
2001	3,600	849	9,383	706	291,694	1.85
2002	3,600	847	9,454	709	294,803	1.75
2003	3,600	844	9,572	696	299,785	1.69
2004	3,600	836	9,786	642	322,179	1.68
2005	3,600	833	9,942	591	345,862	1.70

Table 1   Cultivated land, working population and output

In a small agribusiness economy, the transmission of agricultural information requires a large amount of manpower and time. The central government has established seven district agricultural improvement stations and various experimental agriculture stations. Besides conducting regional or industry-specific agricultural experimentation and research, it also offers complete promotional services so that the results of research

and development are realized in agricultural production. In addition, the town farmers' and fishermen's association that usually exists (Table 2) offers not only financial support, resources and materials for production, operations and sales services, but also performs the important task of the transmission of agricultural information.

Year	Number of Farmers' Associations	Membership	Number of Fishermen's Associations	Membership
2000	304	1917938	40	339590
2001	304	1930171	40	359449
2002	304	1959427	40	372052
2003	304	1950321	40	383893
2004	304	1925550	40	385124
2005	303	1930222	40	389164

Table 2   Farmers' and Fishermen's Associations

However, recent years have seen the quick development and widespread utilization of information technology and the World Wide Web. The agricultural department has risen to meet these developmental trends by transferring the traditional agricultural information and exchange model to a new management environment based on the World Wide Web. It has also employed information technology to construct an information system that connects the agricultural industry value chain to improve manufacturing and processing efficiency as well as stimulate the research, development and design of new products, and provide new kinds of services and marketing. Information technology has also inspired new creative insights, new product development, new services, new sales channels, and even new organizations, thus causing agriculture to develop new value (Figure 1).
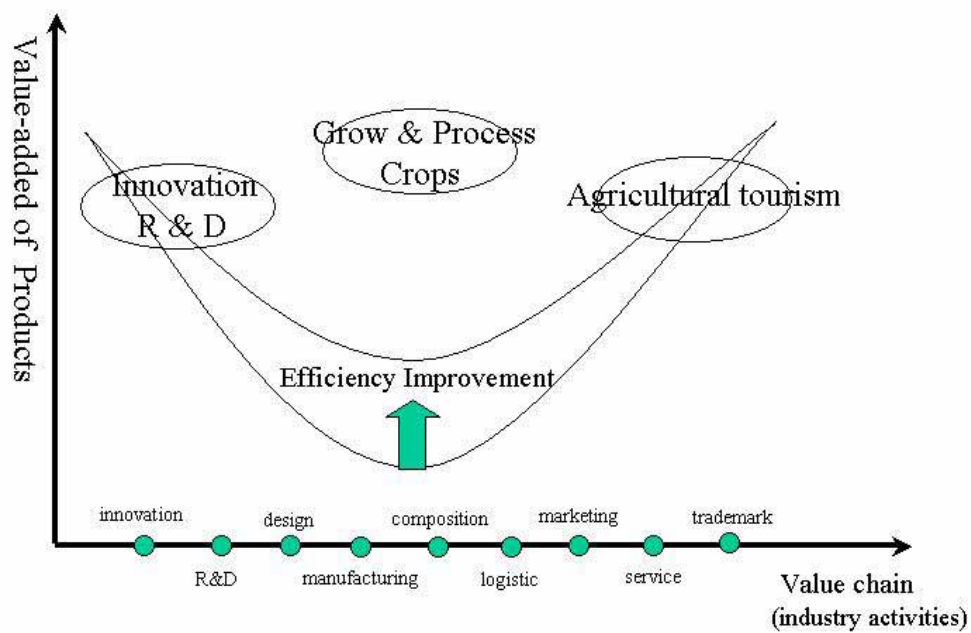
Figure 1   Agricultural Activity Value Chain

First, initiation of the construction of a network infrastructure for agricultural information, enabling the quick execution of agricultural R&D, promotion, manufacturing, marketing and other activities over the Information Superhighway, and the construction of agriculture-related user groups. Next, the promotion of information-centered agricultural services, encouraging various agricultural associations to jointly use a system of credit transaction information and links to the financial networks of various banks nationwide, enabling rural agricultural workers to enjoy financial services of the same quality as that found in urban areas. In addition, integration of related agricultural production technology, production and sales pricing information, and personnel education information. Furthermore, the development of an agricultural information management system, construction and promotion of a marketing system for the creation of a system for agricultural information, and through the World Wide Web, create a direct connection between the network for users from the agricultural sector and the lives of the public, to achieve a modernized agricultural economy that is the integration of production, ecology, and life, and establishing a firm basis for the sustainable management of the national agricultural system.

2. Agricultural Information Network Infrastructure

As mentioned earlier, farmers' and fishermen's associations are the most important agricultural associations in Taiwan, as well as the ones with the longest history. Having long assisted the government by initiating various agricultural and fishing policies, they play a significant role in the promotion of agriculture and the improvement of benefits for agricultural workers. However, an inability to react quickly to meet changes in the social environment and other factors has led to the generation of a large gap between the management effectiveness of these associations, the quality of services offered to workers in the agricultural and fishing industries, and social development. Thus, the initiation of network and information-based processes of farmers' and fishermen's associations can be considered a starting point for the establishment of a network infrastructure for agricultural information. With the assistance of the government, the construction of 344 local area networks for farmers' and fishermen's associations was completed in the three-year time period starting from 2001. ADSL was also employed to create a system for integrating the World Wide Web (Figure 2), enabling farmers' and fishermen's associations that directly serve agricultural workers to become connected to the Internet.
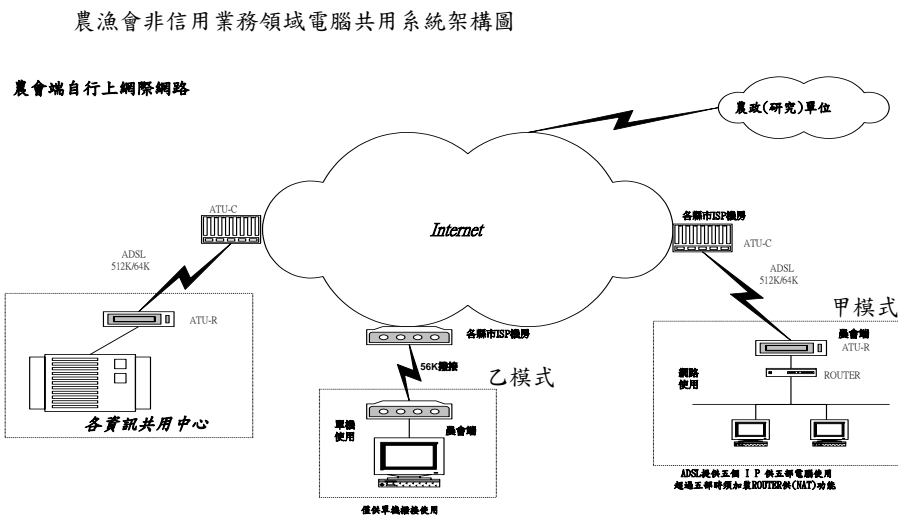
Figure 2   Network Structure of Farmers' and fishermen's Associations

Information technology can be used to elevate the operational effectiveness of farmers' and fishermen's associations, accumulate intellectual capital, improve organizational image, and lastly, develop

such that each farmers' and fishermen's association employee can quickly access new information through the Internet, be full of confidence, and be more capable of adapting to changes in the social environment. Farmers' and fishermen's associations can thus become modern corporations with a solid Internet and information base. At the same time, the government also assists in the planning of a production and marketing group with a management philosophy, the acquisition and installation of computers and Broadband Internet, and the construction of a network infrastructure for agriculture agencies' users, including agriculture-related government units, farmers' and fishermen's associations, and users in production and marketing groups.

3. Helping Farmers' and Fishermen's Associations to Develop
   Information-Based Processes

      Developing web-based personnel systems, membership management systems, financial management systems, sales and inventory systems, joint transportation and marketing systems, accounting systems, farmers' insurance systems and so on, enables farmers' associations to become information-oriented. What requires attention, however, is that government agricultural departments also promote the automation exchange of document at farmers' and fishermen's associations (Figure 3), so that all farmers' associations and government agricultural agency can enjoy rapid and paperless transmission of official documents. This would be of tremendous benefit for the transmission of agricultural information.
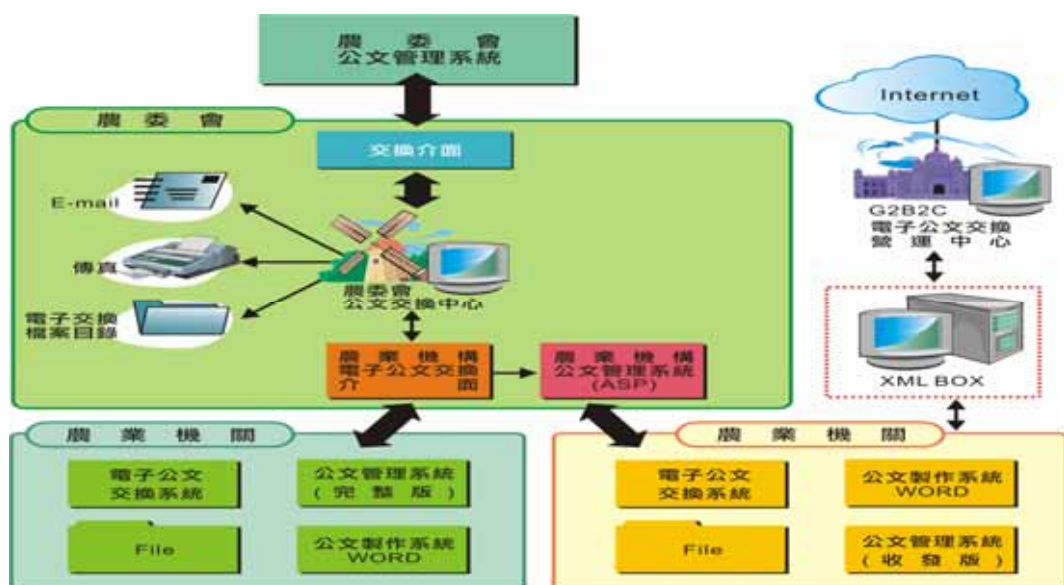
Figure 3   The Farmers' and fishermen's Associations electronic document exchange system

4. Strengthening the Information Content of the Agricultural Information System

The development of Taiwan's agriculture can be divided into three dimensions: production, life and ecology. With regard to production, the important thing is to utilize funds, land, labor and technology to produce agricultural products, keeping in mind manufacturing output value and the profit of farmers. With regard to life, the focus is placed on whether or not it is possible to produce a complete and high quality agricultural product or service that satisfies the public need. This also includes safety, public health and recreational farming information. On the ecological front, the most important considerations are natural resources and environmental protection. Because agricultural production is a production method which directly utilizes and depends heavily on natural resources, it is important to consider resource utilization, the preservation of the natural environment, and the harmony of the rural community while promoting the development of agriculture. In general, Taiwanese agricultural information services can be divided into three main categories: production and marketing information services which provide production technology and market information reports; life information services which provide safety information about fruits and vegetables as well as product propaganda; and the service of providing information about ecological resource preservation.

A. With regards to market transaction information, many of the major wholesale markets in Taiwan have gradually integrated market information. "Agriculture Production and Marketing Group's Information Service Networking" (http://farm.coa.gov.tw) (Figure 4) and "Agricultural Product Transaction and Market Site" (http://163.29.73.197) (Figure 5) are both linked to auction markets and offer seven categories of wholesale market information updated daily: vegetables, fruits, cut flowers, lamb, pork, poultry and fish. Aside from product prices, market comparisons by season, month, and year are also available for reference; farmers' and fishermen's association staff may find them of use when planning product shipments or making other adjustments. In the future, it should be possible to extend market information about agricultural products to retail operators and develop a system for aggregating transaction information from large wholesale markets and fresh specialty (bulk sale) stores. Thus, information can be used to connect all sales

activities, wholesale and retail, of an agricultural product. This not only makes transaction information transparent, it also acts as an effective deterrent to unlawful acts of price manipulation.

Figure 4 Agriculture Production and Marketing Group's Information Service Networking

Figure 5 Agricultural Product Market Information Website

B. In terms of marketing services, due to the rapid development of the World Wide Web and the daily increase in the number of Internet users, Internet transactions have become a commercial opportunity with virtually unlimited possibilities. However, various characteristics of agricultural products such as low price, perishable nature, lack of a uniform set of product standards and high shipping cost, always functioned as barriers to the creation of an actual "agricultural e-marketplace." With the exception of some seasonal, high-priced products such as peaches, lychees, pomelos, pears and cut flowers which are sold directly to consumers over the Internet, agricultural products such as one's daily vegetable supply, rice and fresh farm products are all difficult to sell over the Internet. The establishment of the experimental website, "Commercial websites of agricultural products" (http://www.efarm.org.tw) (Table 6) was an unprecedented first step that could be considered the vanguard in the Internet marketing of agricultural products. In the year 2002, extensive efforts to promote sales and group purchases led to a turnover of NT$491,665. In the year 2005, its sales had reached NT$3,664,760 demonstrating that there is a bright future for the sale of high-value agricultural products over the Internet.

Figure 6 Commercial websites of agricultural products

However, agricultural Internet marketing by no means stops with B2B or B2C marketing of actual agricultural products. An even more important function is to assist the agricultural sector to develop new operational scopes. Aside from agricultural products produced in the field, the Internet can also be used to market the beautiful landscape of farming villages and farming culture and knowledge. The marketing of these precious farm stay experiences facilitates the crossover of agriculture from a primary industry to a tertiary industry which provides services. "recreational farming information website"(http://ezgo.coa.gov.tw) (Figure 7) integrate agricultural tourism information from each city and county, offering both prepackaged tours and DIY features that enable you to custom-build your own tours. By providing a variety of tourism information, this site makes it more convenient for the public to take recreational agricultural tours, thereby doing their part to facilitate the transition of the agricultural sector.

Figure 7   recreational farming information website

With regards to providing food product safety information, the

promotion of organic agricultural products and the production and dissemination of the Good Manufacturing Practices(GMP) symbol denoting safe agricultural products are both important government policies. Thus the "Organic Agriculture Information Center" (http://organic.niu.edu.tw/default800.htm) (Figure 8) provides organic agriculture technology and consumer information, organic agricultural producer search functionality, Internet publications, and other overview information, enabling users to search for information on topics related to organic agriculture.

Figure 8   Organic Agriculture Information Center

Pesticide residues have long been a source of concern for consumers. At present, though compliance with regulations governing the use of pesticides has reached 98%, the "GMP" safe fruit and vegetable seal has been designed because the consumer cannot recognize pesticide residue with the naked eye. This seal represents the quality and safety of products and the honor of farm operators. Consumers can rest assured that products bearing the seal can be bought and used. For a list of agricultural products fulfilling GMP safety requirements, one can search "GMP Announcement,

Advisement and Service Web"
(http://www.tactri.gov.tw/htdocs/notes/gapweb/) (Figure 9)
established by the Taiwan Agricultural Chemicals and Toxic
Substances Research Institute, which provides the public with
information about the safety of fruits and vegetables.

Figure 9   GMP Announcement, Advisement and Service Web

C. Because agricultural production is a production method which
directly utilizes and depends heavily on natural resources, it is
important to consider the utilization of these resources and the
preservation of the natural environment. Today, the mission of
Taiwan's agricultural development should not only be food
production, but also the preservation of the natural environment
and our common natural resources. The website of the Taiwan
Endemic Species Research Institute
(http://nature.tesri.gov.tw/tesriusr/index.htm) (Figure 10) provides
information about Taiwanese biological resources, endemic
species preservation, and ecologically protected areas. Through the
website, researchers and the general public can all quickly access
the information that they are looking for.
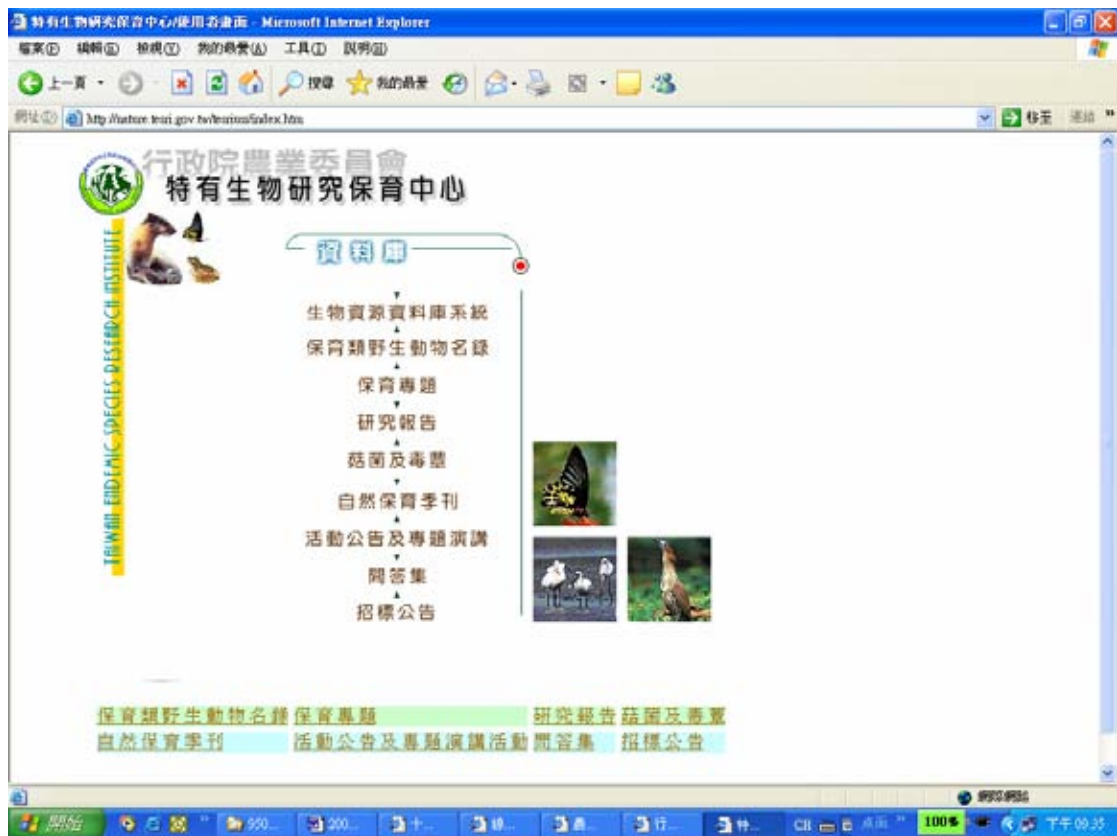
Figure 10　Taiwan Endemic Species Research Institute website

D. Because farmers and agricultural workers usually stay in rural areas on weekdays and are busy with farming tasks, they lack opportunities for continued study. However, the Internet allows them to exchange educational information without the constraints of time and space. The main purpose of the "Agricultural Industry Extension Network" (http://agrext.coa.gov.tw/) (Figure 11) and the "Agriculture Education Website" (http://agredu.coa.gov.tw/) (Figure 12) is to provide a forum for farmers and agricultural workers to learn and share experiences.

Figure 11　Agricultural Industry Extension Network

Figure 12　Agriculture Education Website

5. Future Developmental Directions

Though farmers' and fishermen's associations have not been as quick as other industries to become information-oriented, in recent years, having received encouragement from the government and facing the pressures of competition in a social environment, farmers' and fishermen's associations have met the challenge head-on. Managers of these associations and workers are all able to recognize the new life that information technology can bring them the strength for competition.

At present, the government agriculture department is in the process of establishing an "Agriculture and Food Traceability System," which makes it possible to trace the food supply chain. This work is carried out under the supervision of farmers' and fishermen's associations and includes producing and harvesting as well as sale and transport. Detailed records are kept regarding the application of pesticides, fertilizer and other production materials. After harvest, a production seal is affixed to the paper harvesting container, the container is shipped to the container treatment plant to be cleaned, and a shipping label is affixed. The Agriculture and Food Traceability System strengthens field management and enables consumers to rest assured about the safety of the products they use. Because in recent years, the processes of farmers' and fishermen's associations have become increasingly information-based, instructing agricultural workers to use the Agriculture and Food Traceability System will not be that difficult. At the same time, the government hopes that information technology can continue to increase the management and operational efficiency of farmers' and fishermen's associations and lower their costs, even allowing them to accumulate intellectual capital and improve organizational image. Ultimately, they can become educational organizations that are able to meet environmental challenges at any time.

COUNTRY REPORT

行政院農業委員會
COUNCIL OF AGRICULTURE, EXECUTIVE YUAN

Mei-Yueh Chen

Chinese Taipei

September 17 - 22, 2006
MEDAN, INDONESIA

■WORKSHOP ON THE UTILIZATION OF THE AGRICULTURAL TECHNOLOGY TRANSFER AND TRAINING NETWORKING SYSTEMS

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General Situation of Taiwan's Farmers' & Fishermen's Association

- Over the past five decades, Taiwan has developed from an **agriculture-based economy** to a newly **industrialized one.**

- Taiwan's agriculture sector shares **6.0% of the country's employed population** and uses **23.1% of the country's territory,** but its output accounts is only **1.7% of the GDP.**

General Situation of Taiwan's Farmers' & Fishermen's Association

- **Taiwan's agricultural production has been characterized by small-scale production and as a result of fast economic growth and rising labor costs, the production cost of Taiwan's agricultural sector has risen to a relatively high level.**

- **In an agriculture sector made up of small farms, the spread of agricultural information takes a lot of manpower and time.**

General Situation of Taiwan's Farmers' & Fishermen's Association (cont.)

- **The farmers and fishermens associations throughout the country also shoulder the responsibility of conduits for the free flow of agriculture information.**

- **In Taiwan there are totally 343 Farmers' & Fishermen's Associations with 2,319,386 members in 2005.**

General Situation of Taiwan's Farmers' & Fishermen's Association (cont.)

The major works of FFAs are:

1. **agricultural extension**
   - **According to the law, every FFA should make a budget in this section from the surplus of the previous year.**

2. **economical activities**
   - **In this section, FFAs operate various agricultural materials, farmers' shopping centers, supermarket and joint transportation and sales.**

3. **Finance and Banking Services**
   - **FFAs also provide banking services such as deposit and agricultural loan.**

4. **Insurance Services**
   - **In this section, FFAs manage farmers' insurance and livestock insurance.**

Number of Farmers' & Fishermen's Associations and Members

YEAR	Number of Farmers Association (house)	Total members of Farmers Association (person)	Number of Fishermens Association (house)	Total members of Fishermens Association (person)
2000	304	1917938	40	339590
2001	304	1930171	40	359449
2002	304	1959427	40	372052
2003	304	1950321	40	383893
2004	304	1925550	40	385124
2005	303	1930222	40	389164

■WORKSHOP ON THE UTILIZATION OF THE AGRICULTURAL TECHNOLOGY TRANSFER AND TRAINING NETWORKING SYSTEMS

Farmers' & Fishermen's Association computerization progress

- In 1980's, the government encouraged FFAs to use and share the finance & banking information system which connect to nationwide banking networks.

- At present, there are four main Joint Information Centers. These centers have performed satisfactorily for the development and maintenance of the finance and banking network system, and government encourage them to provide ICT services to other sectors.

Farmers' & Fishermen's Association computerization progress (cont.)

- The government started a program of "Establishing agricultural information community network" to facilitate the management computerization of FFAs from 2001.

- In 2003, The agricultural information community network completed.

Farmers' & Fishermen's Association computerization progress (cont.)

Networking Structure of FFAs
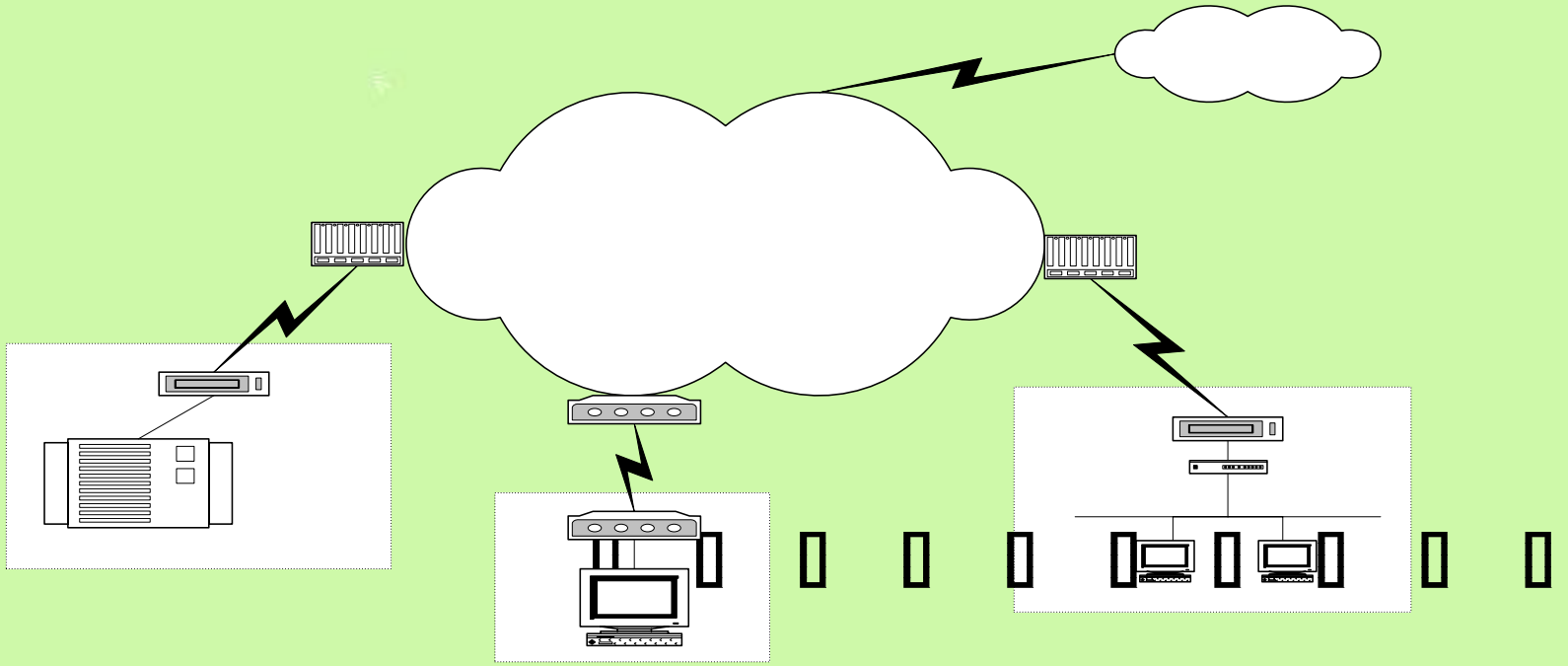
Farmers' & Fishermen's Association computerization progress (cont.)

- **On the other hand, the programs also developed.**

- **Many web-based management systems including personnel, CRM, property management, stock and sales management, joint transportation and selling, accounting, and insurance service.**

Farmers' & Fishermen's Association computerization progress (cont.)

- **personnel system : employee autobiography, salary, promoted history, absent apply…**
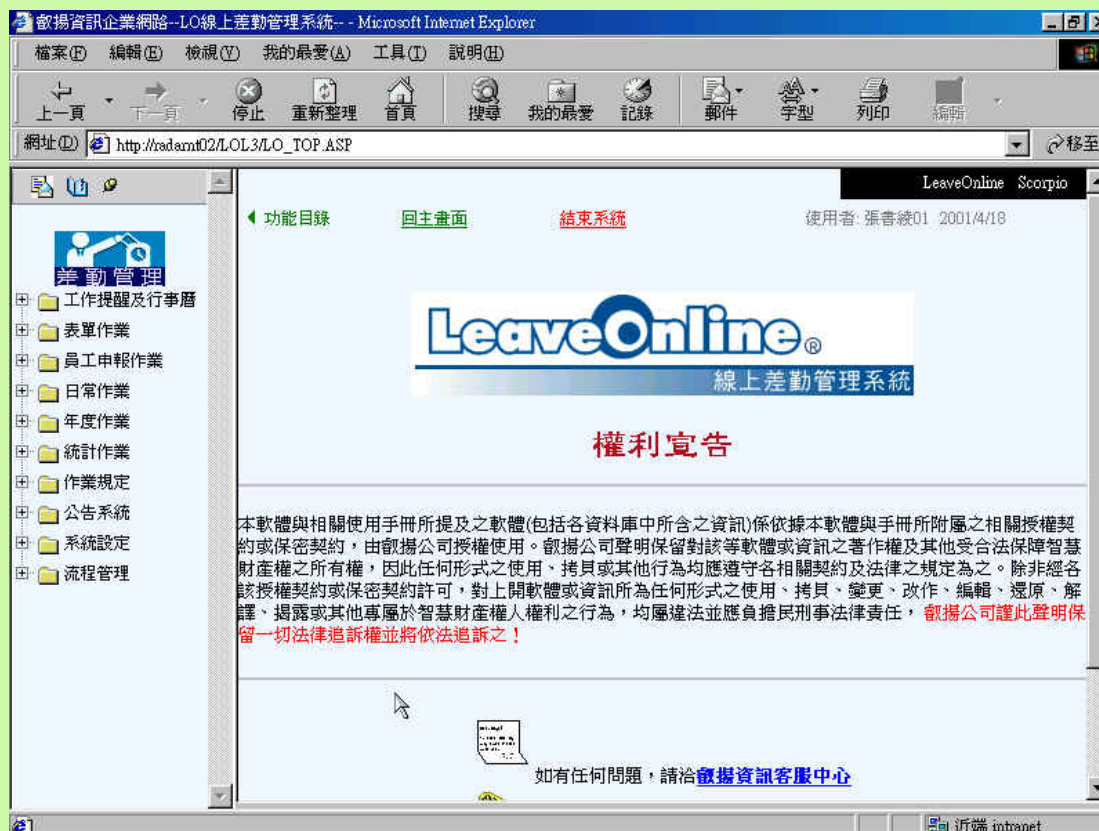
Farmers' & Fishermen's Association computerization progress (cont.)

- **Membership service system : members information records, member annual charge…**

Farmers' & Fishermen's Association computerization progress (cont.)

Asset management system : inventory, assets depreciation…

Farmers' & Fishermen's Association computerization progress (cont.)

Accounting system
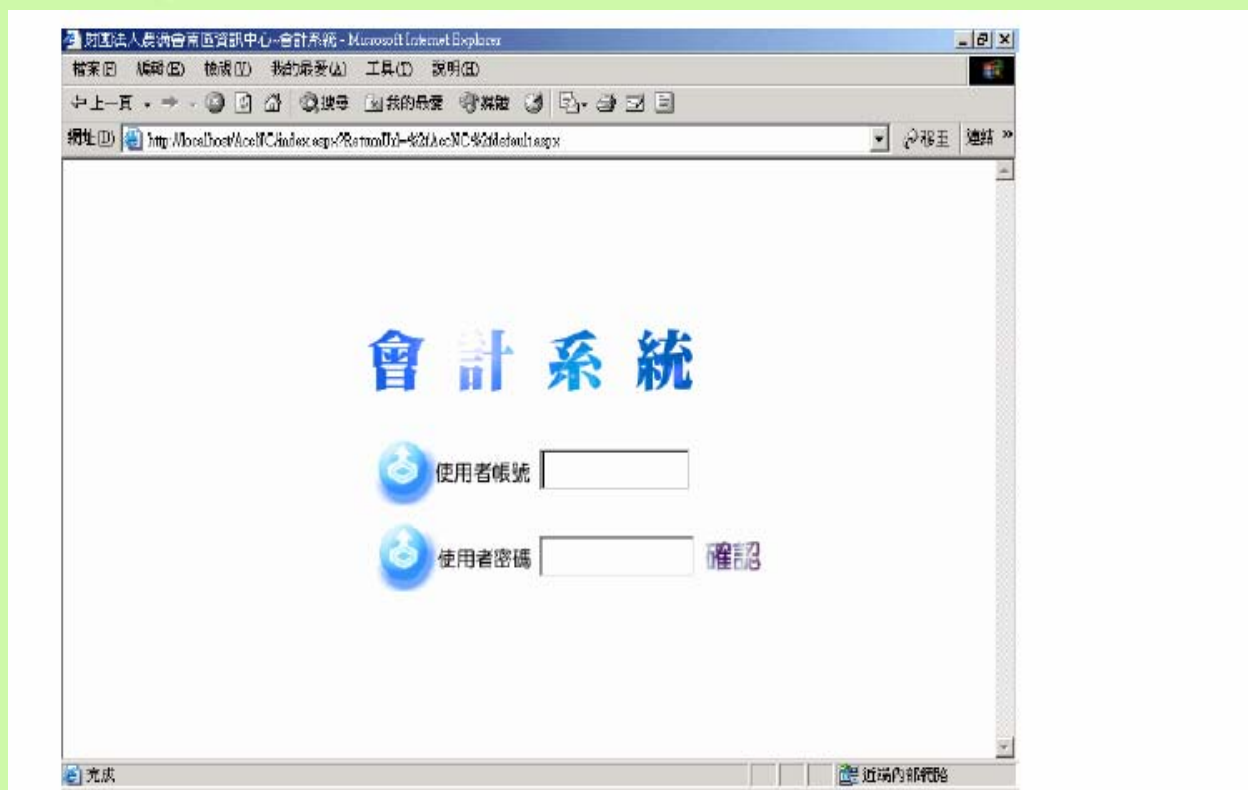
Farmers' & Fishermen's Association computerization progress (cont.)

joint transportation and marketing system

Farmers' & Fishermen's Association computerization progress (cont.)

Farmers insurance system

Farmers' & Fishermen's Association computerization progress (cont.)

The FFAs electronic document exchange system
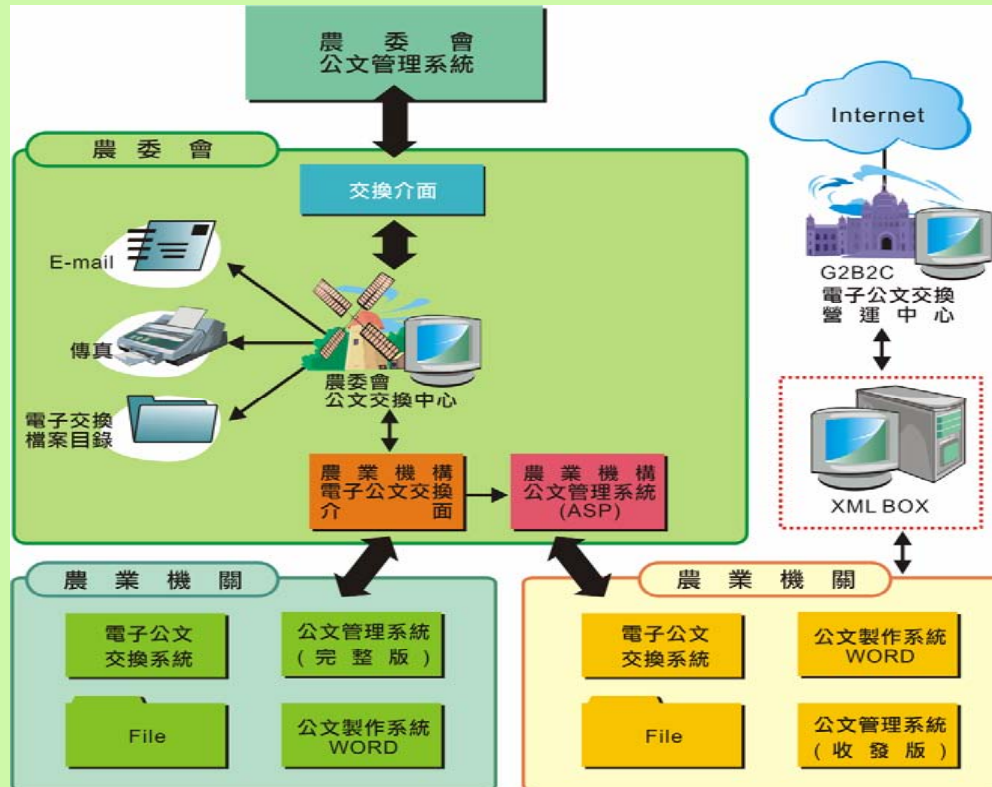
Farmers' & Fishermen's Association computerization progress (cont.)

Commercial websites of agricultural products

Present status of major information networking system in Taiwan

Council of Agriculture(COA) Website

Present status of major information networking system in Taiwan (cont.)

Taiwan agriculture land information system

Present status of major information networking system in Taiwan (cont.)

Taiwan AgExporter Website

Present status of major information networking system in Taiwan (cont.)

Agriculture Extension Network System

Present status of major information networking system in Taiwan (cont.)

The Internet Agricultural Pro

"Pomelo"
It is best gift for Moon Festival

Present status of major information networking system in Taiwan (cont.)

The Leisure Agriculture Info Network

Present status of major information networking system in Taiwan (cont.)

Organic Agriculture Info Network

Present status of major information networking system in Taiwan (cont.)

Homepage of Natural Conservation Network

Present status of major information networking system in Taiwan (cont.)

- **Natural resources and Ecology GIS Database in Taiwan website**

Present status of major information networking system in Taiwan (cont.)

- **Agriculture Production and Marketing Group's Info Service Network**

Present status of major information networking system in Taiwan (cont.)

Agri Production and Marketing Info Network

Present status of major information networking system in Taiwan (cont.)

Agriculture Education Website

Present status of major information networking system in Taiwan (cont.)

Agriculturalist Portal Network

Present status of major information networking system in Taiwan (cont.)

Taiwan Agriculture and Food Traceability System

Present status of major information networking system in Taiwan (cont.)

Animal Protection Info System
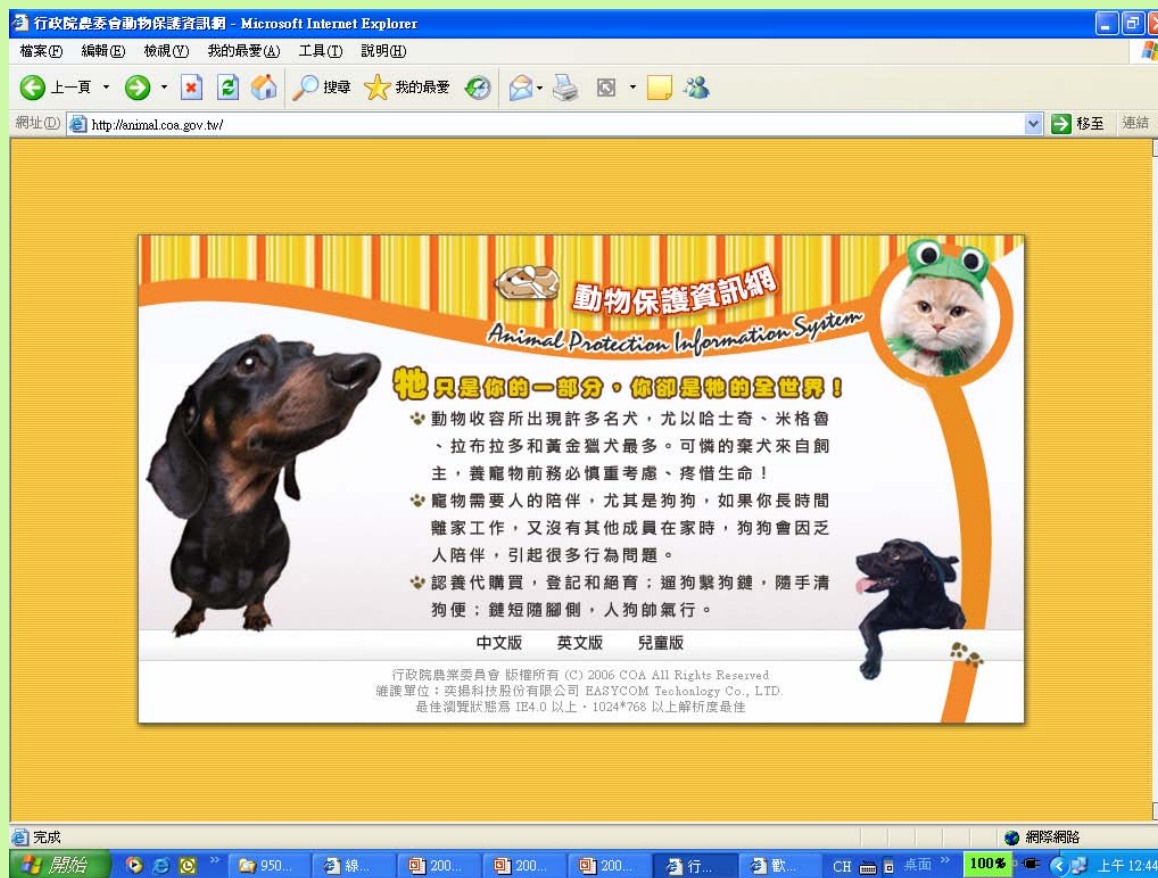
Present status of major information networking system in Taiwan (cont.)

Homepage of National Trail

Aspects in the future development

- **In Taiwan, the computerization of FFAs were delaying, but they have gradually come up with other industries with the support of government projects and the pressure of competition.**

- **The leaders and employees of FFAs all can perceive that the computer and information technology has brought them the strength for competition.**

Aspects in the future development (cont.)

- **Due to the completion of the computerization of business practice in the FFAs, agricultural administration anticipate FFAs can play a supporting role in the agricultural products traceable systems, which build up a complete food chain.**

- **FFAs will be responsible for supporting farmers using computer to keep the records including the process from producing to harvest.**

Aspects in the future development (cont.)

Aspects in the future development (cont.)

Aspects in the future development (cont.)

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Aspects in the future development (cont.)

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THANK YOU
FOR YOUR ATTENTION !

CURRENT SITUATIONS AND FUTURE FIGURE OF AGRICULTURAL INFORMATION NETWORK SYSTEM FOR FARMERS' USE IN JAPAN

Koichi Fukuda

Japan Agricultural Development and Extension Association (JADEA)

INTRODUCTION

It is said that the ratio of farmers who possess personal computers and use the Internet is around 60 percent and over 40 percent respectively (surveyed in 2005 by the Ministry of Agriculture, Forestry and Fisheries (MAFF)). However, the number of farmers, who use the information network systems for their own business, is limited. This is because the advantages of using information network systems are not obvious.

Under the situations above, I studied the future figures of the use of agricultural information network systems, which will contribute to the improvement of farm management in Japan.

The methods of the studies are as follows.

Firstly, I will make clear the general situations of usage of the agricultural information network systems including the Internet from the results of the surveys conducted by MAFF and myself.

Secondly, I will analyze the cases of farmers' usage of information network systems. The details on how to examine them are; I will make clear the problems, etc. of the agricultural information network systems by analyzing the current situations of (1) the "Azemichi Network System", which is the unique network system for farmers and is managed by the Japan Agricultural Development and Extension Association (JADEA for short), (2) the homepages managed by prefecture government and agriculture extension centers, and (3) the homepages operated by farmers themselves.

Thirdly, I will consider the current situations and the problems of those network systems mentioned above.

Finally, I will propose the future figures of the information network systems for farmers including the involvement in the agriculture extension services in Japan.

THE CURRENT SITUATIONS AND PROBLEMS OF FARMERS' USE OF INFORMATION NETWORK SYSTEMS

General situations of farmers' use of information network systems

The ratio of the farmers who possess personal computers and use the Internet is shown in Table 1. The ratio of farmers, who possess personal computers and use the Internet, among all farmers, is around 60 percent, and over 40 percent respectively. However, the ratio of farmers, who use the information network systems for their own business, is only 20 percent of all farmers.

According to the details of the survey conducted by MAFF, the ratio of farmers, whose purpose for possessing personal computers is "farm management such as bookkeeping, etc.", is about 60 percent of the farmers. However, the ratio of farmers, whose purpose is "acquiring information on marketing, weather, etc." by the use of information network

systems, is about 40 percent.

Moreover, the ratio of the farmers, who use the Internet with mobile phones, is around 30 percent.

In short, the ratio of "Farm houses where farmers use personal computers for their own business" in 2005, is two times as many as that in 2001. However the other situations of farmers' usage of personal computers and the Internet hadn't changed so much between 2001 and 2005.

On the other hand, I conducted questionnaires and field surveys on the content and methods of extension activities aimed at the farmers in both Asparagus production area in Yamagata Prefecture, a northern part of Japan, and sweet potato production area in Chiba prefecture, near Tokyo, from December 2005 to March 2006 (see table 2).

Table 1. Results of Surveys on Farmers' Usage of Personal computers and the Internet

(Unit:%)

Usage of personal computers and The Internet	Ratio	
	2001	2005
Farm houses possessing personal computers	53.1	61.2
Farm houses where farmers use personal computers for their own businesses	9.7	20.7
Farm houses where approved farmers use personal computers for their own businesses	36.2	36.5
Farm houses where farmers use the Internet with personal computers	32.8	42.2
Farm houses where farmers possess mobile phones	74.3	70.9
Farm houses where farmers use the Internet with mobile phones	42.0	31.5

Source: "The survey on farmers' usage of personal computers and the Internet", MAFF, 2002 and 2005

Table 2. Outline of production areas

|	Asparagus production area in Yamagata Prefecture	Sweet potato production area in Chiba prefecture
Number of Farm houses	65	78
Cultivated areas per farm household	About 150 a	About 250 a
Farmers over 50 years old	80 percent	70 percent

Source: made by author based on the questionnaires
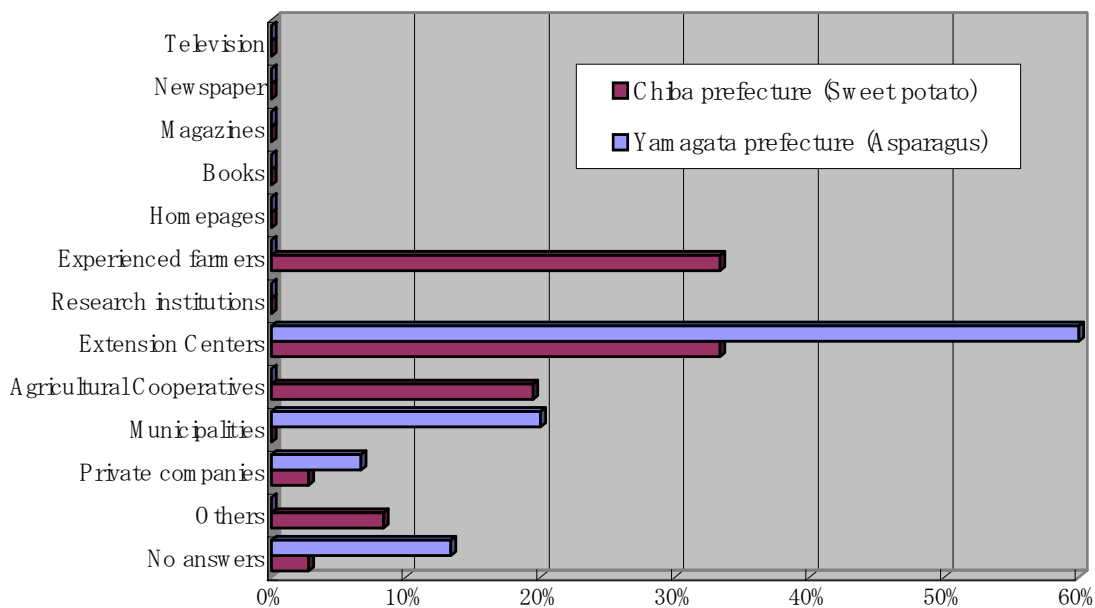
Figure 1. Sources of acquirement of new technical information

Source: Made by author based on questionnaires

Notes: Farmers have to choose two as information sources.
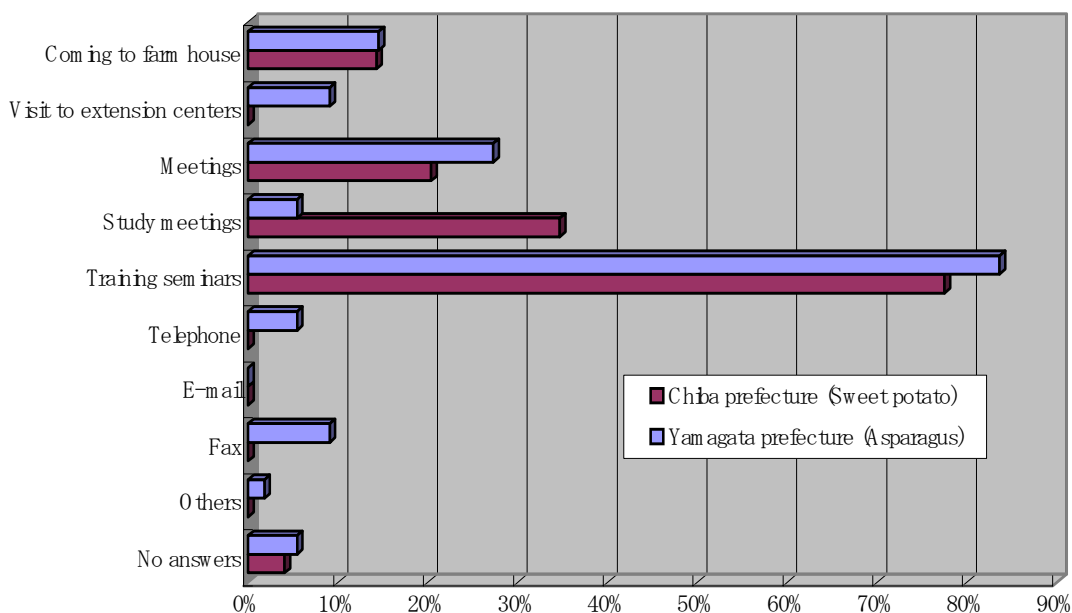
Figure 2. Methods for supporting farmers by extension advisors

Source: Made by author based on questionnaires

Notes: Farmers have to choose two as the methods.

The results of the surveys show that 70 percent of the farmers in both areas are over fifty years old (see Figure 1). The farmers in both areas seldom use homepages for receiving new technical information. The farmers don't use E-mail as a method, either, when the farmers receive advice from extension advisors (see Figure 2).

It is said that the ratio of farmers among all farmers in Yamagata prefecture, who use the Internet with personal computers, is from 20 to 30 percent, according to questioning from extension advisors. This is the similar tendency to the previous survey conducted in 2005 by the MAFF. The extension advisors said that the ratio of the farmers, who possess personal computers and use the Internet with personal computers in the area of Chiba prefecture, is approximately 70 percent and below 50 percent respectively, both of which surpass the ratio of the farmers in the area in Yamagata prefecture. This is because the area in Chiba prefecture is located near Narita Airport and closer to the urban areas.

To sum up the explanations above, farmers don't often use personal computers for farm management despite possessing personal computers. Most farmers also seldom use the Internet for their own management, even if they can connect to the Internet anytime.

On the other hand, fax is more popular among farmers and more often used for farm management. In the area of Yamagata prefecture, 10 percent of farmers use fax, when the farmers receive advice from extension advisors.

Actual cases of using information network system

1. "Azemichi" Network System

The "Azemichi Network System" (Azemichi: a Japanese word which means a footpath between rice paddies) includes electronic forums such as "Free discussion forum", "Technical forum", etc. The Azemichi Network System was started in 1998. Its main purpose is to encourage communications among farmers, extension advisors, etc. participating in the "Local Network System" (the Closed network system for members in the jurisdictions of extension centers or prefecture governments) that had been subsidized by MAFF for four years. Prefecture governments have managed the Local Network Systems, while the Azemichi Network System has been managed by JADEA so far. The participation in the Azemichi network system is free of charge.

Since 1998, the members of the Azemichi Network System have been increasing. At present, over 4,000 farmers, most of who are the experienced farmers, are registered. According to Figure 3, the number of registered farmers varies from prefecture to prefecture. The number of registered farmers is large in the prefectures which conduct the Local Network System, so that the ratio of farmers' living in only 6 prefectures such as Aichi, Niigata, Kagawa, Gifu, Kumamoto, and Shizuoka, accounts for 80 percent of the total participants all over Japan.

The details of usage of the Azemichi Network System show that the number of farmers, who access the system more than one time, is 525 and 425, in 2004 and 2005 fiscal year respectively among about 4000 farmers (see Table 3). On the other hand, the number of farmers, who access the system more than ten times, is 127 and 125 in 2004 and 2005 fiscal year respectively. The ratio of farmers who had accessed the system is only about 10 percent of the 4000 participants in 2005. It can be said that the participants are small portions of all participants. However, the number of participants, who used the system more than one time in fiscal 2005, dropped by 20 percent compared to that of fiscal 2004.

On the other hand, the number of participants, who registered more than one article in

the electronic forums, is 54 and 44 in 2004 and 2005 fiscal year respectively. The ratio of members, who register articles, accounts for only one percent of all members. This means very few people registered articles into electronic forums. The number of articles registered in fiscal 2005, also decreased by 20 percent compared to that of fiscal 2004.

In short, although the number of participants has increased, the connection to the system, references to the forums, and article registration have decreased even during last four years (see Figure 4).
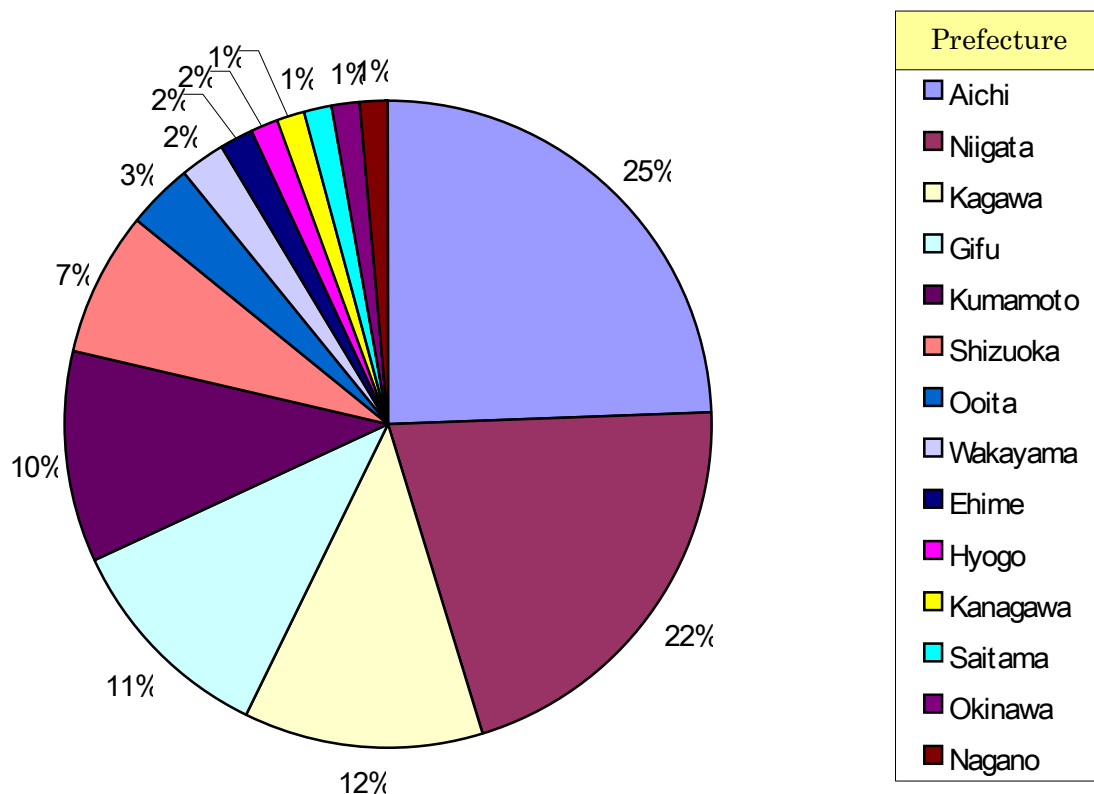
Figure 3. Ratio of farmers' participants of some prefectures in all prefectures
Source: Made by author
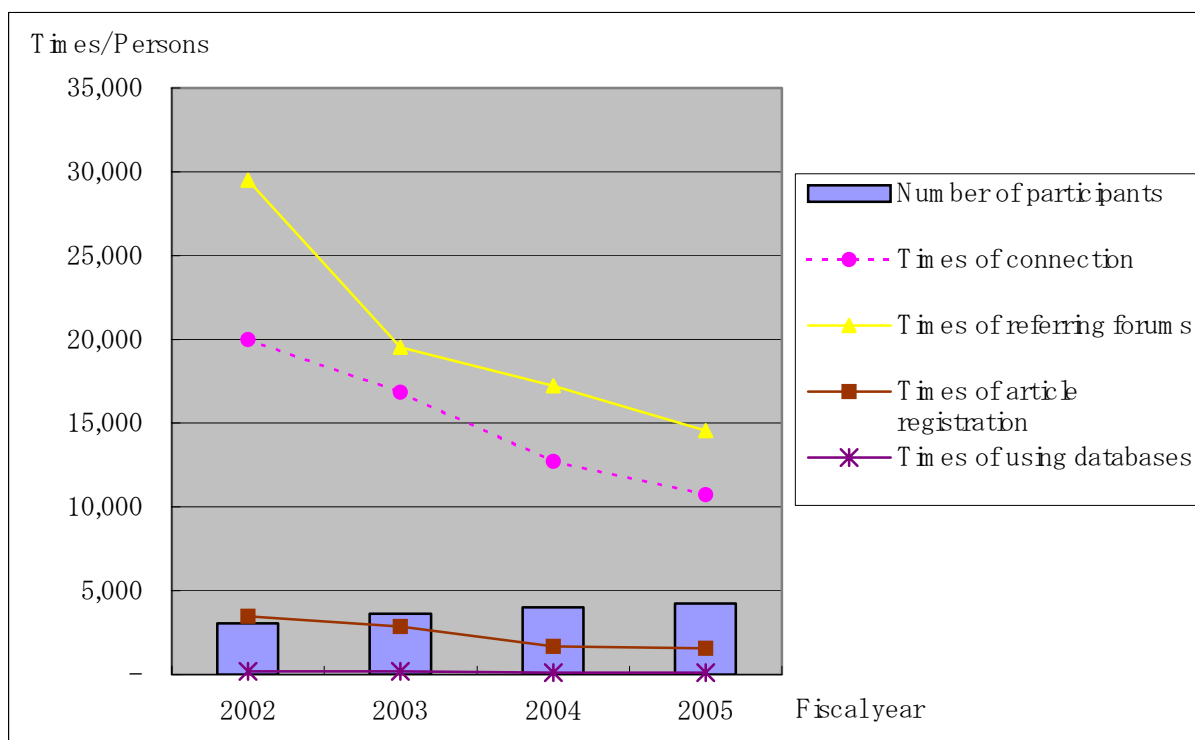
Figure 4. Trends of number of participants, and usage of the Azemichi Network system
Source: Made by author

Table 3. Usage of the Azemichi Network system

	More than 1 connection	More than 10 time connections	More than 1 article registration
2004 fiscal year (Persons)	525	127	54
2005 fiscal year (Persons)	425	125	44
Rate against 2004 (%)	80	98	81

Source: Made by author

Under the situations mentioned above, JADEA has been taking some measures in order to encourage the usage of the Azemichi network system since the middle of fiscal 2005. These measures are as follows.

a. We have asked two young farmers (one is in his twenties, and the other is in his thirties) as board operators to facilitate the communications among members.

b. We have asked 17 online consultants (former researchers, etc.) and 400 researchers belonging to the institutes of national level (National Agriculture and Food Research Organization, NARO for short) to quickly answer the questions asked by farmers (see Figure 5).

According to these measures, the usage of the "Free discussions forum" has improved since April 2006 as shown in Figure 6.

After ten years of operation of the Azemichi Network system, I can point out some problems as follows.

a. The number of participants hasn't increased as much as our expectations.
b. Among about 4,000 registered participants, only a few farmers are actually using the system.

Question: How shall I conduct the management of rice?	A farmer from Niigata prefecture
As a result of the continuous rainfall, the rice has not had sufficient sunshine. The rice hasn't grown enough, so that the leaves remain dark color (SPAD(Soil & Plant Analyzer Development): 38 degrees) and young panicles haven't grown enough. Under the conditions above, what should I do? Please give me advice.	
Answer: About the management of rice	Dr. Sasaki (Online consultant)
We are worried about the inadequate growth of the rice, because of low temperature and continuous rainfall. I think that topdressing should be applied until the meiosis stage. In Tohoku areas where I live, blast has often appeared, so that some control measures should be taken. In Niigata prefecture, however, "Koshihikari BL (Blast resistance Lines)" has been introduced; therefore I think that the control measures for "Koshihikari BL" may be different from those for the other varieties. I recommend you ask extension advisors, officers of a plant protection office, etc. about what you should do.	

Figure 5. Example of the question by a farmer and the answer from an online consultant at the "The technical forum"
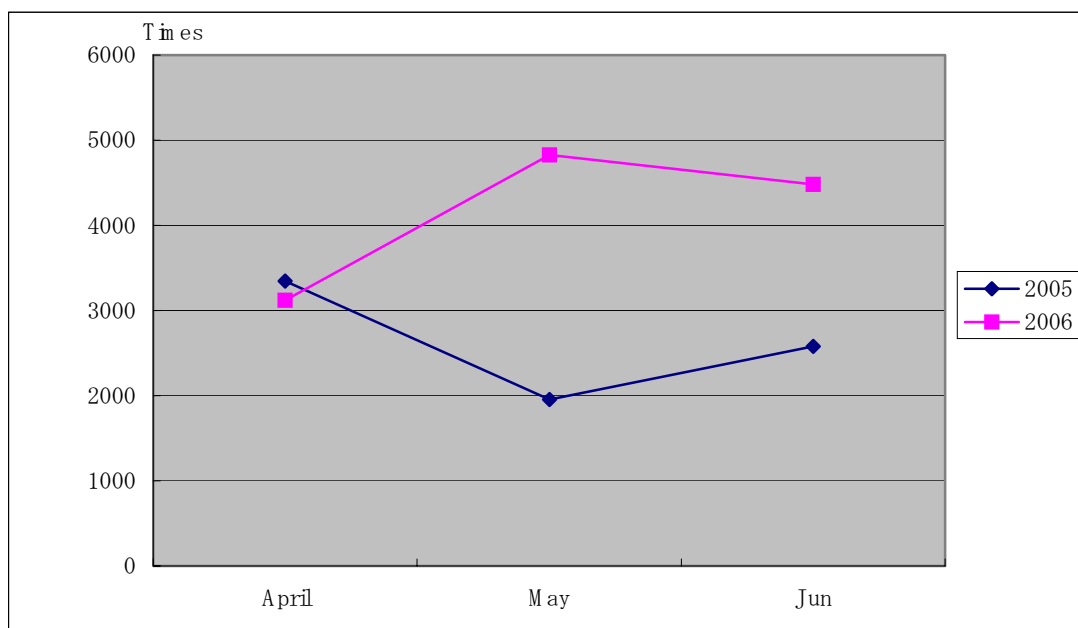

Figure 6. Times of reference of the "Free discussion forum"
Source: Made by author

2. Homepages operated by prefecture governments and agricultural extension centers

JADEA conducted the questionnaires in about 100 extension centers and the surveys by accessing all homepages of agricultural extension centers in 2005 in order to study the current situations of homepages of extension centers.

According to the surveys above, most extension centers (97%) provide information at their own homepages or the homepages of other organizations. The ratio of extension centers possessing their own homepages is about 50 percent. On the contrary, half of the extension centers in Japan don't have their own homepages. Therefore, about 50 percent of extension centers use the portions of the homepages managed by prefecture governments or homepages managed by agriculture development offices, which include extension centers and the other agriculture sections. Some extension centers are using only one page in those homepages for providing information. This means there are the big gaps among extension centers according to the policies of each prefecture government on how to operate the homepages (see Figure 7).
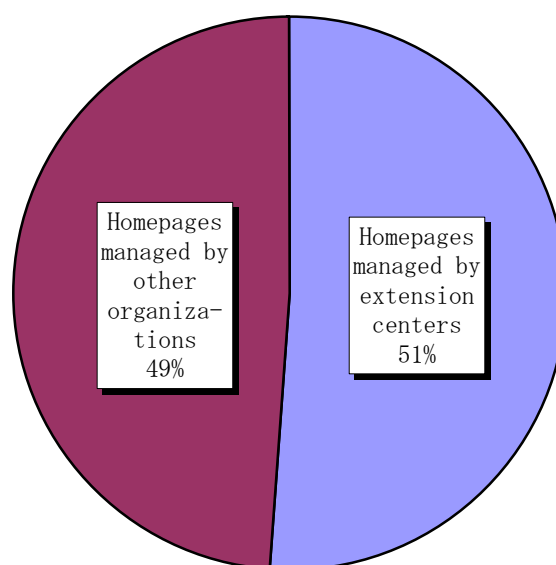
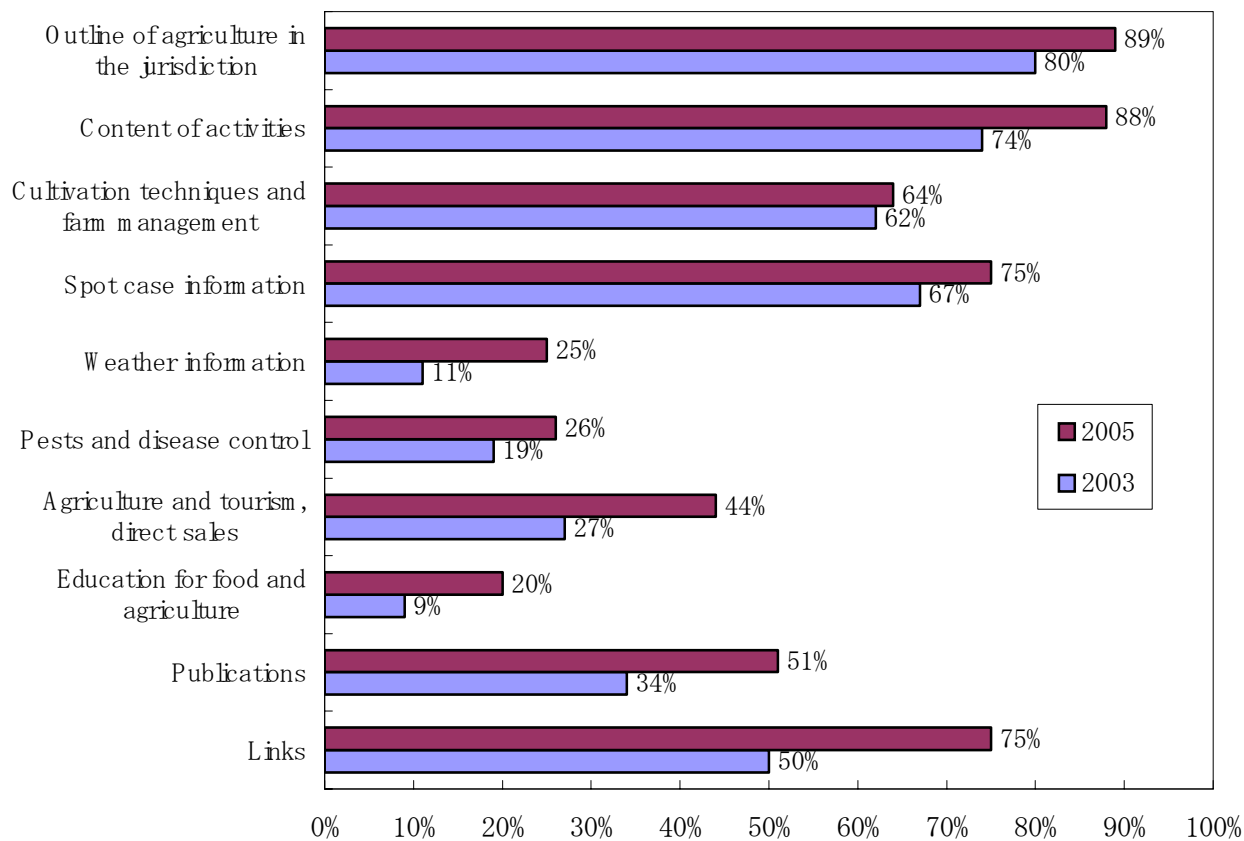*Figure 7. The type of management for homepages of extension centers*
Source: Report on the project of support for establishment of virtual extension centers, JADEA, 2005

Main targets of homepages managed by extension centers are the farmers in the jurisdiction and consumers in general as shown in Figure 8. This tendency hasn't changed between 2003 and 2005.
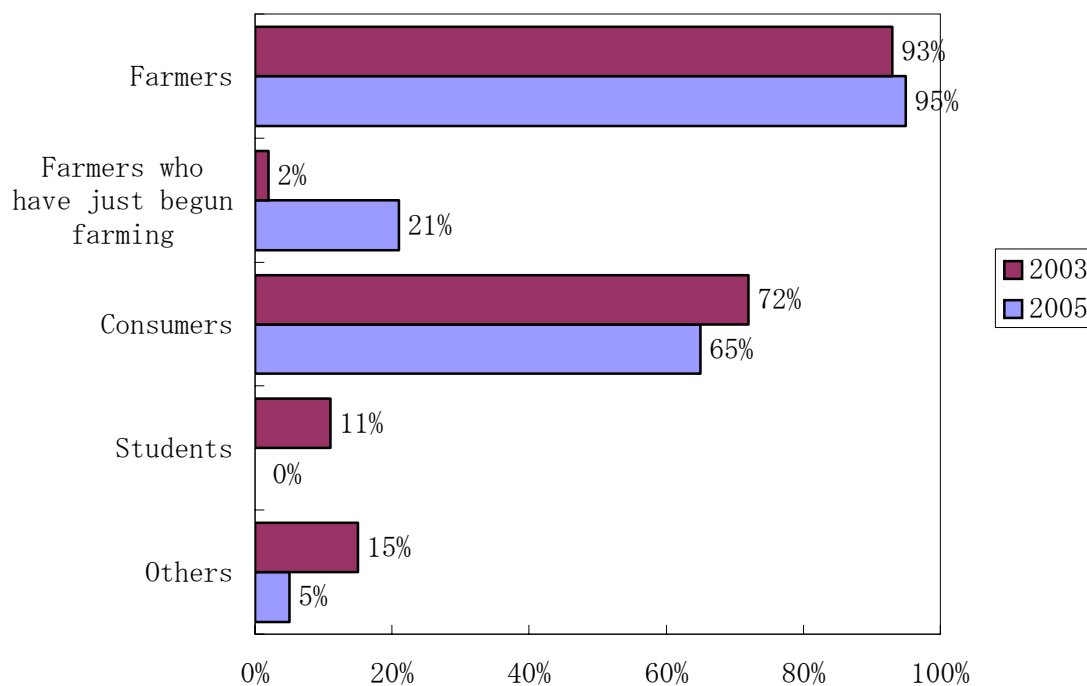
Figure 8. Targets of the homepages of extension centers

Source: Report on the project of support for establishment of virtual extension centers,
JADEA, 2005

Figure 9. Cover pages of the homepages of extension centers
Source: Report on the project of support for establishment of virtual extension centers,
JADEA, 2005

On the other hand, the kinds of cover pages of extension centers are "Outline of agriculture in the jurisdiction", "Content of activities", "Spot case information", "Links", and "Cultivation techniques and farm management", which over 60 percent of extension centers have as cover pages. The details of content of each menu are shown in Table 4. The main targets of "Outline of agriculture in the jurisdiction" and "Content of activities" are consumers, while those of "Spot case information", "Links", and "Cultivation techniques and farm management" are farmers. It can be said that the homepages of extension centers are targeting both consumers and farmers. The menus, which dramatically increased in 2005 compared to 2003, are "Agriculture and tourism, and direct sales" and "Links". That is why, these days, agriculture and tourism and direct sales have been increasingly popular all over Japan, and extension centers are involved in those activities. Also, prefecture governments and extension centers try to increase more kinds of useful information by linking the homepages of the other organizations. Compared to 2003, the ratio of extension centers, which increase the number of cover pages, increased in 2005. It shows that most extension centers have been actively dealing with the homepages by enriching the menus for two years.

As mentioned above, each extension center is positively conducting the management of homepages, however, some problems are pointed out according to the results of the questionnaires as follows.

a. The management of homepages is not definitely considered as a daily job at extension centers.

b. The management of homepages is not considered important in extension activities. As a result, the content is not frequently updated.

c. The special techniques and knowledge are needed for establishing and maintaining homepages, so that the number of extension advisors, who have both skills, is limited.

d. The content has not been made based on acquiring the users' needs.

On the other hand, the main targets for operating homepages are farmers. After asking farmers, however, it becomes obvious that farmers in the jurisdiction of extension centers, who can use the Internet, don't access the homepages of extension centers so often.

Menus	Content
Outline of agriculture in the jurisdiction	Characteristics of agriculture in the areas and introduction of products
Content of activities	Content of activities of extension centers, extension program, introduction of advisors in charge, and structure of extension centers
Cultivation techniques and farm management	Material on cultivation techniques and farm management, research findings and results of surveys
Spot case information	Results and process of extension activities
Weather information	Weather information in the areas, statistics of weather information, etc.
Information on pests and disease, information on chemicals	Forecasts of pests and disease, information on chemicals, etc.

Agriculture and tourism, direct sales	Agriculture and tourism, and the maps, business hours, etc. of direct sales shops in the jurisdiction
Education for food and agriculture	Education for food and agriculture, trial of farming, farm fields of schools, etc.
Publications	Introduction on the publications made by extension centers, etc.

Source: Report on the project of support for establishment of virtual extension centers, JADEA, 2005

3. Homepages managed by farmers themselves

Some farmers, mainly in their thirties and forties have been setting up their own homepages. They are using the homepages for promotion of direct sales and communication with consumers. These days, some farmers are providing the records of their daily activities to the public by using blog[1].

The results of surveys, conducted in 2005 by Hokuriku region including four prefectures, show the farmers' ideas for their own homepages as follows.

   a. **Publicity of farm management**: to convey the current situations and opinions for the philosophy of farm management to the public
   b. **Expansion of channels for sales**: chances for making the new contracts and business, and methods for expansion of channels for selling own products
   c. **Communication with consumers**: methods for communications with consumers (by mainly using mail)

Half of the farmers surveyed, sell less than 20 percent of the total sales volume by Internet sales. It means that Internet sales are not the main method of selling products for most farmers (shown in Figure 10). The farmers also point out some problems on the management of homepages as follows.

   a. It is difficult to make new content in order to compete with an increasing number of attractive homepages made by other farmers.
   b. Preparations are needed to provide the attractive products, which consumers want to buy, although the price of products includes postage.
   c. The establishment of homepages does not guarantee that new customers will be acquired.
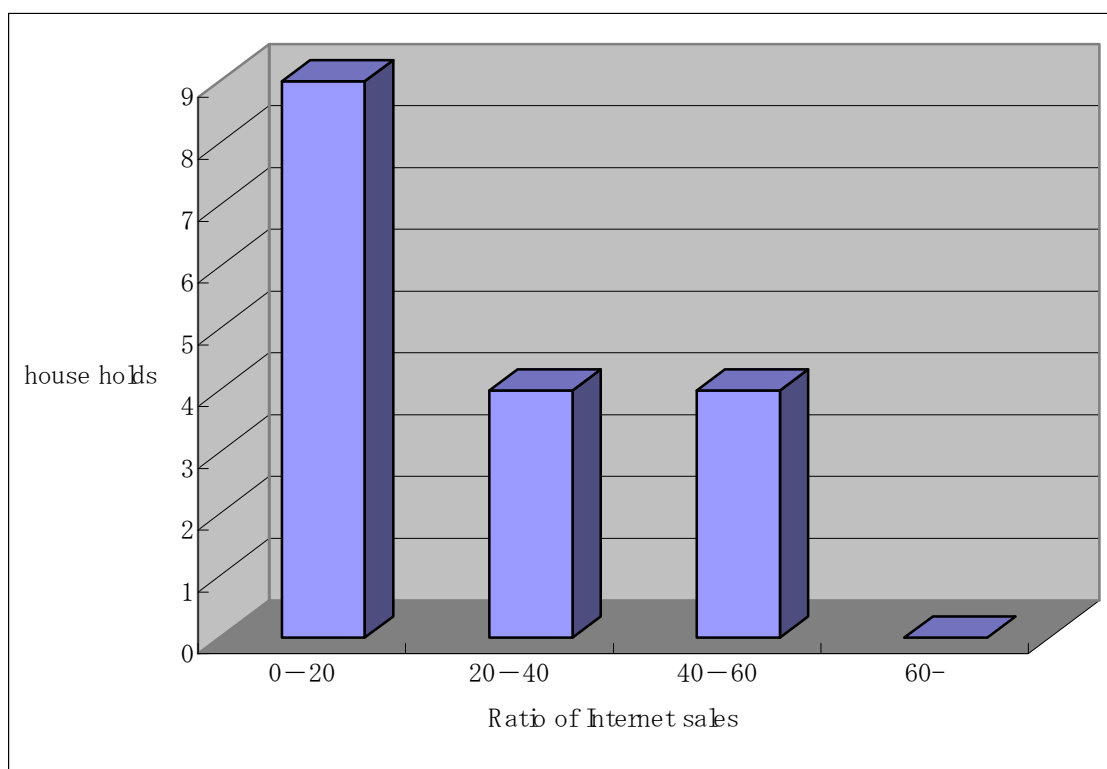
Figure 10. The number of farmers classified by the ratio of Internet sales (17 cases in Hokuriku region)

Source: Report on the project of support for establishment of virtual extension centers, JADEA, 2005

4. Use of information network system at direct sales shops

These days, direct sales shops are supported by computer systems that have been dramatically increasing in Japan. According to the surveys conducted by MAFF in 2004, the number of direct sales shops, managed by municipalities, agriculture cooperatives, etc., accounts for approximately 2,400 all over Japan (see Picture 1). Apart from those kinds of shops, there are a lot of direct sales shops managed by individual farmers.

Farmers can decide the price of their own products by themselves at direct sales shops, so that small-scale farmers can sell their products there. This point is different from market shipment. In recent years, direct sales shops have been rapidly increasing under the sentiment that consumers are more interested in the "community production and community consumption" and "safe and secure foods".

The information network systems by using mobile phones, fax, and personal computers, support the POS (Point of Sale) systems, which have been diffusing in the agriculture sector all over Japan (see Picture 2). In order to know the situations of their own products sales, however, information network systems using computers are not so often used among farmers for the POS systems. Telephones, mobile phones, E-mail by mobile phones, and fax are mainly used.

In urban areas, some farmers sell most of their products through direct sales shops owned by them. For example, some strawberries farmers set up direct sales shops, and the sales have been smoothly expanding so far. This is because strawberries at the direct sales shops are fresh and consumers can directly meet with the farmers (it enables face-to-face

contact) despite the higher price than in supermarkets (see Picture 3). Also, some of the strawberries farmers sell their products by using homepages. In this case, the farmers directly send strawberries to consumers by home delivery services after receiving orders by E-mail.

Picture 1. The inside of a direct sales shop

Picture 2. A farmer can easily input the information of her products
*into the POS system by using a touch panel*

Picture 3. A strawberries direct sales shop managed by an individual farmer

5. Delivery of information to mobile phones

In Nagasaki Prefecture, extension advisors at Shimabara extension center have been sending technical information to mobile phones of about 90 strawberries farmers since August in 2004. The advisors have been providing information once every week or two by mailing list. As of August third in 2006, the total amount of information sent had reached 89. The content of information for provision is the timely information such as cultivation techniques of strawberries, weather information, research findings conducted by extension centers and so on (see Picture 4). The farmers pay 300 Yen (approximately 3 US dollars) a month, because the mail delivery service is one of the services provided by "Agriculture and Forestry Information System of Nagasaki Prefecture" that is a membership system. When a farmer wants to receive the E-mail service, he or she has to become a member of the system and pay a membership fee.

Despite the charge, members receiving the E-mail delivery service have been increasing, thanks to the good evaluation from member farmers. Most of the evaluation by the member farmers are positive, e.g. "I am happy, when the E-mail comes"," It is helpful that I can solve the problems by the delivered E-mail".
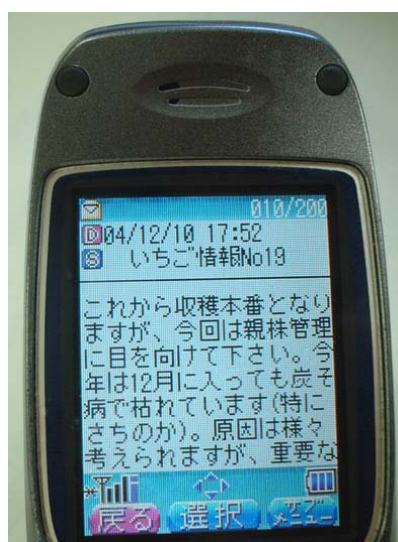
Picture 4. An example of the E-mail received with mobile phones

In Toyama prefecture, extension advisors at Toyama extension center, conduct quick

information provision to 63 "Nashi" pear farmers and 49 rice farmers by sending E-mail to their mobile phones in order to urge them to conduct appropriate tasks (see Picture 5). As a result, the interactive communication system has been established between extension advisors and farmers with an increasing number of questions and opinions from farmers. In Kumamoto prefecture, information on the conditions inside greenhouses is sent to farmers by introducing a security system used with mobile phones. Thanks to this system, the farmers can relax even if they stay at their house.

Picture 5. A "Nashi" pear farmer receiving information with mobile phone

There are an increasing number of Information network systems focusing on the use of mobile phones possessed by most farmers in Japan. Most farmers don't access the Internet, but some farmers are happy to use the information network system on their mobile phones.

CONSIDERATION

Around ten years ago, personal communication network systems, whose purpose was to encourage the communications between farmers, had rapidly spread among some farmers. It can be said that administrative organizations had contributed to the spread of the personal communication network systems to some extent, by providing IT training courses hosted by JADEA, etc. for farmers and having established Local Network Systems.

However, the information network systems have not prevailed so much so far, among the majority of farmers, because of the aging of farmers. On the contrary, some experienced farmers have been setting up their own homepages. In a last decade, most of the personal communication network systems, especially based on local communities, have been closed. One of the reasons is because of high-performance search engines such as "Google" and "Yahoo" that have become popular. Therefore, farmers can easily receive information by using these search engines. As a result, information network systems based on local areas, are not so attractive for farmers any longer. Using the situations mentioned above, I can point out the negative impact of globalization.

The information networks, however, have brought about some advantages for farmers. It is very significant that farmers, who used to be mainly the receivers of information, positively deliver their own information to others. Farmers begin to use their homepages for direct sales shops, because Internet shopping has become very popular among consumers. At the same time, it is necessary that farmers have been open to the public about the traceability of their own farm products and the conditions of their farm management, etc. through information network systems under the sentiment of

consumers' increasing interests for secure and safe foods.

On the other hand, the information network systems of both supporting the management of jobs, and sending technical information to mobile phones, have been become popular despite the stagnant diffusion of the communication network systems used with personal computers. POS systems enable farmers to grasp the real time information of sales of their own products. Therefore, the rapid increase of direct sales shops would not have been achieved without the POS systems that have been introduced with cheaper prices of personal computers these days. Telephones and mobile phones are mainly used to send the data of the sales to farmers. As a result, information network systems using personal computers are not so popular among farmers. An increasing number of farmers use mobile phones, which are more user-friendly than personal computers, when they receive technical information from extension centers, etc.

As mentioned above, the information network systems using personal computers may not prevail among farmers because the majority of farmers are aging. On the contrary, the information network systems, based on the use of mobile phones, show the signs of more diffusion.

CONCLUSION - FUTURE FIGURE OF AGRICULTURAL INFORMATION NETWORK SYSTEMS AND PROPOSAL ON SUPPORT BY EXTENSION CENTERS, ETC. -

Concerning the use of the Internet, the farmers are divided into two groups in Japan. One is a small number of farmers who conduct Internet sales, etc. by using their own homepages. The other is the majority of farmers who can't use the Internet for his or her farm management.

Therefore, extension advisors should conduct the advice for the promotion of information technology using computers towards the two groups of farmers separately. For the experienced farmers, extension advisors should conduct the minimum support such as holding training courses on how to make homepages, and setting up meetings for exchanging information among farmers. On the contrary, for the majority of farmers, the support by research institutes and extension centers, etc. will be indispensable. Especially for older farmers, it will be necessary to conduct training on how to use the Internet, and develop a user interface, which is friendly even for older farmers. In this case, it will be also necessary to consider mobile phones, which are more user-friendly to older farmers (see Figure 11).

Figure 11. Future figure of agricultural information network systems and supports by extension centers, etc

Purposes	Targets and supported content	Supports from **Extension advisors** **& researchers**
"Urging self-reliance for farmers"	Advance farmers <- a) how to make homepages b) Facilitating communication among farmers	Minimum supports

"Development of market of farm products" "Acquirement of needs of consumers"	Ordinary farmers <- a) friendlier user interface b) Use of mobile phones for terminals	Sufficient supports

Source: made by author

It is unnecessary and impossible to accomplish everything by using only an information network system in Japan, if "urging self-reliance for farmers (no reliance on administration, etc.)", "development of marketing of farm products", and "acquirement of needs of consumers" are the ultimate goals for operating information network systems. For example, in order to achieve these goals, the establishment and management of the direct sales shops should be playing an important role in urban areas, as follows.

a. The system, which makes farmers decide the price of their own products, urges the self-reliance of farmers.

b. By shipping farm products to direct sales shops, farmers can develop new markets by selling the products such as "curved cucumber" that cannot be sold at the markets.

c. It is very useful that farmers can know the needs of consumers by carefully observing the behaviors of consumers at the direct sales shops.

In short, the computer systems and information network systems help the management of direct sales shops efficiency.

On the other hand, the technical information network system is not only a supplementary method for meeting with farmers, but also an alternative method for contacting farmers by telephone. Internet sales are not the main methods for the majority of farmers, because most farmers mainly sell farm products at the markets and direct sales shops.

In Japan, we shouldn't achieve all objectives by using only information network systems. Therefore, it is very important to make clear the objectives of management of information network systems such as homepages operated by extension centers. We must think that the information network system is one of the methods for achieving the goal. To sum up, information network systems should be considered as one of the methods for urging self-reliance and the supplementary method for combining the other methods. If this point is made clear, the information network system will contribute to the farmers' self-reliance, the increase of farmers' incomes, and so on, for the majority of farmers.

Notes

1)It is a shortened form of "web log", which is a term used to describe an online journal. Most blogs are run by a single person or group of persons who post their thoughts on subjects or daily happenings. http://www.answerbag.com/q_view.php/5962

REFERENCES

Koichi Fukuda (2004), "A study on the Characteristics and Usage of the New Extension Methods in Agricultural Extension Activities: Focusing on the "New Communication

Technology" Based on Computer Systems, *Journal of Rural Community Studies*, The Agricultural Economics Society of Tokyo University of Agriculture [in Japanese with English summary].

Koichi Fukuda (2005), "Current Situations and Future Direction of Agricultural Extension Information Network System in Japan – Focusing on the Nationwide Extension Information Network System, *Seminar on Networking of the Agricultural Technology Transfer and Training*, APEC –Agricultural Technical Cooperation Working Group Agricultural Technology Transfer and Training (ATT&T)

Current Situations and Future Figure of Agricultural Information Network System for Farmers' Use in Japan

Koichi Fukuda

Japan Agricultural Development & Extension Association

Use of Personal Computers & the Internet in Japan

- The ratio of farmers

   Possess personal computers ： about **60 percent**

   Use the Internet ： over **40 percent**

- The number of farmers, who use the information network systems for <u>their own businesses, is limited</u>.

Purpose of this Paper

In order to contribute to the improvement of farm management

To study the future figures of the use of agricultural information network systems

The methods of the studies

1. To make clear the <u>general situations</u> of usage of the agricultural information network systems in Japan

2. To analyze the <u>actual cases</u>

   (1)   the "Azemichi Network System", which is the unique network system for <u>farmers</u>

   (2)   the homepages managed by <u>prefecture government</u> and <u>agriculture extension centers</u>

   (3)   the homepages operated by <u>farmers</u>

3. To consider the <u>current situations</u> and the <u>problems</u>

4. To propose <u>the future figures</u> of the systems for <u>farmers</u>

Results of Surveys on Farmers' Usage of Personal computers and the Internet

Usage of PC and the Internet	Ratio （%）	
	2001	2005
Farm houses possess PC	53.1	<u>61.2</u>
Use PC for their own businesses	9.7	<u>20.7</u>
Approved farmers use PC for businesses	36.2	36.5
Use the Internet with PC	32.8	42.2
Farmers possess mobile phones	74.3	70.9
Use the Internet with mobile phones	42.0	31.5

The results of the surveys conducted by myself

	Asparagus production area in Yamagata	Sweet potato production area in Chiba
Number of <u>Farm houses</u>	65	78
<u>Cultivated areas</u> per farm household	About 150 a	About 250 a
Farmers <u>over 50 years</u> old	80 percent	70 percent

Sources of acquirement of new technical information
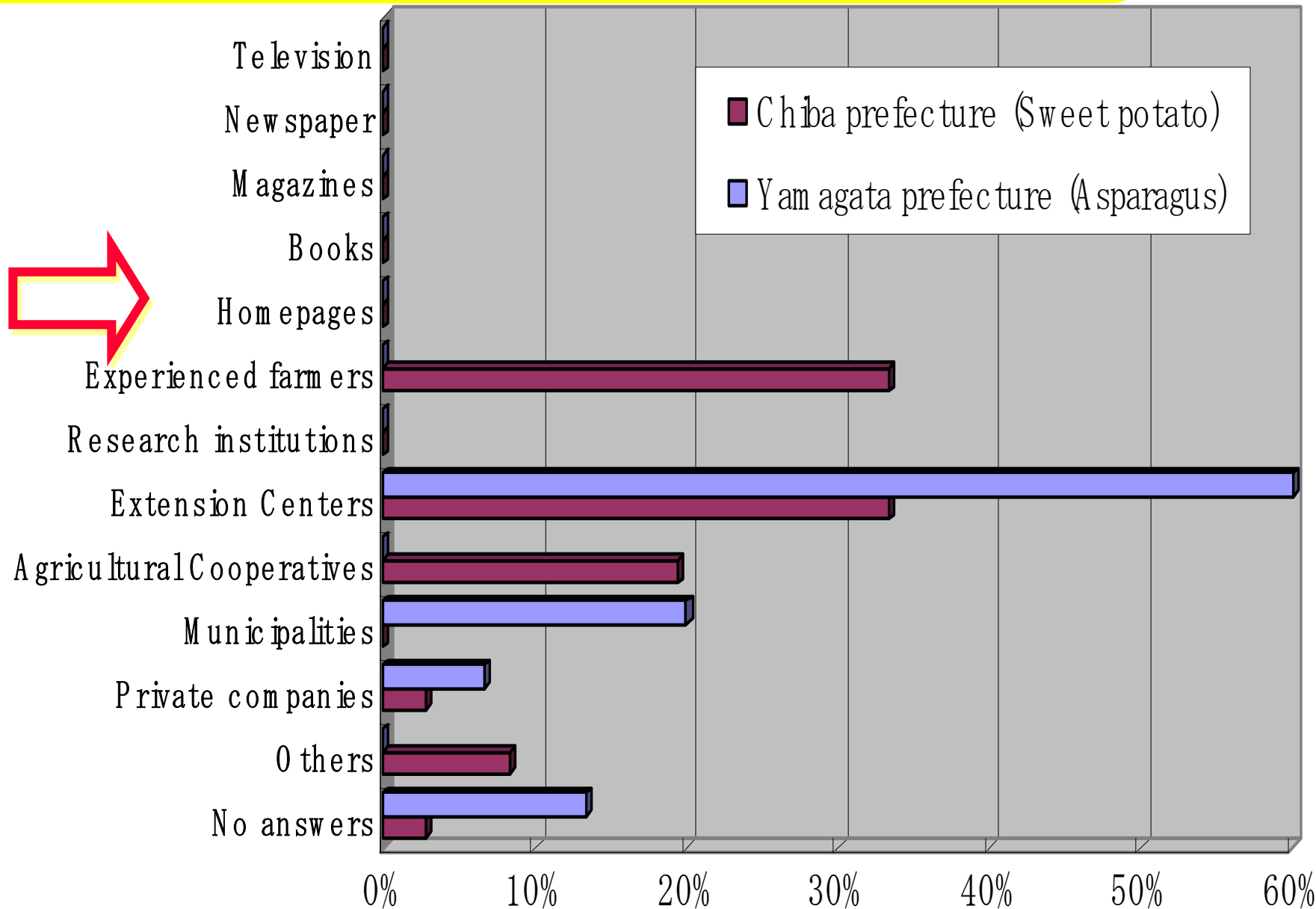
Legend:
- Chiba prefecture (Sweet potato)
- Yamagata prefecture (Asparagus)

Categories (top to bottom):
- Television
- Newspaper
- Magazines
- Books
- Homepages
- Experienced farmers
- Research institutions
- Extension Centers
- Agricultural Cooperatives
- Municipalities
- Private companies
- Others
- No answers

X-axis: 0% 10% 20% 30% 40% 50% 60%

Methods for supporting farmers by extension advisors

Chiba prefecture (Sweet potato)

Yamagata prefecture (Asparagus)

- Coming to farm house
- Visit to extension centers
- Meetings
- Study meetings
- Training seminars
- Telephone
- E-mail
- Fax
- Others
- No answers

0%   20%   40%   60%   80%   100%
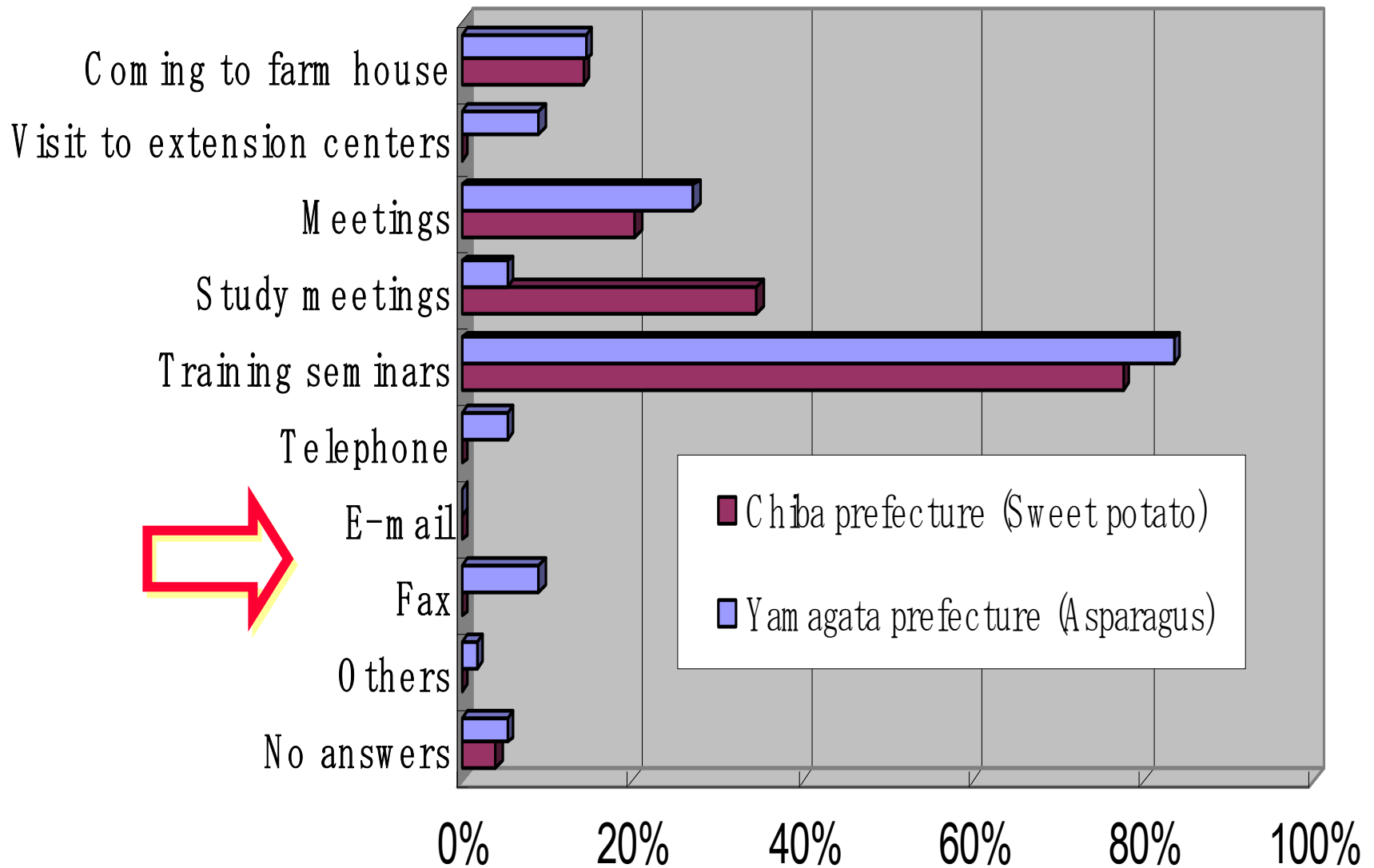
(Azemichi: footpath between rice and paddies)

- Started in 1998

- Main services : electronic forums

- Purpose: to encourage communications among farmers, extension advisors, etc. participating in the "Local Network System"

- Managed by JADEA

Ratio of farmers' participants of some prefectures in all prefectures

Prefecture
- Aichi
- Niigata
- Kagawa
- Gifu
- Kumamoto
- Shizuoka
- Ooita
- Wakayama
- Ehime
- Hyogo
- Kanagawa
- Saitama
- Okinawa
- Nagano
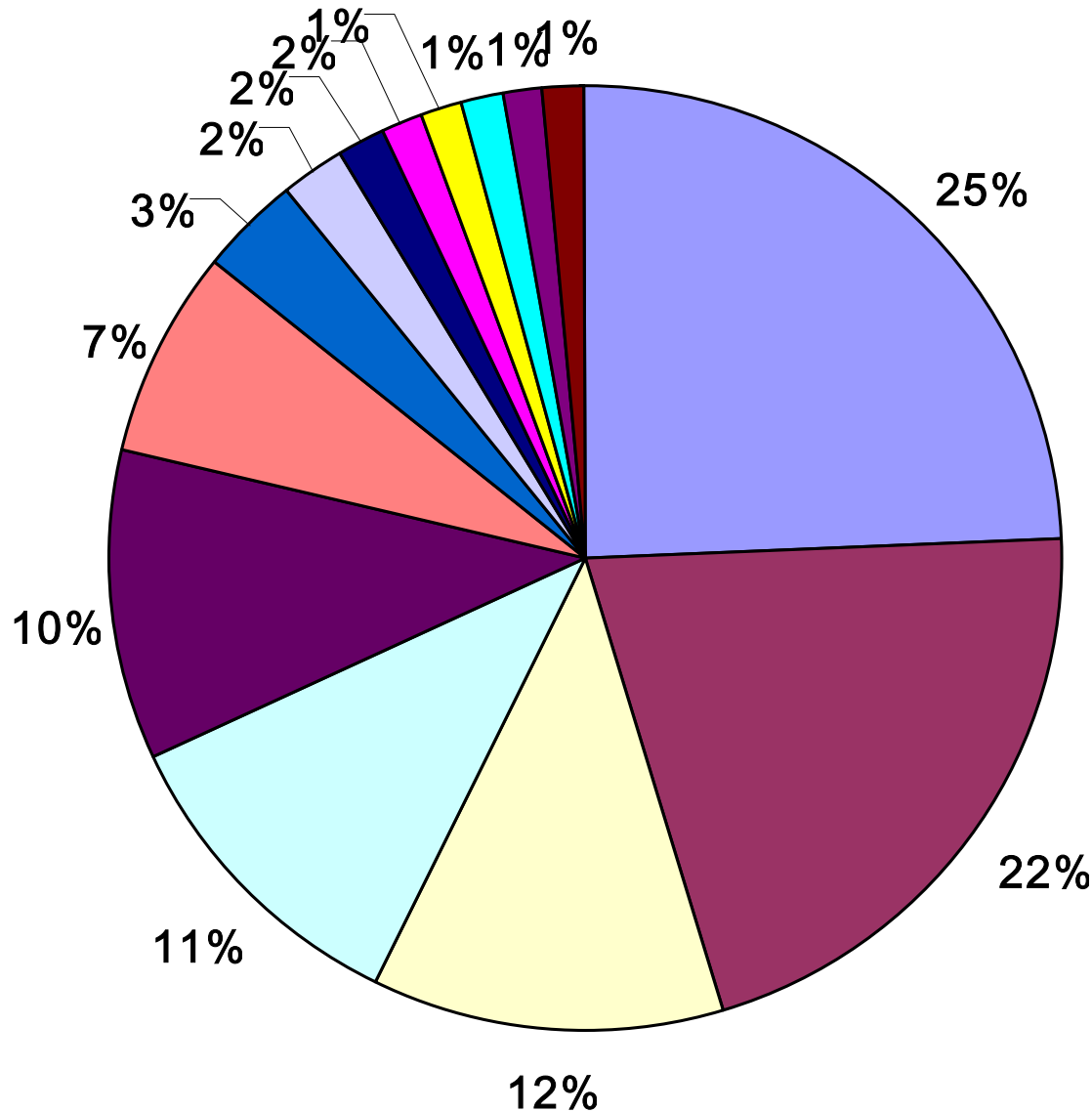
Trends of number of participants, and usage of the Azemichi Network system
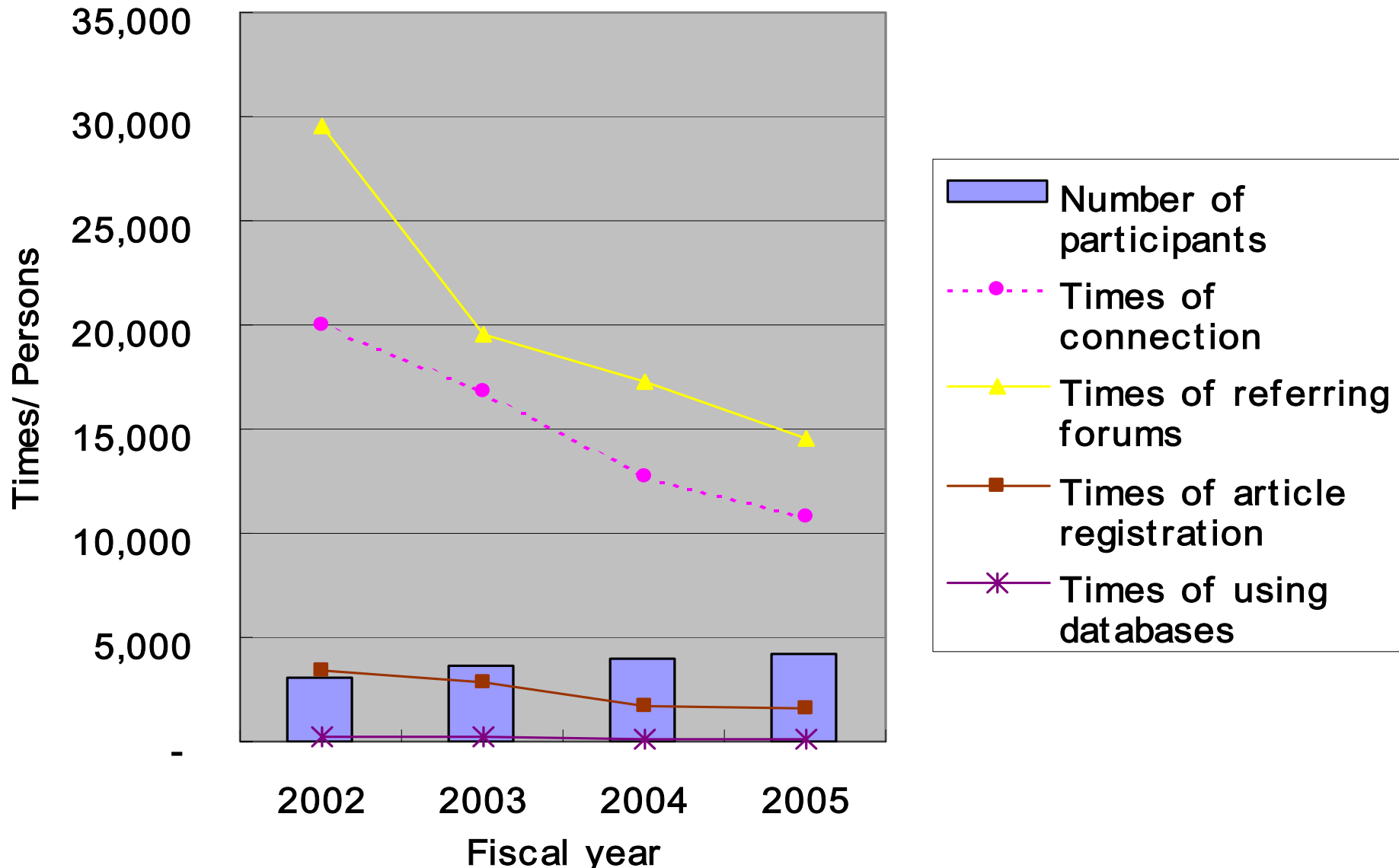
Usage of the Azemichi Network system

	More than 1 connection	More than 10 time connections	More than 1 article registration
2004 fiscal year	525	127	54
2005 fiscal year	425	125	44
Rate against 2004 (%)	80	98	81

- To have asked <u>two young farmers</u> as board operators

- To have asked <u>17 online consultants</u> & <u>400 researchers</u> (NARO) to quickly answer the questions

Example of the question by a farmer and the answer at the "The technical forum"

Question   from A farmer from Niigata prefecture

How shall I conduct the management of rice?

As a result of the continuous rainfall, the rice has not had sufficient sunshine.

The rice hasn't grown enough. What should I do.

Answer   from Dr. Sasaki, the Online Consultant

Topdressing should be applied until the meiosis stage.

The control measures for "Koshihikari BL" may be different from those for the other varieties. I recommend you ask extension advisors, etc. about what you should do.

Times of reference of the "Free discussion forum"
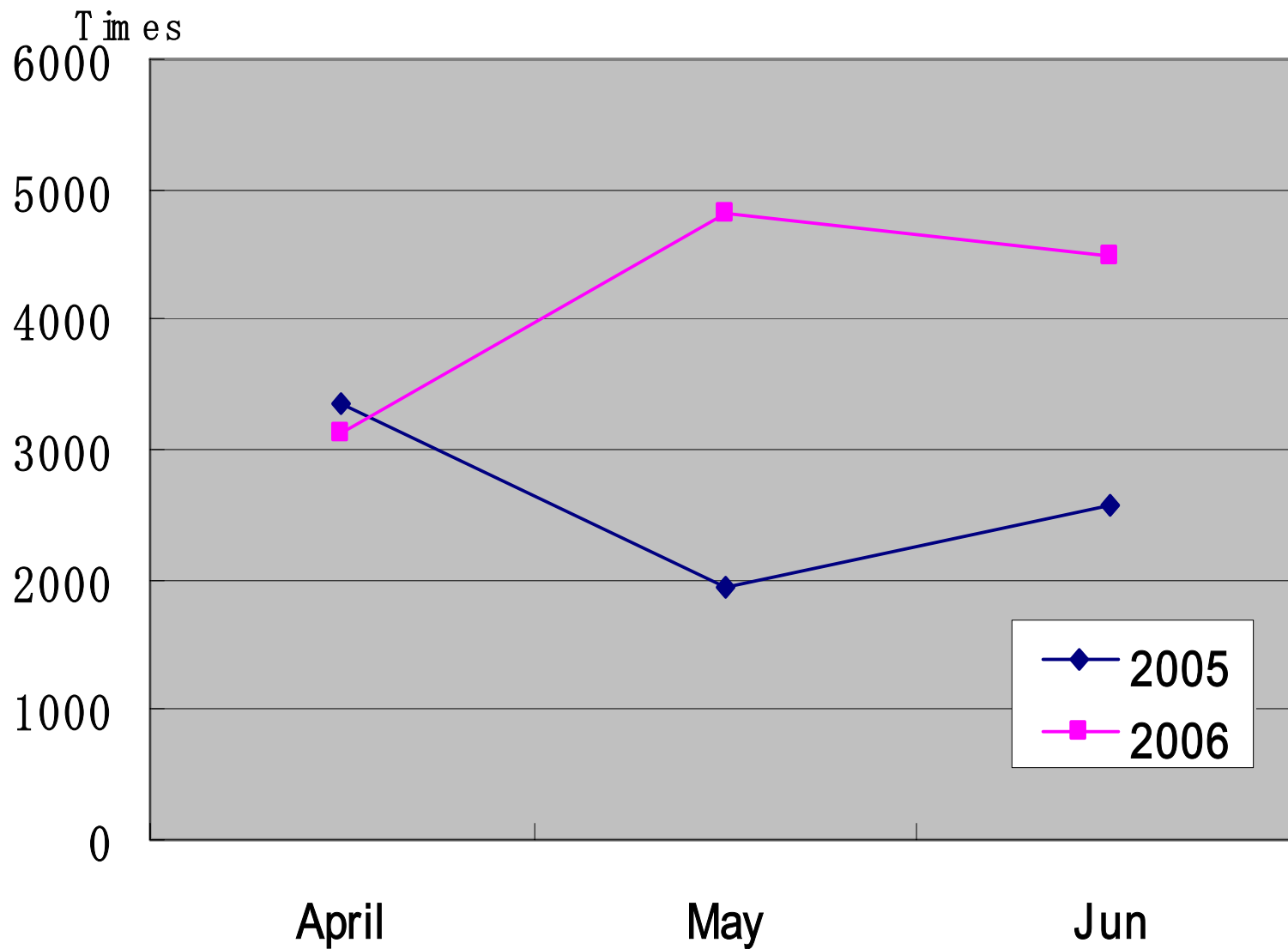
Problems

- The <u>number</u> of participants <u>hasn't increased</u> as much.

- <u>A few farmers</u> are actually using the system.

2. Homepages operated by prefecture governments and agricultural extension centers

- JADEA conducted the <u>questionnaires</u> in about <u>100 extension centers</u> in 2005

- To <u>access all homepages</u> of agricultural extension centers in 2005

- Most extension centers (97%) provide information at their <u>own homepages</u> or the <u>homepages</u> of <u>other organizations</u>.

The type of management for homepages of extension centers

Homepages managed by other organiza-tions
49%

Homepages managed by extension centers
51%
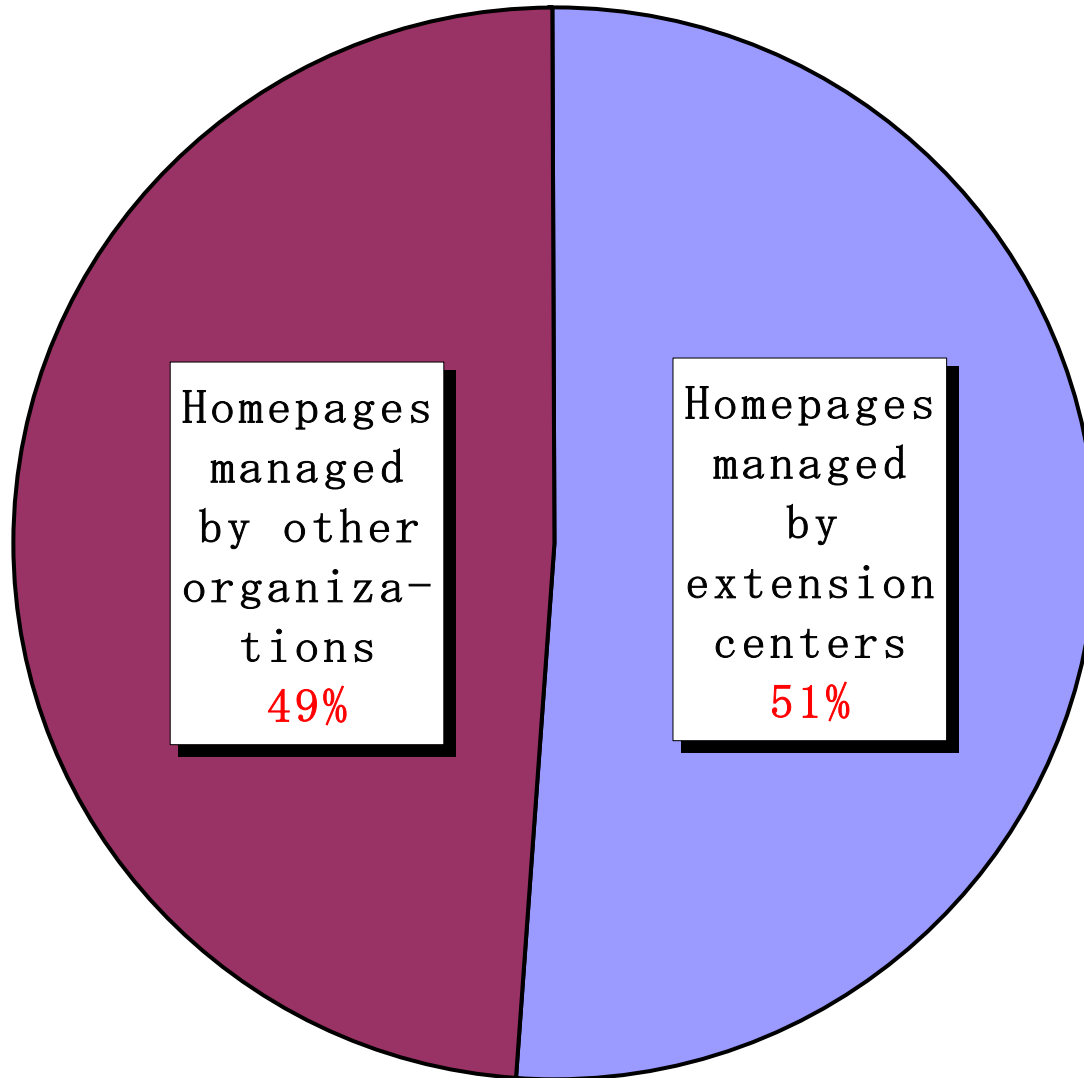
Targets of the homepages of extension centers
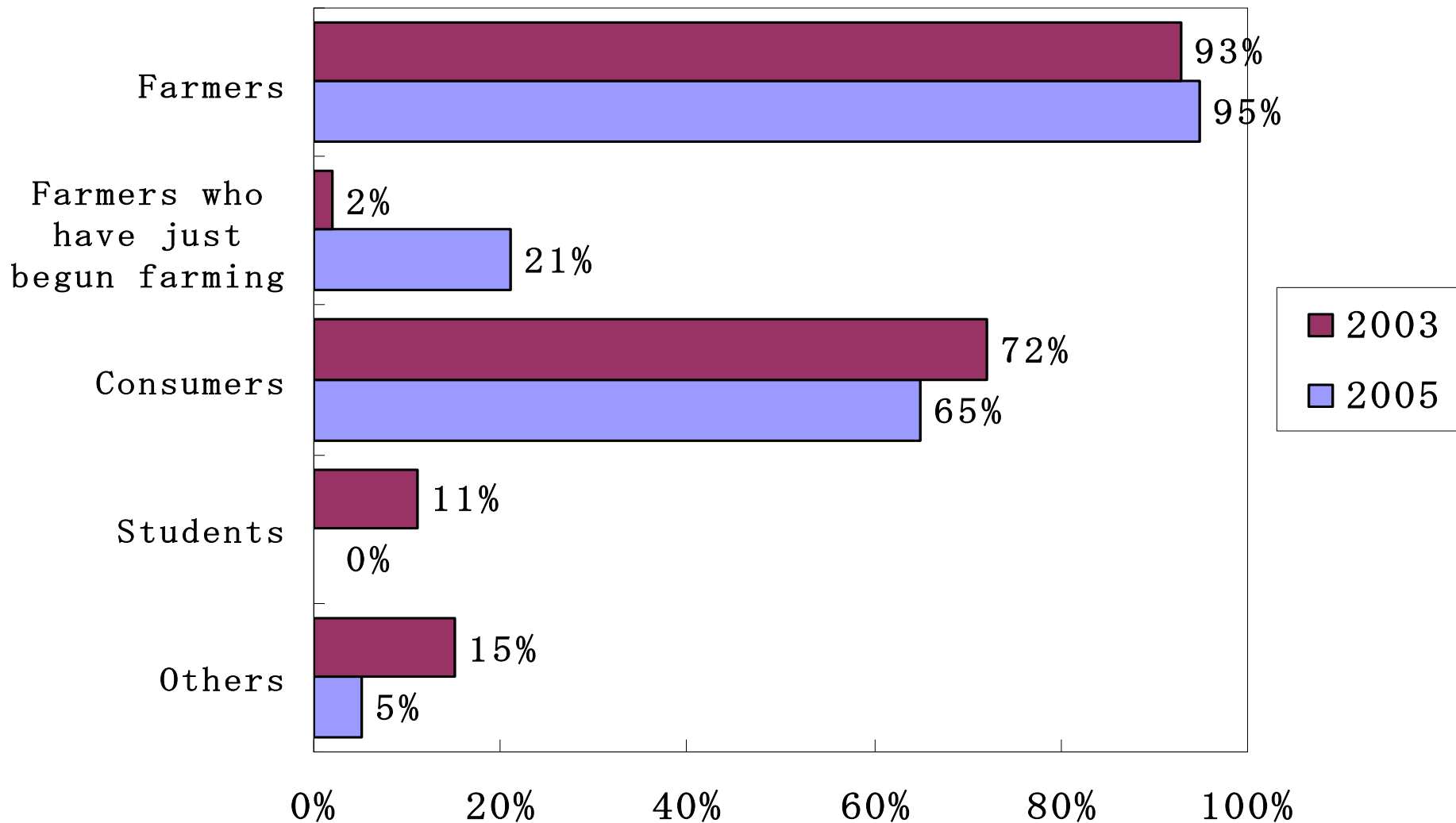
Cover pages of the homepages of extension centers
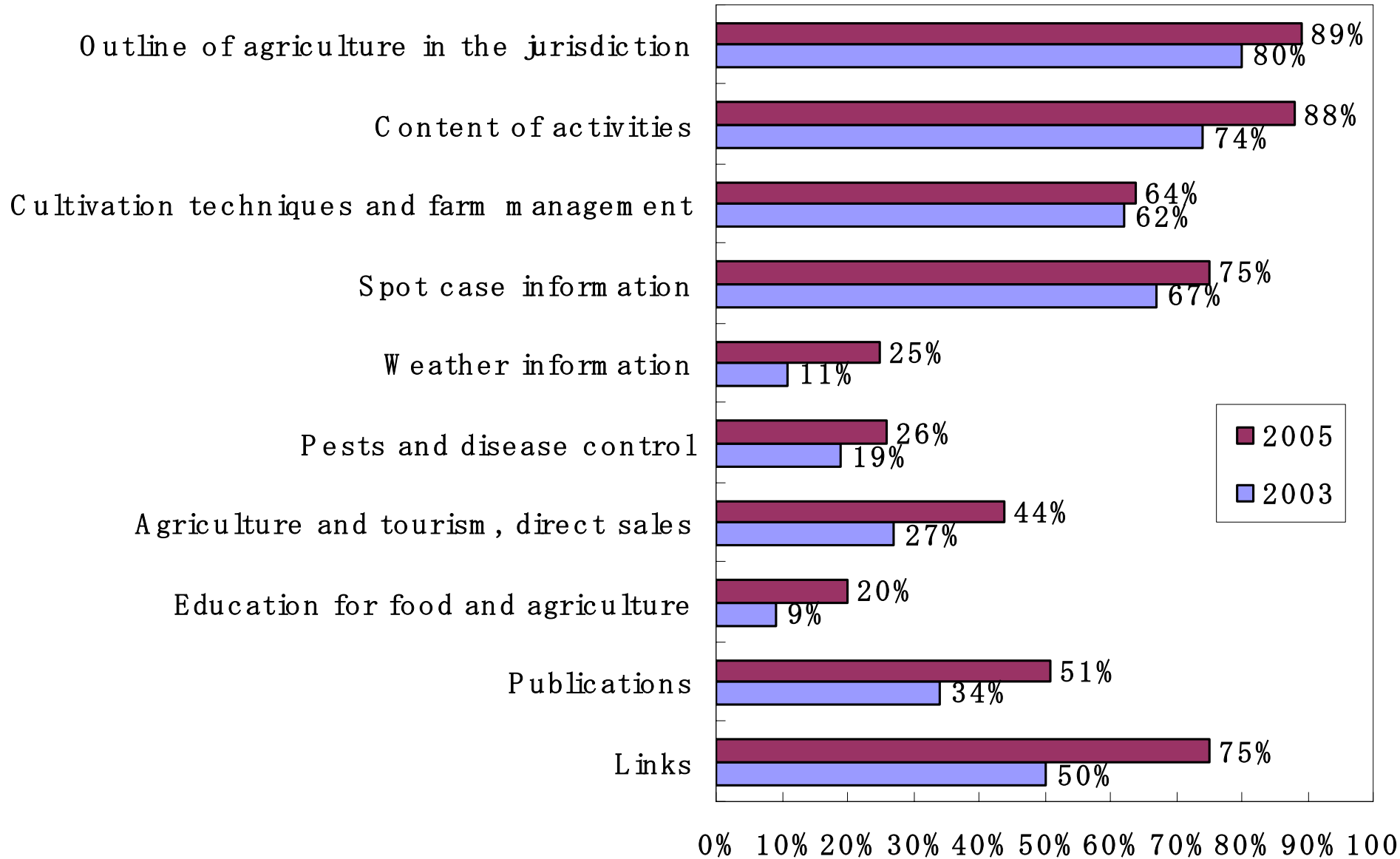
Some problems

- <u>Not</u> definitely placed as <u>a daily job</u> at extension centers

- The content of homepages is <u>not frequently updated</u>.

- The <u>special techniques</u> and <u>knowledge</u> are needed.

- The content has <u>not been made</u> based on acquiring <u>the users' needs</u>

3. Homepages managed by farmers themselves

Farmers' ideas for their own homepages

- **Publicity of farm management** ： to convey the current situations and opinions for the philosophy

- **Expansion of channels for sales** ： Making the new contracts and business

- **Communication with consumers**: methods for communications with consumers

The number of farmers classified by the ratio of Internet sales (in Hokuriku region)
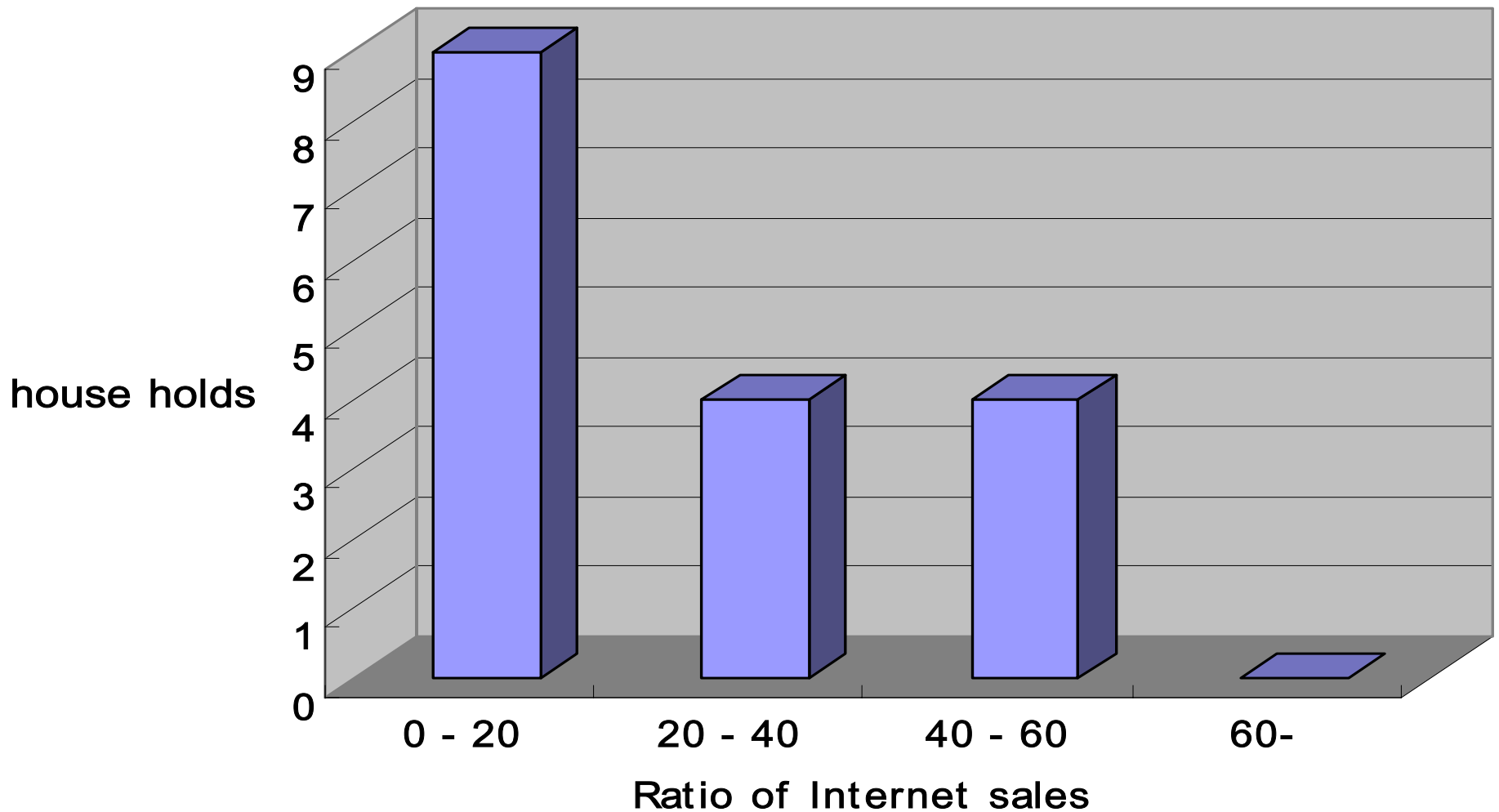
Some problems

- <u>Difficult to make new content</u> : to compete with attractive homepages made by other farmers

- Preparations are <u>needed to provide the attractive products</u> : as the price of products includes postage

- The establishment of homepages does <u>not guarantee</u> that <u>new customers will be acquired.</u>

4. Information network system at direct sales shops

- Direct sales shops, managed by municipalities, agriculture cooperatives, etc., accounts for approximately 2,400 all over Japan

- Farmers can decide the price of their products by themselves

- For the POS systems, telephones, mobile phones, E-mail by mobile phones, and fax are mainly used.

- Some of the strawberries farmers sell their products by using homepages.

The inside of a direct sales shop

A farmer can easily input the information of her products into the POS system by using a touch panel

(Case 1)

- In Nagasaki Prefecture, extension advisors have been sending <u>technical information</u> to mobile phones of about 90 strawberries farmers since August in 2004.

- The content of information : the timely information such as <u>cultivation techniques of strawberries</u>, <u>weather information</u>, <u>research findings</u>, and so on.

- The farmers <u>pay</u> 300 Yen (about 3 US dollars) a month.

- <u>Good evaluation</u> from member farmers
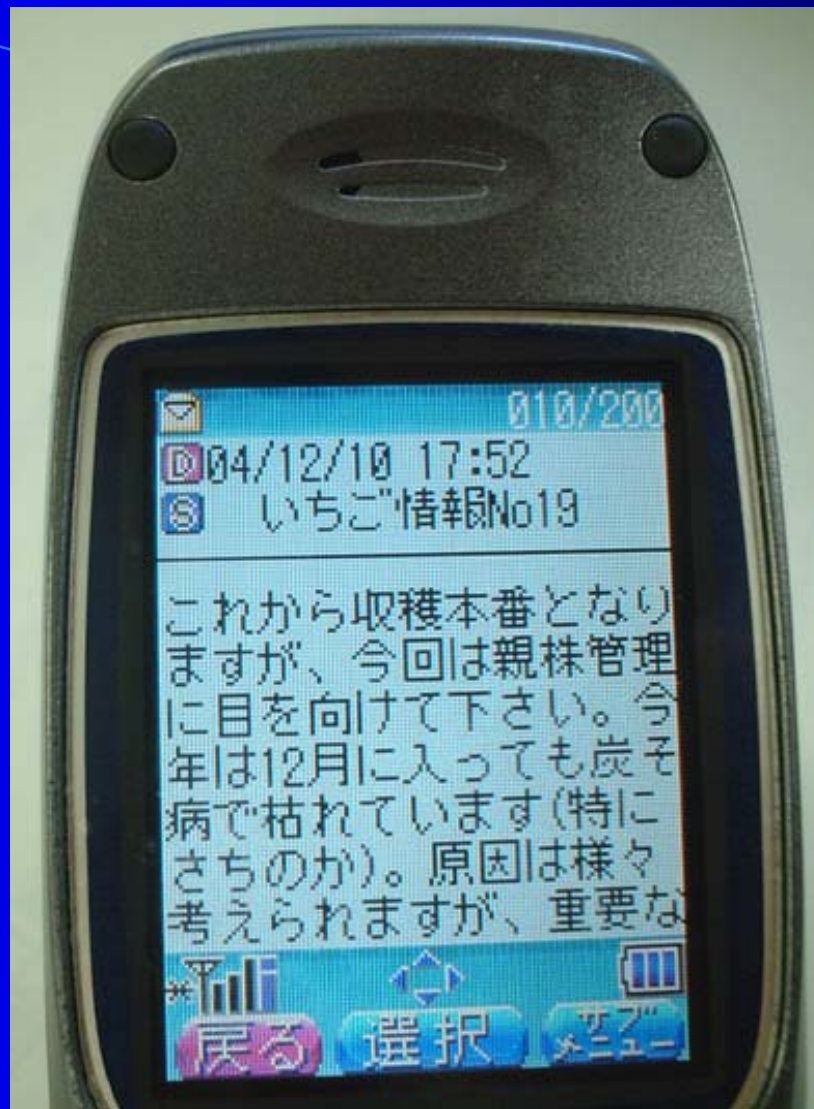
An example of the E-mail received with mobile phones

- *Actual Cases* -

(Case 2)

- In Toyama prefecture, extension advisors provide information to 63 "Nashi" pear farmers and 49 rice farmers by <u>sending E-mail</u> to their mobile phones.

- The interactive communication system has been established between <u>extension advisors</u> and <u>farmers</u>.

(Case 3)

- In Kumamoto prefecture, information on the <u>conditions inside greenhouses</u> is sent to farmers' mobile phones.

- The farmers can relax even if they stay at their house.

A "Nashi" pear farmer receiving information with mobile phone

CONSIDERATION - No. 1 -

- Around ten years ago, <u>personal communication network systems</u> had rapidly spread among some farmers.

- <u>Administrative organizations</u> had contributed to the spread of them.
  e.g. IT training courses, Local Network Systems

- In a last decade, <u>most of them have been closed</u>. Because "Google" and "Yahoo" have become popular.

⬇

The Negative Impact of Globalization

CONSIDERATION - No. 2 -

- Farmers, who used to be the receivers of information

  ⬇

  Positively deliver their own information to others.

- Farmers begin to use their homepages for direct sales shops.

- Farmers have been open to the public about the tractability of their farm products

CONSIDERATION - No. 3 -

- Sending <u>technical information</u> to <u>mobile phones,</u> have been <u>become popular</u>.

- For <u>POS systems</u>, <u>telephones</u> and <u>mobile phones</u> are mainly used to send the data of the sales to farmers.
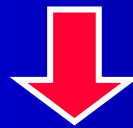
The information network systems using personal computers may not prevail.

The systems, based on the use of mobile phones, show the signs of more diffusion.

CONCLUSION - No. 1 -

Purposes	Targets and supported content		Supports from **advisors** & **researchers**
"Urging self-reliance for farmers" "Development of market of farm products" "Acquirement of needs of consumers"	<u>Advance farmers</u> <- a) how to make homepages b) Facilitating communication among farmers		<u>Minimum supports</u>
	<u>Ordinary farmers</u> <- a) friendly user interface b) Use of mobile phones for terminals		<u>Sufficient supports</u>

No.1

We shouldn't achieve all objectives
by using only information network systems

No.2

It is very important to make clear
the objectives of management of systems

No.3

The information network system is
one of the methods for achieving the goal.

.If this point is made clear,

No.4 The system will contribute to
the farmers' self-reliance,
the increase of farmers' incomes, etc.
for the majority of farmers.

END

Thank you for listening

**MODERNIZING THE PHILIPPINE EXTENSION SERVICES THROUGH ICT
(GENERAL REQUIREMENTS FOR ESTABLISHING NETWORKING SYSTEMS AT
NATIONAL, REGIONAL, AND GLOBAL LEVELS – THE PHILIPPINE MODEL)[1]**

Roger F. Barroga[2] and Luis Alejandre I. Tamani[3]

INTRODUCTION

The devolution of several governmental functions and services to the local government in 1986 included the extension service of the Department of Agriculture. Though beneficial in many respects, it affected the information flow from the research centers to the extension system, which was now fragmented, dispersed, and outside the "information loop."

The Agriculture and Fisheries Modernization act of 1997 offered a new way of restoring this link by embarking on a massive computerization program for the entire Department of Agriculture in what is now known as the National Information Network. To date, this network operates a nationwide satellite network of all its regional field units – providing private communication to the regional directors via video conferencing.

But there's more. The project provided funds for setting up of local area networks in the regional offices. In 1999, the Department of Agriculture issued an administrative order for all its bureaus and attached agencies to set up their IT departments or units, and start digitizing all available information for publishing on line through the DA website and databases.

In 2001, its research bureau, the Bureau of Agricultural Research, embarked on a nationwide computerization and interconnection of all DA R&D units, including selected State Colleges and Universities in project called, "Agriculture and Fisheries R&D Information System (AFRDIS).

The Agriculture and Fisheries Modernization Act (AFMA) of 1997 envisions that farmers and fisher folks will have access to modern agricultural and fishery technologies developed through research and development. As a parallel social goal, the Medium-Term Development Plan emphasizes that information and communications technology (ICT) shall be harnessed to bridge the digital divide among different regions and communities in the country. The use of ICT will transcend the legal and bureaucratic barriers in supporting the technicians.

On the other hand, the Philippine Research, Education, Government Information Network (PREGINET) project of the Advanced Science and Technology Institute (ASTI), through a grant from Japan, has laid down a nationwide data backbone for all government agencies and non-commercial private organizations to interconnect. With this alliance, the interconnection of their networks extends from Mariano Marcos State University (MMSU) in Batac Ilocos Norte and the Isabela State University (ISU) in Echague, Isabela in the north, and Butuan City and Cotabato in the South.

The challenge is to interconnect these available infrastructures, including the knowledge generators, content developers, network providers, learning centers, resource generators, and management experts, to provide e-extension services, distance learning, and market opportunities to extension workers and farmers in agriculture.

RATIONALE

Information and communications technology conveniences like telephone, internet, knowledge and information providers are still mostly centered in urban areas. Though these are now creeping towards the rural areas, the technology adaptation is still slow and being overtaken by the need of information in these rural areas.

The rural folks especially in the agricultural sectors don't have access to needed agricultural and market information. There is a wide gap between the farmers and information. The extension workers who were devolved to the local government units are likewise lacking access to the information of new technologies that render their knowledge obsolete.

There is now a need to adopt proactive strategy to bring ICT opportunities to rural and agricultural communities. ICT innovations are now being made available that harnessing these can bring the needed opportunities to them.

Information and knowledge generators are numerous but are dispersed. They cater to the same clientele but approach them individually.

OBJECTIVES

- Educate, train, and mobilize the stakeholders in agriculture using ICT and distance learning to bring about agricultural modernization;

- Provide e-extension services, advisory, and general knowledge on agriculture through on-line training;

- Communicate relevant information and knowledge through ICT and distance learning;

- Link policymakers, researchers, service providers, markets, business organizations, and farm communities in an open environment.

- To create a network of all knowledge generators;

- To provide access to farming communities for knowledge and e-commerce.

- To provide/develop a web-portal for the publishing of agricultural technologies, guides, information, and services to extension workers and farmers;

- To pilot various ICT modalities in providing solutions to farmers problems;

- To document experiences in using ICT as for development;

- To recommend best practices, technologies, systems for national up scaling.

CONTENTS

PhilRice Network

The Philippine Rice Research Institute (PhilRice), a national research and development agency attached to the Department of Agriculture (DA) established in 1986, was the first recipient of the Institutional Grant amounting to P5M to implement its local area network in year 2000.

The grant allowed PhilRice to interconnect its research facilities using fiber optics technology, and establish its own network operating systems providing local area network services, internet, email, and host its own website. The network operates 24/7 using state of the art equipment, Cisco routers, and switch routers. The grant also provided one year subscription for a 256 kbps leased line to the BAR where a 512kbps DSL internet is available.

In exchange, PhilRice organized all its available information on rice science and technology, and make these online – available for public access, sharing, and use. Within a year, PhilRice has completed its information infrastructure. In 2001, the BAR tapped PhilRice to implement its nationwide network project called the AFRDIS, and transferred funds to administer the implementation of cluster networks.

The Central Luzon Cluster was the first cluster to rise in the country, followed by the Mindanao Cluster, Visayas Cluster, then the Ilocos and Isabela clusters.

In 2002, due to its advanced network, the Advanced Science and Technology Institute (ASTI) as one of its access points in the PREGINET – a nationwide data backbone project, selected PhilRice. As access point, PhilRice is to connect or provide last mile connections to agencies that wish to join the network. ASTI provided PhilRice a computer and video conferencing equipment; on that same year, the said link was used in a teleconference in the US to review on going project with the IPM CRSP project.

And in 2003, with the completion of the VSAT project of the Department of Agriculture, PhilRice was again appointed as access point of DA, transferring satellite equipment, network routers, and a polycom teleconferencing equipment, including several PCs and TV monitor.

From 2002 to 2004, PhilRice built the LAN of its regional and provincial offices, interconnecting with the PREGINET access points when there is available. The first branch to link to an access point is the PhilRice Midsayap in Cotabato. It interconnected with the USM network, via wireless transmitter provided by a commercial Telco, Globe. The second branch office is the PhilRice Agusan. It is connected to the DOST Caraga, through a relay station, the NORMISIST College. The 3-way link was made possible by wireless microwave radios. The third station to interconnect is the PhilRice Batac, in Ilocos Norte – it is linked to the Mariano Marcos State University. This station, again, was linked initially to the University network via wireless internet using fabricated antenna equipment. In late 2003 t0 2004, Isabela cluster was organized, and our PhilRice-Isabela station, located 21 km away from the Isabela State University, interconnected using wireless, wifi internet technology. Last year too, the PhilRice Los Banos station in Laguna, interconnected with the UP Open University, also located inside the college campus. The link is 2.2 km away, but the fabricated wireless antenna made the Internet link possible. Except for its newly built station in Bacolod, Negros (Visayas), PhilRice now has an end to end web presence and connectivity through the PREGINET backbone.

In 2001 and 2003, JICA dispatched a database expert to help PhilRice share its information resources to the public. The expert developed a site called PRORICE, which is a repository of all web-based, digitized information sets. This website is now fully operational and is integrated into the Open Academy website.

All these developments were, in effect, acknowledgements that PhilRice was a little more advanced when it came to ICT. In fact, PhilRice and BAR were already dreaming of a nationwide setup. Thus, when the International Crops Research Institute for Semi-Arid Tropics (ICRISAT) came to these islands advocating one ICT for the whole country, PhilRice was readily offered and almost immediately seen as the most-ready initiator of what is now known by its complete name as the Open Academy for Philippine Agriculture (OPAPA).

Birth of the Open Academy for Philippine Agriculture

The idea of a virtual or ICT-based extension support system was picked up in India, with the successful use of ICT by the MS Swaminathan Foundation. One of their successful applications of ICT was in a fishing village in Pondicherry, where a simple computer set up, powered by battery and solar power, and using a vhf transmitter was able to hook up to an Internet provider in town and accessed the weather information of NASA. By knowing high schedule of high tide and low tide, or of impending storms, someone would announce that it was time to go to sea using a public address system. This enabled farmers to increase their catch.

This simple application and other stories in India inspired ICRISAT Director General Dr. William Dar to put up an ICT-based extension support system in the Philippines. Several meetings were set up with the Secretary of Agriculture Luis P Lorenzo by his senior advisor Dr. Santiago R. Obien, the director of the Bureau of Agricultural Research Dr. William C. Medrano, and the director of Philippine Rice Research Dr. Leocadio S. Sebastian resolved the plan to create a program that will become a major intervention to the current extension system, and which will be managed later by the Agricultural Training Institute. Another inspiration is the experience in Egypt, under the FAO supported Virtual Extension Research and Communication Network (VERCON), being negotiated in Pampanga by Dr. Forunato Battad, professor emeritus of the Central Luzon State University and Dr. Zosimo Battad, president of the Pampanga Agricultural College (PAC).

In May of 2003, Dr. Rex L. Navarro, Head of the Communication and Publications Services of ICRISAT, and in charge of donor relations, organized the first conveners' meeting at the Philippine Rice Research Institute in Nueva Ecija. The meeting sought to review current ICT initiatives of various stakeholders in agriculture, and present the plan to create a virtual extension support system to help modernize agriculture. In the meeting, PhilRice was designated the lead agency for the following reasons: (1) it has advanced ICT network facilities: (2) it has strong extension-communication content; (3) and it was the lead agency of the Hybrid Rice Program of the President Gloria Macapagal-Arroyo. It was agreed that as soon as the Agricultural Training Institute (ATI) has fully completed its ICT infrastructure and is ready, it would take over the project.

An advisory council was organized, to meet quarterly. A project manager was identified, to be assisted by a secretariat and four technical experts: (1) content development; (2) network and database; (3) social mobilization; (4) research and documentation. In July of 2003, members of the advisory council, the Secretary of the Department of Science and Technology, the Secretary of the Department of Agriculture, and the Director General of ICRISAT, the presidents of UP Open University, USM, CLSU, PAC, PhilRice, ASTI, DA-ITCAF, BAR, and IRRI, signed the Memorandum of Understanding establishing the Open Academy for Philippine Agriculture.

In the succeeding advisory council meetings, it was also agreed to pilot hybrid rice first, since this was the flagship program of the President, and there is already available information. The success in rice will serve as template for other crops, fruits and vegetables, fishery and livestock.

It was also agreed that there would be five pilot sites, all major hybrid rice growing areas first: Isabela, Nueva Ecija, Pampanga, and Davao provinces. Areas where there is PhilRice presence were identified as Expansion sites. In the pilot sites, it was agreed that there would be a lead agency, with an area manager to handle the implementation of the project in the area.

The lead agencies identified were those who had strong ICT program and infrastructure, where they can serve as learning centers and access points; and with expertise in various fields related to the technical working groups. Henceforth, the designated lead agencies were the Isabela State University for Isabela; Central Luzon State University for Nueva Ecija; Pampanga Agricultural College for Pampanga area; and University of Southern Mindanao in Kabacan North Cotabato – for the provinces of Davao del Sur and Davao Oriental.

In August 2003, the council advised the Project Director Mr. Roger F. Barroga, to prepare several funding proposals for the project. Proposals were made for JICA, IRRI, FAO, and to the E-Government Fund administered by the Information Technology and Electronic Commerce Committee (ITECC) – now Commission on Information and Communications Technology (CICT)

In November 6, 2003, the Open Academy for Philippine Agriculture was launched at PhilRice, with simultaneous video conferencing hook up in Manila, DOST-Bicutan, ASTI-Diliman, and in the five pilot sites Isabela (site RFU-Tuguegarao), USM-Kabacan; RFU-Davao; and PhilRice-Agusan. The event was also "streamed" or broadcasted in the Internet, allowing those in the

US and other parts of the globe to watch the event. We were also able to hook up with ICRISAT in India, where the DG Dr. Dar gave a message and in Singapore, where Dr. Rex Navarro was able to give his message.

The partner institutions

The **Department of Agriculture** (DA) is the agency of the Philippine government hugely responsible for the promotion of agricultural development. For this, "it provides the policy framework, helps direct public investments, and in partnership with local government units (LGUs) provides the support services necessary to make agriculture and agri-based enterprises profitable and to help spread the benefits of development to the poor, particularly those in rural areas." The DA's vision is captured in these words: "Sigla at yaman sa kanayunan!" (Power to the countryside!).

Information Technology Center for Agriculture and Fisheries (ITCAF) of the DA is the office that formulates policies and guidelines in the design, acquisition, maintenance, use and disposal of information technologies among DA units/offices and National Information Network (NIN) stakeholders and key players, as well as implements programs and projects to fulfill the DA's IT vision and mission for the 21st century.

The mission of the **Bureau of Agricultural Research** (BAR) is clearly put this way: "Our business is agriculture and fisheries research and development. We coordinate, fund and catalyze research, develop partnerships and institutional capabilities, manage knowledge and advocate policies towards improved governance and progressive agriculture and fisheries." Thus, it finds the need to cultivate an atmosphere of research excellence in these fields. BAR recognizes the critical role of R&D in the country even as it shares the vision of the DA of a "transformed technology-based rural economy characterized by empowered rural communities, high productivity and income, global competitiveness, sustainable development, and social equity."

The **Philippine Rice Research Institute** (PhilRice) of the DA is the lead agency in the National Rice Research and Development Network that is aimed at "continuously sharing responsibilities and resources, working towards a common goal of sustained self-sufficiency in rice." PhilRice's initiatives lie in development of new or improved varieties, farm machinery, and crop management techniques, including information generation and technology promotion. To date, it has seven branch offices located strategically in representing the different agro-climatic conditions of the country. The main office is located in the central plains of Nueva Ecija. Up north is the PhilRice Ilocos Norte, representing dryland agriculture. Northeast is the PhilRice Isabela station, representing the Hybrid Rice center. In the Visayas is the PhilRice Negros station in Bacolod; down south we have PhilRice Agusan, representing the soil nutrient management center; the PhilRice Midsayap in North Cotabato, representing the Pest management center. And PhilRice Los Banos – nestled inside the University of the Philippines Los Banos and adjacent to the International Rice Research Institute. It is the principal office and the Rice Grain Quality center.

The **regional field offices of the DA** carry out the mandate of the department in 14 diverse regions all over the country.

The **Regional Integrated Agricultural Research Centers** (RIARCs) of the DA are themselves R&D networks aimed at responding to the technological needs for furthering agricultural development in the regions.

The **Philippine Carabao Center** (PCC) of the DA is mandated to "conserve, propagate and promote the Philippine carabao as a source of draft animal power, meat, milk and hide to benefit the rural farmers." The PCC's mission is "improving the general well-being of rural farming communities through Carabao genetic improvement, technology development and dissemination, and establishment of Carabao-based enterprises, thus ensuring higher income and better nutrition."

The **Agricultural Training Institute** (ATI) is extension and training arm of the DA. Republic Act 8435, or the Agriculture & Fisheries Modernization Act (AFMA) mandated ATI to lead in the formulation of the national agriculture and fisheries extension agenda, including the budget. Beneficiaries of ATI services are LGU officials, extension workers, farmers, fisherfolk, entrepreneurs, officers & members of cooperatives, and rebel returnees.

Region I	ATI Regional Training Center, based at Sta. Barbara, Pangasinan, with its Provincial Training Centers in Batac, Ilocos Norte and San Fernando, La Union
Region II	ATI Regional Training Center, based at Cabagan, Isabela, with its Provincial Training Center in San Mateo, Isabela
Region III	ATI Regional Training Center, based at Dinalupihan, Bataan, with its Provincial Training Centers in Magalang, Pampanga and Munoz, Nueva Ecija
Region IV-A	ATI Regional Training Center, based at Los Banos, Laguna, with its Provincial Training Center in Trece Martires, Cavite
Region IV-B	ATI Regional Training Center, based at Naujan, Oriental Mindoro
Region V	ATI Regional Training Center, based at Guinobatan, Albay, with its Provincial Training Center in Pili, Camarines Sur
Region VI	ATI Regional Training Center, based at Banga, Aklan, with its Provincial Training Centers in Mambusao, Capiz and Hamtic, Antique
Region VII	ATI Regional Training Center, based at Tagbilaran, Bohol, with its Provincial Training Center in Cebu City
Region VIII	ATI Regional Training Center, based at Baybay, Leyte, with its Provincial Training Centers in Palo, Leyte and Borongan, Eastern Samar
Region IX	ATI Regional Training Center, based at Roxas, Zamboanga del Norte with its Provincial Training Center in Ipil, Zamboanga Sibugay
Region X	ATI Regional Training Center, based at El Salvador, Misamis Oriental with its Provincial Training Centers in Musuan, Bukidnon, Cagayan de Oro City and Iligan City
Region XI	ATI Regional Training Center, based at Panabo, Davao del Norte
Region XII	ATI Regional Training Center, based at Tantangan, South Cotabato with its Provincial Training Centers in Kabacan, North Cotabato and Midsayap, North Cotabato
Region XIII	ATI Regional Training Center, based at Butuan City, Agusan del Norte
CAR	ATI Regional Training Center, based at La Trinidad, Benguet
ITCPH	ATI-International Training Center on Pig Husbandry, based at Lipa City, Batangas
ARMM	ATI Regional Training Center, based at Sultan Kudarat, Maguindanao (Concurrent staff to come from ATI Regions IX, X and XII).

The **Bureau of Postharvest Research and Extension** (BPRE) of the DA was created on May 24, 1978 through PD 1380 and "tasked to spearhead the development of the country's postharvest industry." BPRE has patiently struggled in its mandate of conducting postharvest R&D as this is one area where rice scientists can make a difference in the lives of farmers. In the country, postharvest losses in rice run up to 16%; in Mindanao alone, just the drying of palay by appropriate machinery has reduced farmers' overall financial losses by about 40%.

The **Central Luzon State University** (CLSU) at the Science City of Muñoz, Nueva Ecija is a regional center of excellence in the field of agricultural instruction, research and extension. It is mandated to provide "professional and technical training in agriculture and

mechanic arts, provide advanced instruction, promote research, literature, philosophy, the sciences, technology and the arts." Today, CLSU is one of the premiere state institutions dedicated to agriculture in the Philippines and in Southeast Asia known for its breakthrough researches in aquaculture, ruminants, crops, orchard and water management.

The **Department of Science and Technology** (DoST) is the national arm for promoting science and technology in the service of development. The DoST provides the overall direction, leadership and coordination of science and technology activities in the country and formulates policies in support of these. The Medium-Term Plan of the DoST for 1999-2004 outlines the S&T programs and projects aimed at pursuing the vision of "a competent and competitive science community with a social conscience."

The **Advanced Science and Technology Institute** (ASTI) is the agency of DoST mandated to conduct R&D in the fields of communications engineering, microelectronics and information technology. ASTI is currently implementing one of DoST's flagship projects, the Philippine Research, Education and Government Information Network (PREGINET). The PREGINET is designed to provide nationwide broadband link of government, academe and research institutions.

The **Philippine Council for Agriculture of the Forestry and Natural Resources Research and Development** (PCARRD) is one five sectoral councils of the Department of Science and Technology (DoST). To plan, coordinate, evaluate and monitor the national R&D program in agriculture, forestry and natural resources, PCARRD today is the government's chief instrumentality. It supports and maintains 14 consortia in the country, the better to consolidate and coordinate the R&D agenda in those areas: Ilocos Region, CAR, Cagayan Valley, Central Luzon, Southern Luzon, Bicol Region, Western Visayas, Central Visayas, Eastern Visayas, Northern Mindanao, Western Mindanao, Caraga, Southern Mindanao and Central Mindanao. **The Farmers' Information and Training Centers** (FITS) were organized in various regions of the country by PCARRD with the help of LGUs. FITS is part of the Techno Gabay (Techno Guide) Program of PCARRD. The objective of FITS is to "improve access to information and technology services by various stakeholders" in their own locales. There are 77 FITS hosted by LGUs, 21 by the DA, 11 by SCUs, 3 by NGOs, 3 by DoST-PSTC, and 1 by DENR.

Isabela State University (ISU) Cabagan in Northern Luzon is one of the better state universities in the Philippines. It is one of the Centers of Excellence in Education (Forestry) chosen by the Commission on Higher Education (CHED).

The **Pampanga Agricultural College** (PAC) is one of the more prestigious state colleges of agriculture in the Philippines. Located in Central Luzon, the rice granary of the Philippines, PAC is a cooperating station of the National Rice R&D Network.

The **University of Southern Mindanao** (USM) is one of the leading universities in Mindanao. It has a fourfold function of instruction, research, extension and production. The USM is committed to produce competent humans, generate and promote appropriate technologies to improve the quality of life in its service area. USM President is Virgilio G. Oliva.

The **University of the Philippines Open University** (OPOU) was established by the UP Board of Regents on February 23, 1995 in order to "respond to growing demands for quality graduate and undergraduate education even in areas which do not have a UP campus." The OPOU is the 6th constituent unit of the UP System, which includes UP Baguio, UP Diliman, UP Los Baños, UP Manila, UP Mindanao and UP Visayas. Its headquarters are in Los Baños, Laguna. UPOU Chancellor is Felix Librero.

The **International Crops Research Institute for Semi-Arid Tropics** (ICRISAT), whose Director-General is a Filipino, Dr. William D. Dar, inspired and supported these 19 institutions in the country to integrate their knowledge banks in order to provide extensionists and farmers one ubiquitous and omnipresent access to experts, experiments and experiences in trying to answer questions or solve problems in rice agriculture.

The **International Rice Research Institute** (IRRI) is a major Open Academy partner. IRRI is "a nonprofit agricultural research and training center established to improve the well-being of present and future generations of rice farmers and consumers, particularly those with low incomes. It is dedicated to helping farmers in developing countries produce more food on limited land using less water, less labor, and fewer chemical inputs, without harming the environment." It is one of the 16 members of the Consultative Group on International Agricultural Research (CGIAR) which includes CIMMYT in Mexico, ICRISAT in India, WorldFish in Malaysia and IPGRI in Rome.

Operational Framework

All agricultural technology and information of participating agencies will be organized and deployed in the a website – a portal – where extension workers and farmers may avail of e-learning modules, knowledge banks, diagnostic tools, decision support systems, digital images, online databases, advisory services, and interactive tools such as email, sms, chat, and forum.

All participating agencies will be involved in the maintenance of the network, training of extension workers in ICT, content development, social mobilization, and research and documentation.

Participating extension workers in turn, will assist groups of farmers and serve as information broker. The extension worker will turn to the system for any information requested by his constituent farmers. Or he may connect farmers directly to experts – who will be online – or through sms technology. Farmers can directly access information and services through sms-based applications and a call center to assist farmers' queries.

Project Components

1. **Internetworking or convergence among government networks** - There are now three government nationwide data backbones: PREGINET of ASTI, DA-NIN VSAT, and the DA-BAR AFRDIS Cluster Networks. These backbones are now fully operational, however, they are working independently. By interconnecting these backbones under a common program, the access points shall multiply, allowing more agencies to link up.

2. **Last mile connections of agencies to access points** - Through access points from PREGINET, DA-NIN VSAT and AFRDIS clusters, content providers and learning centers such as PhilRice Branch offices, the DA-ATI Centers, the RIARCs, and state colleges and universities (SCUs) can be connected in a composite government high speed backbone.

3. **E-Learning** – Available technology and information will be digitized and converted to e-learning modules and deployed in the Internet web portal. This will allow extension workers may update anytime, anywhere. Online courses may be short term, diploma or certification programs, which will be conducted jointly with open universities providing distance education.

4. **Advisory Services and General Knowledge in Agriculture** – Key to extension workers' effectiveness is the right information at the right time. Information must be packaged in such as was as to provide diagnostic analysis of situations, feasibilities, or scenarios, as well as causal factors and confirmatory information. Knowledge banks, general production guide, diagnostic tools, visual and learning resources, FAQs, directories, markets, sellers, buyers, seed sources, production statistics, soil and weather map, pest profiles, GIS-maps, crop suitability maps, SMS service for query and email notification, digital library, interactive network services will be made available to our extension workers.

5. **Social Mobilization, Training, Capacity Building** – creating public awareness, buy-in, participation in the open academy, sharing of resources, expertise, knowledge; upgrading the IT skills and literacy of extension workers, training content developers in multi-media; training IT manpower to maintain the networks;

6. **Project duration is three (3) years.** The initial year will focus on rice. Succeeding years will focus on other crops, fishery, and livestock.

7. **Location/Scope** – the pilot areas will focus on hybrid rice growing areas in **Isabela, Nueva Ecija, Isabela, Pampanga, Davao Provinces. Expansion areas will include those with** rice-based farming systems (diversified cropping systems), nutrient and pest problem areas of **Ilocos, Agusan, and Cotabato provinces**

8. **Target Beneficiaries** - Agricultural technicians devolved in local governments, extension agents, scientists and technical experts in the different government offices, farmers'/people's organizations, schools and universities. By the numbers, we expect to benefit some 17,000 agricultural technicians; 50,000 hybrid rice growers, and 1 million rice farmers.

9. **Roles of Implementing Agencies** – Participating agencies will have one or more of the following functions: as network provider, content provider, content developer, learning center, social mobilizer, and resource mobilizer.

a. Network Providers - Department of Science and Technology-Advanced Science and Technology Institute (DOST-ASTI) – through PREGINET; Department of Agriculture-Information Technology Center for Agriculture and Fisheries (DA-ITCAF) – through National Information Network (NIN) and AFRDIS (clusters);

b. Content Providers - Philippine Rice Research Institute (PhilRice); International Rice Research Institute (IRRI); Bureau of Agricultural Research (BAR); Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD)- Farmers' information and Technology Services (FITs); DA-Regional Integrated Agricultural Research Centers (RIARCs).

c. Content Developers - PhilRice, IRRI, University of the Philippines – Open University (UPOU), PCARRD, ATI – Agricultural Training Institute, State Colleges and Universities (SCUs) such as Pampanga Agricultural College (PAC), University of Southern Mindanao (USM), Central Luzon State University (CLSU), and others;

d. Learning Centers - Agricultural Training Institute (ATI), SCUs such as USM, CLSU, PAC, Isabela State University (ISU), Mindanao State University – Iligan City (MSU-IIT), Northern Mindanao State Institute of Science and Technology (NORMISIST), and others
Local Government Units (LGUs)

e. Social Mobilizer - International Crops Research for Semi-Arid Tropics (ICRISAT); PhilRice; CLSU, USM; broadcast media organizations; people's organizations;

f. Resource Mobilizer - DA, BAR, PhilRice (for the start up funds of Php3.5M); international organizations, private sector; foundations;

Project Milestones

Opapa bags E-Government Funding

In September 2004, the Commission on Information and communications Technology (CICT) approved the P191 million funding of four ICT-based farm support programs, which it now calls, e-Farm. These projects include the E-Consortia project of PCARRD; the Open Academy for Philippine Agriculture by PhilRice, the e-Agrikultura project of the Department of Agrarian Reform (DAR) and the Development Academy of the Philippines (DAP). This project was favorably endorsed by NEDA to the DBM. PCARRD will get about P93million to strengthen its e-consortia system and interconnect 80 FITS centers nationwide.

PhilRice, representing the OpenAcademy project, will get about P70 million for some network connectivity and maintenance of network backbones. The bulk of this fund, however, will be used for content development – conversion of analog information to digital, development of knowledge banks and e-learning modules, online databases, and IEC materials. DAR will

bring Internet commerce to its agrarian reform communities and business in its kiosks; the DAP on the other hand, will bring in management expertise and provide bridging fund and will need about P21 million in the next three years. The project will be implemented 2005 to 2007.

In December of 2004, due to budget constraints, the fund was trimmed down by the DBM to P168.7 million. In spite of this cut, this is perhaps the biggest commitment by government to invest on ICT content and services delivery.

Open Academy is Pinoy Farmers' Internet

During the December 2004 meeting of the OPAPA advisory council meeting, it was resolved to highlight the name Pinoy Farmers' Internet: Open Academy for Philippine Agriculture. Part of the resolution called for the translation of the content in the Pinoy Farmers' Website into local dialect.

Pinoy Farmers' Internet Web Portal

We now have a prototype portal (**http://www.openacademy.ph**) that can be viewed in the Internet. The portal has knowledge banks, e learning, and e-commerce links. An important link is the local dialect tab, so that farmers can read the website in their dialect. A best practices link will also upload information from below. The e-commerce site will become a virtual exchange point – linking producers and markets – so as to reduce the number of middlemen. The site will start with rice information, and build on to include other crops, fruits and vegetables, fishery and livestock.

Connectivity solutions: Low-Cost High Speed Internet

Many areas of the country still do not have fixed telephone line making it difficult to even install dial-up connection. One the other hand, dial-up connection is one of the slowest Internet connections at only 54kbps. The advent of inexpensive wi-fi radio transmitters and devices provided new opportunities for using wireless Internet technology.

The existing microwave radio transmitters costs from P80,000 to P150,000 per pair; the grid antenna that comes with it will cost another P11-15,000. Mr. Virgilio Oliva, Jr. the head of the ICT of University of Southern Mindanao, was able to download antenna designs from Australia and began fabricating low cost antenna's that would extend the reach of the low cost radio transmitters. These transmitters cost from P6,000-9,000 but their range is very short – from 800 to 900 meters only.

By designing and fabricating our own antenna, Mr. Oliva and I were able to extend the range of this radio from 800 meters to 2 km. The farthest was 34 km when paired with a 100mw radio transmitter using directional antennas. Starting 2002, PhilRice and USM joined together to test these designs in PhilRice's branch offices networks in Batac Ilocos Norte, Isabela, Nueva Ecija, and Agusan del Norte.

The best design is to cluster agencies or offices or barangays within a 20km radius. A lead agency will subscribe to an Internet provider, then install a 100mw radio transmitter as the base with an omni antenna to distribute the Internet. Each cluster member will install an antenna mast, transmitter, and a directional antenna pointed to the base station. Each member pays or shares the cost of the common Internet.

We have done this in Mindanao, Isabela and Central Luzon and it works. It is the perfect solution for a campus LAN. Not many know it, but even before La Salle announced its wireless campus Internet, the University of Southern Mindanao was already an Internet campus – using wireless radios. NORMISIST College is fast catching up. The low cost wi-fi radio transmitters with their fabricated antennas give you high-speed Internet performance, videoconferencing, and voice over IP services.

With the presence of network backbones and access points, local government units, research agencies, farmers' cooperatives, barangays, and even individuals, can now be connected with high speed broadband internet using these innovations.

ICT for Extension Workers: Busting the Fear Factor

To date we have trained some 108-extension workers on using the Internet. These extension workers were from Isabela, Pampanga, Nueva Ecija, Davao, and Cotabato provinces.

The trainings were conducted right in their area, the facilities and experts coming from the pilot sites. In Isabela, the Isabela State University in Echague provided the training venue and 35 paces all with Internet connection. ISU is a member of the AFRDIS and was designated as the cluster leader for Isabela Cluster. Likewise, the Central Luzon State University (CLSU) provided the computer facilities with Internet for the training of some 45-extension workers of Nueva Ecija. The Pampanga Agricultural College (PAC) provided more than 50 paces with Internet. We had to divide the class because of the big turnout in this campus. The University of Southern Mindanao in Kabacan, North Cotabato – hosted the training of extension workers coming from Davao del Norte, Davao del Sur, Davao Oriental, and Cotabato. The USM is the lead of the Mindanao cluster and is one of the biggest Internet providers in the area – serving more than 13 agencies including the local government unit. It is bigger than an ISP.

At the end of their two-day hands on training, they had their own email account, they learned how to attach documents such as word and excel files in the email, they learned how to take digital pictures and send as attachment in their email, and they learned how to search for information in the Internet using Google and yahoo. They also learned how to use the Rice Doctor diagnostic tool, use the e-learning modules on rice production, and take online test in the learn rice module. All in two days for even those who have never used a PC before. These are mid-career on the average, the most senior participants were aged 55 to 61.

The format, training approach, grouping, and presence of mild mannered assistance contributed to the success in learning. On deeper analysis, it is the fear factor that constrains learning how to use the computer. It is fear of ridicule more than the fear of the technology. The major difficulty they had was how to use the mouse. Having conquered the mouse, they have also conquered their fear.

It is important that facilitators are sensitive about this. Make sure that the first timers are joined together. If another room is available, separate those who already know how to use the computer. I designed the setting in such a way as there is maximum hands-on – no complicated lectures or concepts at first – just straight to the point. I had I facilitator to assist 3 participants. For a group of 30, I had 10-computer assistants – mild mannered, patient, and accommodating – ready to show how it is done. On the second day, we asked the participants to join an e-group and elect a leader or moderator, and then allowed them to interact, chat, and send email and documents to each other. Today, we send weekly tips to these participants by email and sms.

The success of this approach is that we have busted their fear factor, we have made them appreciate the power of the computer as their tool, and we have made advocates of ICT in the local government. Sometimes the funds are there, it's just a matter of perception and priority.

Knowledge Management and Content Development

Early this year, PhilRice Executive Director Dr. Leocadio S. Sebastian issued a policy directive to organize all technology information and databases on line. Eleven database projects were identified which will be deployed online. This includes rice variety search, genetic resources, rice-product match, seed net growers, hybrid rice producers, training alumni, rice statistics, rice weather information system, and the sms-based seed inventory system, among others.

These services can be accessed in the website through a link and user interface. Backend database is either SQL or Myself servers. To date, we have completed the Rice Statistics request form in the website, and will be sent to the database administrator as email. The administrator will run the query in the system, generate the results and email the output back to the requisitioned. This will be the same modality to be used in the rice genetic resources information system.

The rice weather information system, on the other hand, will automatically run the query and immediately display the output. The limit will be on the daily readings only.
The division that owns the database updates these databases regularly. We have provided them access in the server so they can update the contents regularly.

We also tapped an Asian Development Bank web consultant Ms. Mildred Villarreal to train our staff how to plan and development effective websites. Even members of the communication staff of the Agricultural Training Institute (ATI) benefited from this training program.

Earlier on, the Rice Knowledge Bank architect Dr. Albert Atkinson trained PhilRice web developers how to use powerful knowledge management software in single source publishing - the ROBOHELP. This software is so easy to use, it generates table of contents, index and glossary and a print version – automatically.

One effective method in developing e-Learning modules was to have results of focus group discussions or rapid rural appraisals available in order to define learners' needs. We invited site coordinators, together with PhilRice rice experts, writers, and web developers; together with University of the Philippines Open University (UPOU) e-learning experts, multi-media crew, and rapid rural appraisal (RRA) experts, in a workshop held at IRRI training center.

In one setting, we have the content developers, subject matter experts, and educational designers in one setting, presenting and validating the content, format, html presentation, and overall design, appeal, and effectiveness of the materials. At the end of the 5-day course, 5 e-learning modules on hybrid rice seed production was completed and immediately uploaded in the web. Using the same process and format, we proceed to build 5 more modules on our own at PhilRice. We now have 10 e-learning modules on this subject available.

To further improve the e-learning modules, we asked graduate students of the College of Development Communication (CDC) to pre-test two e-learning modules – hybrid rice seed production and rice postproduction modules.

Both modules are highly effective, easy to comprehend, readable, enjoyable, easy to download, and easy to navigate. However, the hybrid rice module is more focused, the postproduction module is more overloaded with information.

We are also working with the International Crops Research Institute for Semi-Arid Tropics (ICRISAT) in the testing of software that allows extension workers to modify an existing website, add content, local dialect, pictures, and then save the information as html, or print the page as handouts to farmers.

Upcoming Projects

Seed Stock Inventory via Cell Phone

We are developing an sms-based seed inventory system using handheld mobile phone. Right now, we have over 100 accredited seed growers network or simply seed net to multiply foundation seeds of rice for sale to private and commercial rice seed growers. Using a mobile phone, seed net members will text their actual harvest, per variety, and a farmer's call center located at PhilRice will receive the text message and automatically tally the total production of all the seed net members. On a daily basis, the seed net member's text their stock inventory, hence the real time inventory is available. Any commercial seed grower or farmer can inquire – by calling, or through the web, or by text- where to buy seeds, what variety, and stock

available using his mobile phone. At the backend is a database program that will handle the inventory, names, numbers, and volume, and requests.

Farmers' Internet Bus

We will convert an old microbus into a mobile Internet bus, complete with 8-10 flat panel monitors and 2 servers in a thin client configuration. This will be fitted with wireless radio transmitter, VSAT antenna, GPS antenna, vhf, and multi-media and audiovisual equipment.

The bus will be deployed during field days so that farmers and extension workers can engage in video conferencing, remote pest diagnostics, farmer-to–farmer dialogues. The bus will also be used as a training facility for local government units so that the Internet experience will be made concrete. Hopefully, local government executives can appreciate the power of ICT and change prioritize investments in ICT training and facilities. The bus will also be a rolling GIS laboratory – taking road map, point data for mapping, and building on available data

Content Management System (CMS) – An open source software is now being customized to provide a web-based tool for updating the website. The CMS is a convenient tool for uploading text, images and clips, and even page layout and design. Another software is being explored to handle the translation of the content into local dialect.

Multi-Media clips E-Learning Modules – A multi-media team from ASTI using open source linear editing tools enhance the existing e-Learning modules on hybrid rice by integrating video and audio clips into the current content deployed in the website. This is in collaboration with the ASTI group.

VCLASS – A virtual learning platform that integrates online registration, content management, presentation screen, topic outline, and video of the lecturer. Any content material can be uploaded into the system, and viewed as PowerPoint or PDF file. The registrar also has a database of the students, and can issue tests and grades individually, online. Students can initiate discussions with groups or instructors using email, discussion board, and chartrooms. This is in collaboration with the ASTI group.

Fact Sheet Fusion – Developed by Center for Biological Information Technology (CBIT), University of Queensland, Australia – we are now testing this new software. It automatically generates fact sheets in html or xml, and can be linked easily to websites, and downloaded as full-page fact sheet for reproduction using conventional print or paper copiers.

Farmers' Call Center – Using an SMS Kit locally adapted by the ASTI, we can conveniently receive text messages, and sort them using open source software customized for this purpose. The SMS Kit is a GSM modem or circuit board from cellular phones embedded into a PCI adapter card, and fitted into the slot of the motherboard of desktop PCs. It is a convenient way to implement sms service because it the SIM uses the PC hardware to handle calls, text messages and queries that will arise out of the services available in the web portal. The messages will be sorted into Frequently Asked Questions (FAQs) and posted in the website.

ICT Initiatives from Partner Agencies

The Agricultural Training Institute (ATI) has now developed it 3-year information systems plan detailing the investments in ICT infrastructure, systems development, and training. The plan details the local area network, as well as the wide area network to link together its regional centers. In preparation for the eventual transfer and management of the Open Academy, the ATI has created an office for this purpose, and updated its website. It now has a running local area network connected to the DA-NIN.

The Advanced Science and Technology Institute (ASTI) has interconnected PREGINET sites with the Satellite sites of the DA-NIN based in the regional field units.

The Pampanga Agricultural College has started its radio-internet-sms program. Its current radio program is now enhanced with a PC with Internet connection, and farmers can text in their queries, comments and suggestions. A researcher will look up the query in the Internet, organize the information, and the broadcaster will air the answers the following day. In this way, farmers and extension workers are link using a mobile phone, radio broadcast, and the Internet.

CICT and the E-Government Fund

In August 2003, the Open Academy project sought to tap the E-Government Fund being administered by the Commission on Information and Communications Technology (CICT) and the National Computer Center. The Open Academy project included the content development, interconnectivity of all FITS centers, e learning and distance education.

Almost a year and after several presentations leading up to the Executive Council, the Open Academy project, together with several other e-farm projects, were integrated to form one unifying and e-farm project that can provide an end to end solution to modernizing Philippine Agriculture. The CICT formally endorsed the project to the President, with an approved budget of P191million.

E-Farm projects converge: the K-Agrinet

Now operating for more than a year, the Open Academy for Philippine Agriculture was integrated by three new ICT initiatives – the connectivity of e-farm and e-consortia project of PCARRD; and the e-agrikultura project of DLR-DAP – called the Knowledge Networking for Enterprising Agricultural Communities (K-Agrinet);

K-AGRINET integrates the Information Communications Technology (ICT) initiatives of four agencies: Department of Science and Technology-Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (DOST-PCARRD), Department of Agriculture-Philippine Rice Research Institute (DA-PhilRice), Department of Land Reform (DLR) and Development Academy of the Philippines (DAP). K-AGRINET is "convergence at work" because it capitalizes on the strengths of various participating agencies and their own networks.

Objectives

- Contribute in creating modernized and socially equitable agriculture, forestry and natural resources (AFNR) sectors by improving access to modern and indigenous information technologies through the use of ICT;
- Improve the status and raise the quality of life of rural folk, upland dwellers, and fisher folk and their families through a well-informed, information-driven and digitally-connected agriculture sector using a shift from a traditional to a knowledge intensive farm management; and
- Link policy makers, researchers, service providers, markets, business organizations, and farm communities in an open environment.

Interventions

The different agencies involved in K-AGRINET identified and developed four focus areas of intervention. The interventions cover different stages of knowledge development and utilization, which makes for a holistic approach in dealing with the provision of knowledge. The interventions are as follows:

Open Academy for Philippine Agriculture – This project led by PhilRice is an interagency project that focuses on e-extension and distance learning to involve our agricultural extension workers in the information loop. The project packages available information and data into online, web-based knowledge and services that could be accessed by extension workers and farmers. The project uses the DA-National Information Network (DA-NIN VSAT backbone), Agriculture and Fisheries Research and Development Network/Agriculture Research

Information Network (AFRDIS/AGRINET) Cluster Networks, PhilRice access points, Agricultural Training Institute (ATI) Learning Centers, Farmers Information and Technology Services (FITS) Centers and e-Agrikultura Centers of the Agrarian Reform Communities (ARCs).

e-Consortia – This intervention, led by DOST-PCARRD, intensifies technology and knowledge generation and exchange among existing partner R&D institutions through improved ICT tools and applications. It takes care of knowledge generation for K-AGRINET and involves the 14 Regional R&D consortia.

e-Farm – Also led by DOST-PCARRD, this project promotes knowledge-based e-commerce by initiating e-based farm-to-market opportunities through the FITS Centers and their respective Farmer Scientists.

e-Agrikultura – This intervention is led by the DAR and DAP which mobilizes the social capital toward developing enterprising agricultural communities. It generates participation and support of the community to the program.

Framework

Connecting the Knowledge Generators. The backbone for the DOST network is the Philippine Research, Education and Government Information Network (PREGINET) and for the DA is the NIN. Both provide interagency connectivity by combining broadband access, network cluster, and satellite-based networks to provide a powerful information infrastructure. The DOST-PCARRD-AGRINET and the DA-AFRDIS clusters serve as access points for the K-AGRINET Program. These access points are the major sources of knowledge and technologies in the agriculture sector. They are the conduits between the information infrastructure backbone and the extension service providers.

Strengthening the Structural Capital. The structural capital refers to the 14 regional consortia, the participating agencies of the open academy, 80 FITS centers hosted by local government units (LGUs), state colleges and universities (SCUs), and other extension service providers. This structural capital is where information, technologies, and other resources are lodged. This needs to be strengthened by enhancing the substance to be need-based, up-to-date, relevant, and readily accessible. This structural capital needs to be interconnected to facilitate the packaging, exchange, and dissemination of knowledge to the intended beneficiaries.

Through e-Consortia, the internet connectivity of the 14 regional consortia will be enhanced, the different ICT tools and applications for knowledge management will be improved, and new need-based ICT information systems will be developed at the national level by PCARRD and deployed to the network to intensify knowledge generation and exchange. The Open Academy will provide learning opportunities for extension workers through on line training programs and distance education. Through e-Farm, e-connectivity of the extension service providers, specifically FITS centers will be established and maintained. FITS centers will be provided with different knowledge products and services by the consortia and the Open Academy. The Centers will also develop and promote their own products and services for their clients. Through e-Farm, the clients of FITS Centers and the Magsasaka Siyentista or Farmer Scientists of the respective FITS Centers will be introduced to e-commerce.

Translating Knowledge into Social Capital. Information must be translated to knowledge for it to serve as resource base of the beneficiaries or social capital. The beneficiaries of the program are the farmers, agri-business entrepreneurs, fisher folk, and members of the agricultural community. The different interventions of the Program will help achieve e-governance through improved ICT tools and application. Moreover, the Program will pave the way for an information-based community development. With the information infrastructure and structural capital in place, there should be a mechanism to link them at the community level where most of the social capital that will boost the economy of the rural sector resides. This is the major concern of e-Agrikultura wherein agrarian reform

communities will be mobilized and will be linked to the knowledge generators and disseminators and other support service providers to transform them into enterprising communities.

Citizen's Feedback and Mechanisms. The e-Agrikultura and e-Farm provide mechanisms for getting feedback of the beneficiaries that help knowledge generators and extension workers develop the most appropriate service to the communities.

This framework shows how the four interventions interconnect, each having distinctive features and functions but work in complementation toward achieving the common goal of developing enterprising agricultural communities. In a way e-Agrikultura is a client of the three interventions, servicing the end-users of information at the community level.

Components

The Program has the following cross-cutting components:

1. Hardware and software provision. The Program provides hardware and software to enhance and sustain the existing systems. Open source technology is also being considered.
2. System and content development. Information systems are developed and customized to address the needs of target beneficiaries. Content build-up and information packaging is also intensified.
3. Interconnectivity. The project will roll out the last mile connection of FITS and Kalahi Centers, e-communities, LGUs, important government offices, agrarian reform communities, NGOs and farmer organizations and other service providers. With the enhancement of the connectivity of appropriate organizations, the dissemination and exchange of information is wider, faster, and more need-based.
4. Social mobilization. This includes capability building and community preparation activities, program advocacy and awareness, ICT-based trainings/workshops, values enhancement programs and incentive packages for community achievers.
5. Program and project management. The program management component monitors and evaluates the implementation of the projects to ensure that targets and objectives are met. A program management information system will be developed to facilitate the consolidation and analysis of program reports.

Beneficiaries

The Program has three kinds of beneficiaries:

a. Local extension service providers – agricultural technicians, extension agents, scientists, Farmer Scientists (Magsasaka Siyentista), and technical experts in different field units (Agricultural Training Institute, DA Field Units, SCUs, DAR, etc.) and other government and non-government organizations hosting the FITS centers
b. Cooperatives, farm/fisher folk and agricultural-based people's organizations
c. Private sector – agricultural traders and agri-business entrepreneurs and civil society

Program Benefits

The benefits that may be derived from the Program by the institutions involved are savings in training cost, traveling expenses, supplies and materials and communications; increase in staff efficiency; and decrease in operating cost. The farmer-beneficiaries will actively participate in e-commerce; achieve higher income; make informed decisions; and achieve an entrepreneurial spirit.

Business Model

K-AGRINET is also designed from the business perspective. Specifically, the e-Agrikultura serves as the conduit between the service providers and the beneficiaries. The revenues of the Program may come from: retrieval of selected R&D information; certain percentage for completed e-commerce transaction; agricultural information retrieval like real time market information, subscriptions to databases, and commercialization of IP knowledge products that will be generated by the project; selected distance learning modules such as on-line training and certification programs; and access points can also generate income from internet subscriptions, web hosting, email accounts, and consultancy services – ranging from connectivity solutions, web development, systems development, and training.

The business model as envisioned for K-AGRINET is as follows: e-Consortia and OPAPA provides the R&D information and knowledge inputs to the Program's website. The website/portal includes knowledge banks, online courses for extension workers and entrepreneurs, e-mailing/chatting /discussion board and SMS facilities. The website/portal may be accessed by the target beneficiaries in the e-Agrikultura Centers, e-Farm Centers and Open Academy Learning Centers.

Aside from service fees collected from clients, revenues from the website may come from advertisement fees from suppliers of agricultural inputs and other related services, certain percentage form accessed information via SMS and fees form selected on-line courses availed of by beneficiaries. The income will be pooled for the maintenance of the portal.

Other service providers envisioned providing additional inputs to the web portal and e-Agrikultura centers are as follows: the B2Bpricenow.com to facilitate e-commerce, Land Bank providing the payment gateway for web-based transactions, agricultural input suppliers, other technology providers and the domestic and international markets for specific demands for agricultural produce.

e-Agrikultura centers as business conduits will later be managed by ARCs cooperatives or by the community. Income generating activities for the e-Agrikultura centers include minimal Internet access fee, fees for the use of facilities such as photocopying, fax and telephone services, sale of agricultural inputs, marketing, and credit facilitation.

Every business transaction may be taxed. In this way, appropriate taxes will be collected, hence, expanding the tax base to mean additional income opportunity to the national and local governments.

Emerging Information Technology for Rural Areas

Wifi – Providing last mile connection to remote areas

Much of the Philippine rural areas have limited information infrastructure. Telephone penetration is low, and the ISPs are mostly located in the town centers or schools. The dial up connection is slow. High speed DSL connection is available in town centers, but it cannot extend beyond 5 kilometers from the CO. Wifi or wireless Internet has potential for rural Internet, but at present, the cost of equipment is beyond the reach of even the local government units.

PhilRice and the University of Southern Mindanao (USM) teamed up to provide low cost wireless connectivity solution, fabricating wifi antenna designs from baking pan, soda cans, plastic pipes and other readily available materials. The antenna designs were downloaded from the Internet. Low powered wifi radios made in Taiwan, ranging from P6,000 to P10,000 were used. Cluster networks consisted of one central antenna or head end, wherein the Internet source will drop, and distributed to members by wireless radios. The Internet sources were the access points of PREGINET, DA-NIN, and AFRDIS networks. From the access points, a cluster network will share a high speed broadband link.

Methodology

- Testing and evaluation of hi-powered standard wifi microwave radio: Aironet, Avaya, Orinoco in Nueva Ecija and Cotabato;
- Testing and evaluation of low cost wifi radio transmitters: Planet, Linksys, and D-Link
- Use of double walled metal boxes to house low cost transmitters installed outdoor;
- Download antenna designs from the internet;
- Fabrication of low cost external antenna to extend reach of low cost radio transmitters
- Cluster network design in order to share a common link and share the cost of the link
- Use of GIS to measure elevation, distance, and line of sight in constructing antenna mast
- Relaying using multi-point antennas to extend the broadband internet;
- Pairing high powered wifi radios as central or relay antenna with low cost low powered wifi radios for client for cluster network design

Results

Central Luzon Cluster
Internet source: 1mbps leased line to Diliman Quezon City, 1mbps DSL internet via Infocom, PLDT
PhilRice - Central antenna, standard, hi power
Campus buildings – low cost, low power radios with fabricated antenna, within 300m
CLSU – remote 7 km from PhilRice – standard, hi power
BPRE – remote 6 km from PhilRice – standard, hi power
PCC – remote 10kms from Philrice – standard, hi power

Cotabato Cluster
Internet Source: E1 to Davao, Globe Telecoms
USM – central antenna
Kidapawan – remote, standard, hi power antenna, 34 km
Provincial office – remote
Campus buildings – within 2 km – low power, low cost transmitters, fabricated antenna

Agusan Cluster
Internet Source: DOST Caraga – via TELOF as PREGINET ACCESS POINT, E1
DOST-NORMISIST-PhilRice Agusan relay setup
DOST to Normisist – standard antenna, low power radio, 12 km
Normisist to PhilRice Agusan – standard antenna, low power radios 17km

Isabela Cluster
Internet Source: 256kbps leased line from Echague Isabela to Diliman Quezon City; and 1mbps DSL to infocom, shared.
ISU – central antenna, standard hi power
PhilRice to ISU – standard hi power radio and antenna – 21 km

PhilRice Los Banos
Internet Source: UPOU – 256kbps leased line to ASTI, Diliman, Quezon City
UPOU – central antenna using standard hi power radio and antenna
PhilRice Los Banos to UPOU – low power, low cost radio, fabricated antenna, 2.2 km

Recommendations

- Broadband internet source can be tapped from existing PREGINET access points, DA-NIN VSAT network, AFRDIS cluster networks, TELOF, ISPs, and TELCO within the area;

- Hi power radio with standard antenna is effective in extending the broadband internet within a distance of 25 km point to point from source with clear line of sight; remote sites can connect to this central antenna using the same hi-power wi fi radios within a 25 km radius.

- The hi-powered radio can serve as central antenna or omni, and low power, low cost wifi radios can be used to connect to this central antenna within 2 to 3 km radius in a star network configuration; this is recommended as a low cost solution in interconnecting buildings in a wireless campus set-up;

- Use of wifi radio for broadband internet connectivity enables high speed internet, multi-media applications, videoconferencing, voice of internet, and other applications not possible using dial up connection.

- There is initial investment in tower construction, and radio equipment, but within 1-2 years, the cost of set up is recovered. There is no distribution fees, on the cost of the internet source – which can be shared by all those connected to a central antenna.

- Wireless internet infrastructure is meant as temporary solution. When TELCO services are available, particularly DSL or wireless broadband services become available, the low monthly recurring costs outweigh the maintenance concerns, and cost of wireless internet infrastructure.

- Effectiveness of wifi system also depends on the availability of trained manpower to operate and maintain the system.

CONCLUSION

With the creation of the Open Academy for Philippine and Agriculture (OPAPA) and the Knowledge Networking Towards Enterprising Agricultural Communities (K-Agrinet), the realization of bringing the much needed agricultural modernization is soon to be achieved. It has started networking the various knowledge generators and bringing their information in one information portal. These will bring the agricultural information nearer to the agricultural communities.

Existing data backbones are being utilized and extended through wired and wireless media. This also extended the reach of information and marketing agricultural commodities through the internet is being realized.

The agricultural extension workers are now being continually trained in the use of ICT in accessing information they need to pass on to their clientele. On-line courses would soon be offered for their career development.

Continuous testing of emerging ICT is being implemented. The use of the short messaging system (SMS) is a cheaper media in disseminating information. The use of home-grown equipment is encouraged to further bring down the cost of technology.

MODERNIZING THE PHILIPPINE EXTENSION SERVICES THROUGH ICT

(GENERAL REQUIREMENTS FOR ESTABLISHING NETWORKING SYSTEMS AT NATIONAL, REGIONAL, AND GLOBAL LEVELS – THE PHILIPPINE MODEL)

Roger F. Barroga[1] and Luis Alejandre I. Tamani[2]

[1] Program Director, Open Academy for Philippine Agriculture
[2] Information Technology Officer II, Philippine Rice Research Institute

Introduction

Internetworking or convergence among government networks

Government Nationwide Data Backbones

- 2 broadband nationwide data backbone (DA and ASTI)

- 19 regional network access points (PREGINET)

- 15 regional field offices with VSAT connection (DA-NIN)

- 21 cluster networks of AFRDIS

AFRDIS MEMBER INSTITUTIONS

Rationale

- Current extension service is fragmented and dispersed; 17,000 extension workers devolved to the local government units

- Difficult and expensive to provide technical support to devolved extension workers

- Limited connectivity, lack ICT equipment

- Limited training on the use of ICT;

- ICT can link the fragmented system – extension workers, r&D centers, farmers, and markets

Objectives

- Educate, train, and mobilize the stakeholders in agriculture using ICT and distance learning to bring about agricultural modernization;
- Provide e-extension services, advisory, and general knowledge on agriculture through on-line training;
- Communicate relevant information and knowledge through ICT and distance learning;
- Link policymakers, researchers, service providers, markets, business organizations, and farm communities in an open environment.
- To create a network of all knowledge generators;
- To provide access to farming communities for knowledge and e-commerce.
- To provide/develop a web-portal for the publishing of agricultural technologies, guides, information, and services to extension workers and farmers;
- To pilot various ICT modalities in providing solutions to farmers problems;
- To document experiences in using ICT as for development;
- To recommend best practices, technologies, systems for national up scaling.

The Philippine Rice Research Institute (PhilRice) Central Experiment Station
Science City of Munoz, Nueva Ecija

Branch Stations

- PhilRice-Batac
- PhilRice-Isabela
- PhilRice-Los Banos
- PhilRice-Negros
- PhilRice-Midsayap
- PhilRice-Agusan

Meeting of the minds

MOU signing between DA and DOST July 2003

First Advisory Council Meeting

OPAPA Stalwarts

Soft Launching Nov 2003
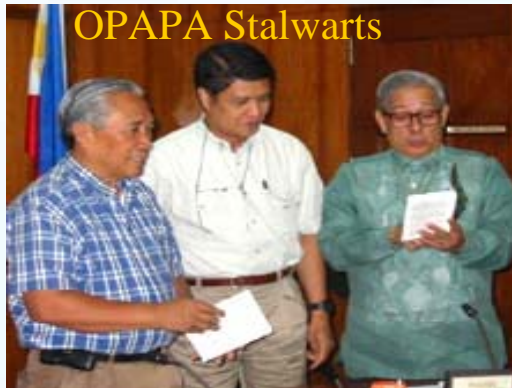
Convenors' Meeting May 2003

PINOY FARMERS' internet
Open Academy for Philippine Agriculture

Partner Institutions

- Department of Agriculture / Information Technology Center for Agriculture and Fisheries
- Bureau of Agricultural Research
- PhilRice
- DA Regional Field Units / RIARCs
- Philippine Carabao Center
- Agricultural Training Institute
- Bureau of Postharvest Research and Extension
- State College and University (CLSU, USM, PAC, ISU, UPOU)
- Department of Science and Technology / ASTI
- PCARRD
- International Crop Research Institute for the Semi-Arid Tropics
- International Rice Research Institute

e-Extension, e -Learning, e-Commerce

Web Portal

Experts online

Farmers Call Center

Extension Worker

Farmers Coop

Farmer

Online Trading

PINOY FARMERS' internet
Open Academy for Philippine Agriculture

Project Components

Internetworking or convergence among government networks

3 Government Nationwide Data Backbones

PREGINET of ASTI
DA-NIN VSAT
DA-BAR AFRDIS Cluster Networks

These backbones are fully operational, however , they are working independently

By interconnecting these backbones under common program, the access points shall multiply, allowing more agencies to link up.

Project Components

E-Learning

available technology and information will be digitized and converted to e-learning modules and deployed in the Internet web portal

Project Components

Last mile connections of agencies to access points

PhilRice Branch Stations

RIARS

DOST Regional Offices

Pilot Site

PCARRD Consortia & FITS centers

ATI Centers

Farmers Cooperatives

LGU

DA-RFU

Other Govt Agencies
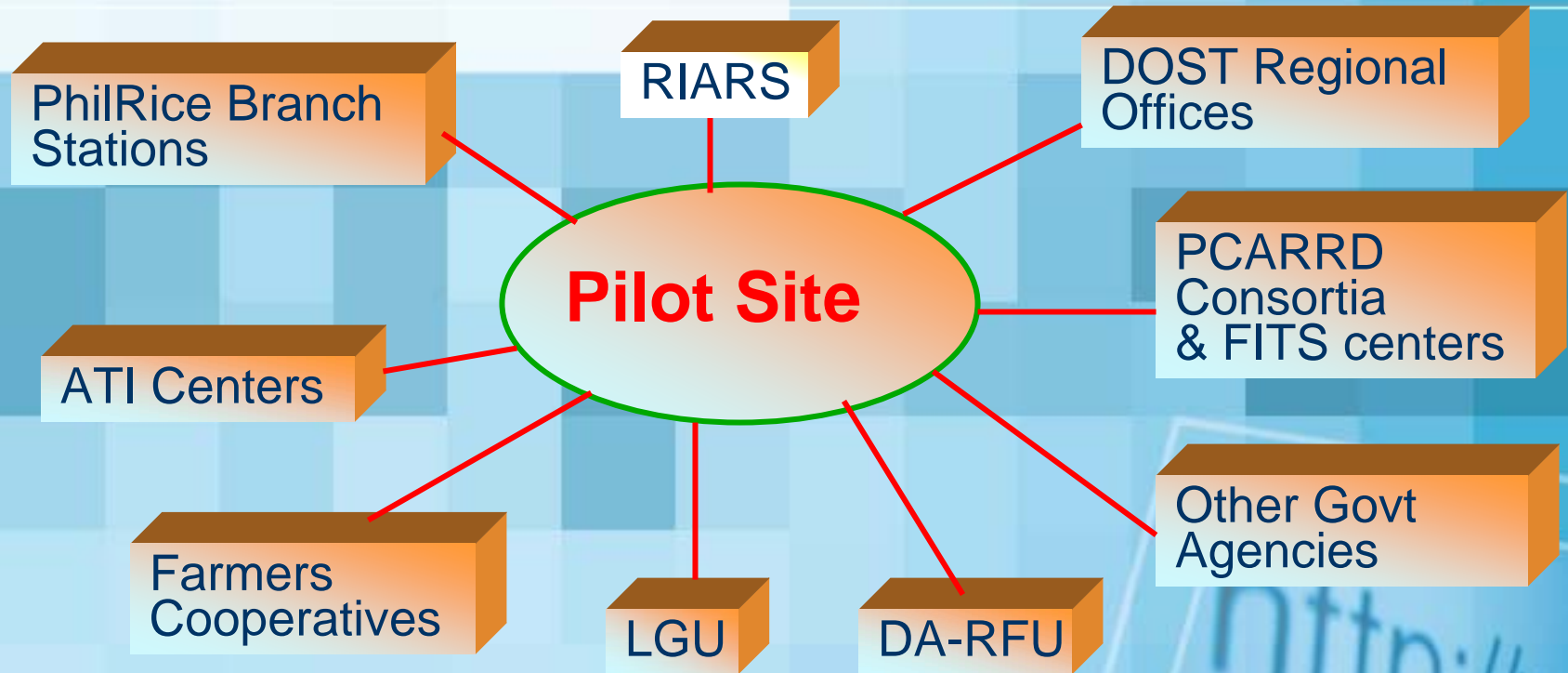
PhilRice ⟷ Pilot Site ⟷ ATI centers

Content providers and learning centers such as PhilRice Branch offices, the DA-ATI Centers, the RIARCS, and state colleges and universities (SCUs) can be connected in a composite government high speed backbone

Project Components

Advisory Services and General Knowledge in Agriculture

Key to extension workers' effectiveness is the right information at the right time.

Project Components

Social Mobilization, Training, Capacity Building

Creating public awareness, buy-in, participation in the open academy, sharing resources, expertise, knowledge.

Upgrading IT skills and literacy of extension workers, training content developers in multimedia, training IT manpower to maintain the networks

PINOY FARMERS' internet
Open Academy for Philippine Agriculture

Roles of Implementing Agencies

1. Network Providers
2. Content Providers
3. Content Developers
4. Learning Centers
5. Social Mobilizer
6. Resource Mobilizer

www.openacademy.ph

Web Portal for Extension Workers

E-learning Modules in Hybrid Rice

- Web-based 20-minute learning package on rice production with self-assessment

Fact Sheets Fusion (FSF)

USE 40 KG CERTIFIED SEEDS PER HECTARE

Home « Knowledge bank « Factsheets on hybrid rice technology « Use of 40-kg certified seeds per hectare

Steps in Using the 40 Kg Per Hectare Technology

1. Prepare a 400 sq m seedbed .
   This may be any of the following:
      10 seedbeds at 2 m x 20 m each
      20 seedbeds at 1 m x 20 m each
      40 seedbeds at 2m x 5 m each

Note
• A larger seedbed will give the seeds enough "breathing space" thus, producing vigorous seedlings with more tillers and longer roots per seedling
• Too small seedbed will result in overlapping seeds and overcrowded seedlings

2. Mix organic matter on top of the seedbed

Use compost or any organic materials such as dried chicken manure, rice hull ash, or rice straw. A 400 sq m seedbed needs 200 kg or 5 cav of organic matter.

Note

• Organic materials help loosen the soil, thus:
– it is easier to pull the seedlings and
– it minimizes root damage

3. Broadcast the 40 kg certified seeds evenly into the seedbed

Note
• Divide the 40 kg seeds equally by the number of seedbeds.
• Broadcast approximately 1 kg per 10 sq m.

4. Transplant 1-3 seedlings per hill

Pull 20-25 day old seedlings and transplant them immediately at 1, 2, or 3 seedlings per hill. During the wet season, transplant at 20 cm x 20 cm distance between hills and 20 x 15 cm during dry season .

•Each seedling would be vigorous and have 2-3 tillers at planting, thus, 1-3 seedlings per hill would already have 4-9   plants.

•Too close spacing results in shading, less tillers, and in tall plants which are susceptible to lodging.

A 20 m x 2 m seedbed

Broadcasting seeds at the seedbed

rice seedlings ready for transplanting

For more information, please contact:
The Secretariat
Open Academy for Philippine Agriculture
Website:http://www.openacademy.ph
Email: opapa@openacademy.ph

ICT Trainings

IPR Training Room, PHILRICE

Inside the Mobile Internet Bus

Internet Cafes

PINOY FARMERS' internet
Open Academy for Philippine Agriculture

Farmers' Call Center

- Purely text-based farmers' support services:
- can route to experts or services;
- query databases;
- download images;
- push "tech tips"

opapa@openacademy.ph;

Experts Online

Cyber Forum using DA-NIN VSAT Facilities

[Audio and Video Conference](#)

10.10.2005

Mr. Ruben Miranda recognizes the participants to the Farmers' Field Day as the VSAT facilities air the event live to the DA-Rural Field Units in the cities of Davao and Tuguegarao

PINOY FARMERS' internet
Open Academy for Philippine Agriculture

Radio+Internet+SMS

• Announcer gets information from internet; broadcasts info

• Farmers text feedback, query;

• Announcer emails experts, broadcasts answer;

Pinoy Wi Fi antenna

[Low Cost internet access 2 km range](#)

Last Mile Connectivity: wireless

PLDT WeRoam

Yr 1	Nodal Center (1)	LGU (1)	Farmers' Org (1)
Yr 2	Nodal Center (1)	LGU (5)	Farmers Org (5)
Yr 3	Nodal Center (1)	LGU (10)	Farmers Org (10)
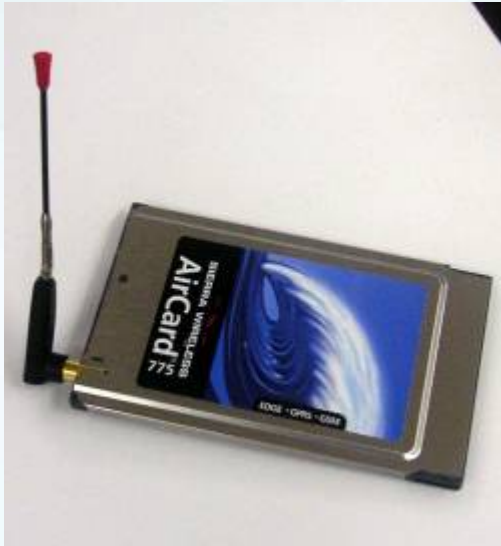
Linking Farmer Cooperatives

Internet to Farmers Coop

Magsaysay
Farmers'
MultiPurpose
Cooperative,Inc.

PHUSFIMCO
Hagonoy Farmers'
Cooperative

Internet Village Framework

Knowledge Bank → **ICT mode** → **Delivery Approach** → **Pilot Site** → **Lessons**

- FactSheets
- E-Learning
- Diagnostics
- Databases
- Image Library

CyberUnits
- CD-based
- dial-up
- wi-fi
- dsl
- vsat

Radio+ Internet+ +Mobile

Mobile Internet Bus

DapitSaka ATM

PART

Rice Doctor to the Barrio

Real Learning

CPAR

Quezon/ Laguna

Pampanga/ Nueva Ecija

Davao/ Cotabato

Ilocos Norte

Feedback

Derivative Knowledge Products

Local Experiences

Best Practices

PINOY FARMERS' internet

Open Academy for Philippine Agriculture

Project Milestone

Connectivity Solutions: Low-Cost High Speed Internet

Fabrication of low cost antenna's that would extend the reach of the low cost radio transmitters.

With the presence of network backbones and access points, local government units, research agencies, farmers' cooperatives, barangays, and even individuals, can now be connected with high speed broadband internet.

Project Milestone

ICT for Extension Workers: Busting the Fear Factor

Project Milestone

Knowledge Management and Content Development

Proof of Concept ICT Technologies

- Content Management System for WebSite
- VCLASS e-learning platform for online learning;
- Fact Sheets Fusion for web deployment;
- DA VSAT facility for remote discussions;
- Radio + Internet + Celphone SOA
- Farmers' Call Center using M2M software
- Telco Customer Support via Smart 700RICE
- Use of DOST-SEI Mobile Internet Bus
- Roadshow approach in Advocacy & PR
- Use of Internet Cafes for ICT trainings
- Use of e-card and web-based online trading
- Open Source systems for low cost software
- Wireless internet WeRoam for last mile connect
- Low Cost Internet using fabricated wi-fi antenna
- Cluster networking for cyber communities
- Voice over internet (VOIP) telephone service

E-Farm projects converge: the K-Agrinet

Objectives

- Contribute in creating modernized and socially equitable agriculture, forestry and natural resources (AFNR) sectors by improving access to modern and indigenous information technologies through the use of ICT;

- Improve the status and raise the quality of life of rural folk, upland dwellers, and fisher folk and their families through a well-informed, information-driven and digitally-connected agriculture sector using a shift from a traditional to a knowledge intensive farm management; and

- Link policy makers, researchers, service providers, markets, business organizations, and farm communities in an open environment.

K-AgriNet

E-Farm projects converge: the K-Agrinet

Interventions
- **Open Academy for Philippine Agriculture**
- **e-Consortia**
- **e-Farm**
- **e-Agrikultura**

Framework

- Connecting the Knowledge Generators.
- Strengthening the Structural Capital.
- Translating Knowledge into Social Capital.
- Citizen's Feedback and Mechanisms.

K-AgriNet

Components

The Program has the following cross-cutting components:

- Hardware and software provision.

- System and content development.

- Interconnectivity.

- Social mobilization.

- Program and project management.

Beneficiaries

The Program has three kinds of beneficiaries:

- Local extension service providers
- Cooperatives, farm/fisher folk and agricultural-based people's organizations
- Private sector

Program Benefits

The benefits that may be derived from the Program by the institutions involved are savings in training cost, traveling expenses, supplies and materials and communications; increase in staff efficiency; and decrease in operating cost. The farmer-beneficiaries will actively participate in e-commerce; achieve higher income; make informed decisions; and achieve an entrepreneurial spirit.

K-AgriNet

Conclusion

- With the creation of the Open Academy for Philippine and Agriculture (OPAPA) and the Knowledge Networking Towards Enterprising Agricultural Communities (K-Agrinet), the realization of bringing the much needed agricultural modernization is soon to be achieved. It has started networking the various knowledge generators and bringing their information in one information portal. These will bring the agricultural information nearer to the agricultural communities.
- Existing data backbones are being utilized and extended through wired and wireless media. This also extended the reach of information and marketing agricultural commodities through the internet is being realized.
- The agricultural extension workers are now being continually trained in the use of ICT in accessing information they need to pass on to their clientele. On-line courses would soon be offered for their career development.
- Continuous testing of emerging ICT is being implemented. The use of the short messaging system (SMS) is a cheaper media in disseminating information. The use of home-grown equipment is encouraged to further bring down the cost of technology.

INDONESIAN EXPERIENCE

DEVELOPMENT OF ORGANIC BIOFERTILIZER PRODUCTION SYSTEM

BY

A.   TOHAWI HUSNULAH

INDONESIA

RATIONAL

- FARMING NEED FERTILIZER
- ORGANIC FERTILIZER HAVE SEVERAL ADVANTAGES
- TROPIC AGRICULTURAL NEED TO ADD ORGANIC MATTER
- LACK & EXPENSIVE OF ANORGANIC FERTILIZER
- ORGANIC BIOFERTILIZER PRODUCTION IS SIMPLE BUT NOT EASY
- NET WORKING

CONCEPT

- PROSEDURE OPERATIONAL SYSTEM OF RAW MATERIAL , EQUIPMENT & MACHINE …THROUGH TRAINING & APPRENTICE SHOULD BE GET QUANTITY & QUALITY ORGANIC BIO FERTILIZER BY FARMER'S GROUP PRODUCTION

- ENCOURAGED FARMER'S GROUP WHICH PRODUCED ORGANIC BIOFERTILIZER FOR THEIR COMMUNITY

OBJECTIVE

- FARMER TO FARMER   TRAINING & APPRENTICE OF ORGANIC BIOFERTILIZER (OBF) PRODUCTION SYSTEM

- ENCOURAGED (OBF) SMALL INDUSTRIAL ON SKILLED FARMER'S GROUP

- INCOME GENERATING , INDEPENDENCY & STRENGTHEN FARMER'S GROUP

- PROMOTING LEIA (LOW EXTERNAL INPUT AGRICULTURAL) CONCEPT

- NET WORKING

DEMENSION

- **MASS**
  GOVERNMENT , NGO's (ARFTC) ,
  UNIVERSITY , FARMER'S GROUP

- **LENGTH**
  EAST JAVA PROVINCE – INDONESIA

- **TIME**
  2003 - 2004

CONTENT

- **MAN**
  - GOVERMENT   =   2   PERSONS
  - NGO's (ARFTC)   =   4   PERSONS
  - UNIVERSITY   =   6   PERSONS
  - FARMER'S GROUP   = 252   PERSONS

- **MONEY**
  115,000 $

MATERIAL

- RAW MATERIALS (ORGANIC MATTER)
- DECOMPOSER
- ENERGY
- NUTRIENT

METHODE

- TRAINING
- APRENTICE
- SELF PRODUCTION

MACHINE

- FLEXY HAMMER MILL
- SIEVE

MARKET

- FARMER
- FARMER'S GROUP
- PROJECT

FOR (500 – 700) HA

ACCOUNTABILITY PERFORMANCE

- **INPUTS**
  - FOUNDING , RAW MATERIALS , DECOMPOSER , EQUIPMENT & MACHINE

  - TRAINING , APRENTICE , SELF PRODUCTION

PROCESSES

- TRAINING
- APRENTICE
- SELF PRODUCTION

OUT PUTS

- EX TRENE
- QUALITY PRODUCT
- ECONOMICAL SCALE
- FARMER'S GROUP PRODUCTION

OUT COMES

- SKILLED HUMAN RESOURCES
- QUALITY PRODUCS
- ECONOMICAL SCALE
- FARMER'S GROUP PRODUCTION

BENEFITS

- TRANSFER OF TECHNOLOGY
- STANDART QUALITY PRODUCT
- AGRIBISNIS DEVELOPMENT
- STRATEGIC FARMER'S GROUP PRODUCTION

IMPACT

- BETTER FARMING
- BETTER FARMER'S INDEPENDENCE
- BETTER BUSSINES
- BETTER PRODUCTION
- BETTER LIVING
- BETTER FARMER'S COMMUNITY
- BETTER ENVIRONMENT

TARGET

QUANTITY

- USEFULL UNIT OF EQUIPMENT & MACHINE
- 12 FARMER'S GROUP SKILLED
- 1,20O TON ORGANIC BIOFERTILIZER
  AS A FARMER'S WORKING CAPITAL

QUALITY

- QUALIFIED PRODUCT
- SKILLED EX TRENE
- BETTER FARMING
- LEIA (LOW EXTERNAL INPUT AGRICULTURAL)
- EXIST & PROSPEROUS

STATEMENT

- ORGANIC BIOFERTILIZER … YES !!!

- GO ORGANIC 2010

- DYNAMIC CONCEPT

- THE SOIL IS MOTHER OF PLANT

- LEIA … WISE !!!

ATT&T ISSUE

- TECHNOLOGY OF MACHINARY MASSPRODUCTION ORGANIC BIOFERTILIZER

- TRANSFER KNOWLEDGE THROUGH TRAINING & APPRENTICE

- NET WORKING

- EXIST & PROSPEROUS

CONCLUSION

- WELL OPERATED

- POLITICAL WILL ATTACHMENT

- TAKE CARE & TO DEVELOPT

- NET WORKING

- NOW , AGAIN & SUSTAINABLE

- EXIST & PROSPEROUS

I
INTRODUCTION P4S

by : Mr A. Tohawi H.SH
chairmen of farmer agricultural and rural - training centre (FAR-TC)

APA ITU P4S ?

Pusat pelatihan pertanian dan pedesaan swadaya adalah suatu lembaga yang dimiliki dan dikelola oleh petani baik secara perorangan atau kelompok, yang mempunyai kegiatan usaha yang maju dan mempunyai rasa peduli untuk berbagi di sesama petani dan pihak yang berkaitan dengan pertanian, sehingga di dalam kegiatan berbaginya terkandung ada proses pembelajaran / pentransperan ilmu dan pengalaman yang didasari sifat tanpa pamrih.

APA SAJA AKTIFITAS P4S?

Melaksanakan kegiatan usaha pertanian reel, dari mulai aspek hulu sampai dengan hilir, sesuai dengan unggulan usaha masing-masing P4S baik yang bergerak di on farm maupun di of farm.

DIMANA SAJA P4S ITU BERADA?

P4S tersebar di seluruh propinsi di Indonesia, dengan berbagai klasifikasinya **(pemula, lanjut, madya dan utama)** dengan ciri khas masing-masing pengelolaan.

ADA BERAPA P4S DI INDONESIA ?

Jumlah yang terdaftar di forum komunikasi p4s ada **330** yang tersebar di Kabupaten/Kota dan 30 propinsi.

PEMANFAATAN KOMPUTER DAN INTERNET DI P4S

Pemanfatan komputer dan internet oleh petani Indonesia masih sangat rendah, belum ada data yang pasti berapa persen petani / pengusaha pertanian Indonesia yang sudah memanfaatkan komputer dan internet.

Ada beberapa pengelola P4S yang sudah memiliki komputer dan memanfaatkan internet namun belum maksimal, diantaranya dimanfaatkan untuk :

- Pembukuan usaha tani
- Pengadministrasian kegiatan
- Mencari literature
- Surat menyurat (e-mail)
- Data base P4S
- Alamat website P4S :   www.p4s.com

Pengelola P4S memiliki pengetahuan dan mampu mengoperasikan komputer dan internet didapat dari kreativitas masing-masing, didorong rasa ingin tahu dan merasa benar-benar membutuhkan, belum adanya partisipasi penyuluh pertanian lapangan yang sehari-hari sebagai mitra petani dilapangan.

Salah satu lembaga swasta yang pernah mendorong peningkatan pengetahuan para pengelola P4S untuk mampu mengoperasikan komputer dan internet adalah Microsoft Indonesia, ada beberapa petani pengelola P4S yang sudah dilatih dan dibekali pengetahuan tentang betapa manfaatnya komputer dan internet untuk menunjang kegiatan usaha tani.

AKTIFITAS
PUSAT PELATIHAN PERTANIAN DAN PEDESAAN SWADAYA
(P4S)

Penyuluhan perkoperasian di P4S

Pelatihan budidaya ikan air tawar di P4S KOPSES

Pengurus Forum Komunikasi P4S sedang menjelaskan program-program kegiatan kepada para pengelola P4S

BAGAIMANA UNTUK MENUNJANG PENGEMBANGAN P4S KE DEPAN.?

Untuk menunjang berkembangnya P4S-P4S, perlu adanya sarana dan prasarana yang lebih lengkap, baik yang berkaitan dengan pengembangan usaha pengelolanya maupun alat untuk melengkapi sarana proses pembelajaran, dan yang paling diperlukan untuk hal itu adalah kelancaran proses teknologi informasi yang belum dimiliki oleh setiap P4S serta penguatan kelembagaannya.

Kelembagaan P4S di tingkat nasional sudah mempunyai akses internet, namun demikian fasilitas tersebut belum dapat digunakan secara maksimum, dikarenakan diantara para pengelola P4S belum semuanya mempunyai akses internet/fasilitas IT yang memadai.

Untuk menjangkau seluruh P4S yang tersebar di setiap peloksok di tiap kabupaten/kota, sudah merupakan keharusan tersedianya fasilitas IT, untuk mempermudah pengkoordinasian secara kelembagaan yang pada gilirannya akan mempercepat segala aspek kegiatan usaha .

II

SEJAUH MANA P4S MENGGUNAKAN TEKNOLOGI INFORMASI

?

a. **idealnya :**
-   sebagai alat komunikasi antar p4s
-   sebagai akses informasi ke berbagai pihak
-   peningkatan bisnis/ peningkatan pendapatan
-   peningkatan kepercayaan
-   untuk meningkatkan pelayanan
-
b. **syarat-syarat**
-   sarana prasarana dasar ; listrik.telpon
-   peralatan lunak / soft ware
-   sumber daya manusia
-   biaya operasional
-
c. **kondisi sekarang**
-   yang sudah terjangkau listrik 97%
-   listrik dan telepon 80%, yang punya computer 75.%,yang sudah mempunyai akses internet 0.5%, yang sudah mempunyai ID internet 0.2.%

- kelembagaan FK P4S sudah di lengkapi dengan fasilitas internet dengan ID www.p4s.com

d. masalah
- ada yang belum terjangkau listrik sebab kondisi lokasi nya jauh dari jangkauan PLN langkahnya………………..

- ada listrik tapi telepon belum terpasang sebab jaringan telepon…. langkah……………

- Ada listrik, telepon tetapi tidak ada computer sebab piranti computer sapai saat ini masih merupakan alat yang mahal dan pemakaiannya memerlukan ilmu pengetahuan yang khusus, dimana petani belum semuanya dapat mengg unakan langkah……………

- ada listrik,telepon, computer, tapi belum terpasang pasilitas internet.,sebab………langkahnya…………………..

- Ada semua di point atas, tapi belum punya ID

- Semuanya ada tapi biaya operasional

- **Perencanaan ke depan. Periode 3 tahun ke depan (2006-2009)**

No	Program	Kegiatan	Tahapan	Komponen	Biaya	Waktu	Lokasi	Penanggung jawab

Catatan:
-Pusat pelatihan pertanian dan pedesaan swadaya (P4S) pernah mencoba memasukan data produk ke dalam internet, tetapi permintaan pasar tidak sesuai dengan yang ditawarkan.
- kelompok kontak tani nelayan andalan KTNA sebagai induk organisai dari FK P4S telah melaksanakan **sms centre** dengan nomor ……, yang menjadi masalah adalah, perlu adanya 1.000.000 nomor handphone yang terdaftar, artinya biaya untuk membuat jaringan IT ini, masih mahal.

-hubungan dengan materi pertemuan ini :
 Pusat pelatihan pertanian dan pedesaan (P4S) ada 330 yang terdaftar, tapi tersebar diseluruh pelosok , kami dari pengurus FK P4S, merasa berat jika menyebarkan informasi, kaitan dengan kegiatan ini, apa yang harus segera disiapkan oleh FK P4S untuk dapat menindaklanjuti,paca WORKSHOP ON UTILIZATION OF THE ATT&T NET WORKING ini.

Role of Technology to Improve Farmer's Capacity

Cynthia Iskandar
PT Microsoft Indonesia

Experience of Farmers' group from Bali

- Access information about new commodity
- Searching opportunity through internet
- Create connection with buyer through email
- Shorten distribution line
- Not depends on the middle man

Microsoft
Your potential. Our passion.™

VIDEO
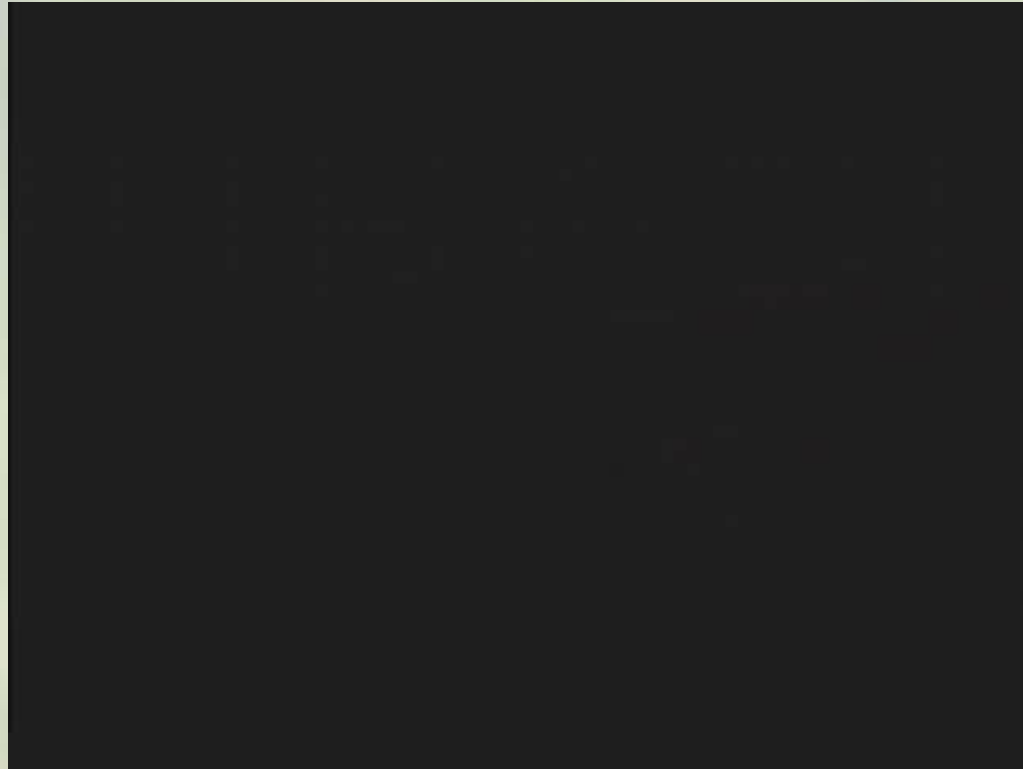
SHARING SESSION

I WAYAN KANTEN
Leader of Farmers' Group in Pancasari - Bali

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ACTIVE APPLICATION OF INFORMATION NETWORKS, PRESENT AND FUTURE PROSPECT

Toshiro Takatsuka, Takatsuka Farm

INTRODUCTION

Currently, 61.2 % of Japanese farmers are using personal computers and 69 % of them are the customers of the Internet (Ministry of Agriculture, Fisheries, and Forestry, Japan, hereafter MAFF, 2005). Although the reasons why they buy the personal computers are various, the majority start to use after they participate in "training courses for book-keeping for 'blue return' or self-reporting tax return". These courses are organized by agricultural extension offices and Japan Agricultural cooperatives, (hereafter JA), in different regions. But except for the bookkeeping, farmers who are using personal computers mainly for the purpose of farm management are still limited.

I would like to present here, therefore, my own farm management as a case study in relation to the application of information networks. My presentation consists of four parts, (1) reason and timing for purchasing personal computers, and how I use them in my current farm management, (2) types of information networks I use, and how I use them, (3) present status and the problems, which are based on my experiences as a board operator to facilitate information communication in "AZEMICHI Network, where AZE means dykes of rice field and MICHI means road in Japanese, which is provided by Japan Agricultural Development & Extension Association, (here after JADEA), and (4) future possibilities of the development and application of the information network will be discussed and/or proposed.

GENERAL OUTLINE OF TAKATSUKA FARM

(1) Outline

As shown in Table 1, although the rice cultivation is the core with 9.7ha, the farm is diversified in its management to include fruits, 1.3ha, vegetables, 1.0ha, and food-processing factories.

Table 1: The outline of Takatsuka Farms

Size of Fruit-growing area		Rice	Food Processing Factories	Vegetable	Total
Persimmon	Japanese Pears				
115a	15a	970a	54 m²	100a	1,200a

(2) Human Resources

Family members: my wife, father, my mother and myself

Part time labor: three persons for ten days for bud treatment and one person for

Harvesting in the

  Persimmon production

(3) Major machineries and facilities

For efficient operations and cost cutting, workhouse and big machineries such as combine harvester and tractor are jointly owned by 8 families, which are organized as an agricultural production union. Major rice-growing activities in spring and harvesting in autumn are collaborated by the 8 families. The same members are operating and managing a rice-milling center under JA.

PRESENT STATUS OF THE APPLICATION OF INFORMATION NETWORKS

(1) Introduction of Personal Computer

I started to use computer when I was a university student in 1989. Later I used computers to prepare various documents for a company I worked in Tokyo. The company organized internal and external training courses for the staffs often, which made my computer skills improve. In 1997 I myself bought a computer for personal use apart from the company business use. In 1999 I left the company and returned to my hometown, Niigata, to do farming with my parents. At that time we had two computers for myself and for my wife. We bought a third computer in 2003 and fourth in 2005 to replace the two old computers. Now we have three computers, one of which is used as a toy for our child.

(2) The Chronological table of the application of Information Networks （see table 2）

Table 2: The Chronological table of the application of Information Networks

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Use of the Internet	→									
Open of Home Page			→							
Participation of AZEMICHI network				→						
Use of Mailing List				→						
Open Diary Through "Web log"									→	

a. Use of the Internet

As soon as I purchased personal computer, I started using it for the Internet and e-mail. At the beginning, the Internet was connected through telephone line in a "dialup connection", but with it, the image processing was very slow. Hence, the computer was used mainly for document preparation and e-mailing. Currently, an

ADSL line made the communication speed dramatically higher including image processing. Search engines, such as "Google" and "Yahoo", have also developed extensively, thus, the Internet is now mostly used for acquisition of necessary information.

b. Opening of Home Page

In 1999 my wife opened the home page of our farm by self-support efforts using reference book. (see screen picture 1) Major aim was not increase the selling farm products, but to expand the communication with people all over Japan. Currently we are selling farm products on requests to people who had started communication through the homepage. But the renewal of the homepage, which my wife has been working on, has now become a little too burdensome.

Screen Picture 1: Top Page of Takatsuka Farm Home Page
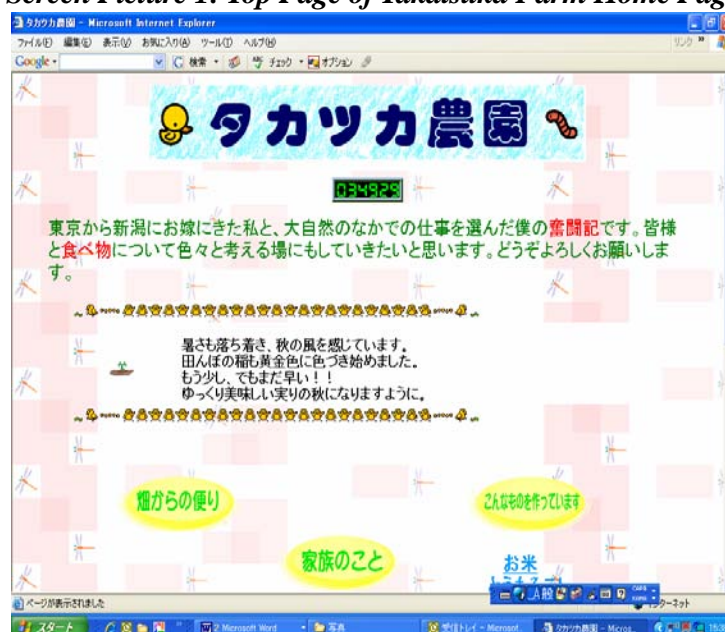
c. Participation in AZEMICHI network

The AZEMICHI network has been in operation since 1998, which was started at first by JADEA through a four year funding by MAFF. The AZEMICHI network is still being continued currently. A major object of this network is to facilitate communication in national scale among people in different local networks in prefectures and extension offices. Although members are exclusive, no user fee is required. This is the information network among the farmers and one of its major services is an e-mail conference.

After the home page of Takatsuka Farm was opened, I have participated in an introductory training course of the local network (see Photo 1) through the invitation by the local extension center. Senior farmers had also participated as advisors, who encouraged me to become a member as an active local network contributor for KAKIKOMI, to write comments or notes in a free plaza in the network. The local network managed by Niigata prefecture has organized training workshops and a social gathering is held annually. My activities in the local network have expanded day by day through the expansion of the network of people who communicate actively. Active

participation on the network increased to obtain relevant information and expanded communication rings that encouraged us to initiate further activities and pleased us. Now I am a board operator of the free plaza in the AZEMICHI network. Being an operator is not for my duty but for my pleasure.

Photo 1: Introductory Training Course of AZEMICHI network

d. Use of Mailing List

In order to facilitate exchange of information regarding rice growing and agriculture, I have joined a Mailing List, (hereafter ML), of which members are consisted of both rice producers and retailers coming from all over Japan. In the ML, e-mails are sent simultaneously to all the members of an ML. Although all information is not necessarily of direct interests to all the members, there are many opportunities to obtain and share new findings and useful information. Twice a year, members are gathered in Tokyo for direct social interaction. Apart from e-mail communication, direct meeting, discussion, and eat and drink deepen good contact among members, which further activates ML communication.

e. Open Diary through "Web log"

Our home page contains "farming activities ongoing". But daily or even seasonal renewals require much effort and are tedious. Thus we have started using "Web log", in which we can describe casually in a diary style specific activities in our farms and personal comments and essays of each day. Renewal of the "Web log" is easy and can be done using not only personal computer but also mobile phone, which make renewal possible even during the busiest season.

The "Web log" is a simple style diary, in which I can disclose my personality directly, as well as my policy on farming to "Web log" readers, i.e., customers (see Screen Picture 2).

Screen Picture 2: Farming diary through "Web log"

(3) Present status and problems of AZEMICHI network

During August of 2006, there were only 16 members who wrote comments or opinions on the free plaza in the network. Although the number of access is increasing, that of active members is not. My proposals to improve this situation are following four, i.e., (1) to give personal ID's to the agricultural extension officers and leading farmers, so as to enable them to write freely on the free plaza even from their own homes, (2) to increase the number of board operators such as I, so as to increase the supply of relevant information, (3) to increase awareness of the presence of the AZEMICHI network, and of the way it can be used in various occasions, utilizing such activities as the training courses on bookkeeping and on personal computer use organized by the agricultural extension offices, and (4) to organize face-to-face meetings (see Photo 2) at least once a year so that members can make more direct personal relationship among them. Information network gives us just opportunities for beginning communications. Hence, without occasions for faces to faces talks, such network communication will diminish with passing time.

Photo 2: Off line meeting at Niigata Prefecture

(4) The approach to facilitate the application of information network

There are many farmers who want to price heir products appropriately and sell them. Many farmers, however, tend to stay as exclusively farmers, because they have no experience and knowledge in marketing. They, therefore, don't know how to obtain necessary information to start.

Let's assume that we desire to sell our products on the Internet. For the pricing, we can now search on reasonable price ranges at the sites such as "RAKUTEN", which is the largest Internet shopping mall in Japan (see Screen Picture 3), and many other personal shops. We can get necessary information through our personal home computer on how to price, how to present the merchandise, how to prepare them for the market, and how to make a catch copy on them, and so on. Since those sites announce lists of best sellers, we can also understand the market trend on the favorite products of consumers.

It will be difficult, however, for beginners to log onto the Internet and to make a home page on their own independent efforts easily upon buying personal computers. Thus, the first step will be to encourage farmers to use the personal computer by supplying relevant information services on the Internet by administrators, extension offices and JA. Information supply services by letters and fax, which have been the traditional methods, should be replaced ultimately. It may be necessary to supply step-by-step training on subjects such as e-mail communication, the Internet searching, and the Internet writing. If we train them at first to certain degrees of computer skills, e-learning through e-mail communication will be possible for them. To visit and train at farmers' homes may be necessary sometimes.

Screen Picture 3: Top page of RAKUTEN Home Page

FUTURE PROSPECT OF DEVELOPMENT

I believe that the current farm management needs improvements in three major areas.

The integration or the expansion of farm management from the production to goods marketing will be the first. Traditionally, farmers were just producers exclusively. Farmers have left the marketing activities of all of their products solely to JA and other market mechanisms. This must change. Farmers should manage not only production but also food processing and merchandising.

Farmers will have to try to develop new farm product goods through the linkage with consumers and other business sectors. We can increase the value of new farm goods through the supply of the background concept behind the development of particular products and relevant information on such products to the consumers and markets.

The second point is to widen and deepen personal relationships through communication with other business sectors. Active communication with people in the distribution sector, food manufacturing and processing sector, the food service industry, and ultimately with consumers who enjoy eating farm products are very important.

All of them are our potential customers. Face to face human relationship is the prerequisite to obtaining and delivering useful information.

The third point is the introduction of marketing approach. The marketing is an integrated business method that includes all the facets from production to food processing and retailing under unified policy. The same business model is applied without exception through the distribution sectors, food manufacturing and processing sectors, and the food service industry. The planning of the business models is based on the needs of the consumers.

The ultimate importance is "how to find the customers" who would like to buy farm products, "how to develop customers", and "how to sustain good human relationship". "How to attract our farm customers" is really important concept that we must develop.

In order to improve the three points mentioned above, it is imperative to use the tool of personal computers for their active application to information network.

   Regrettably at the moment, apart from the bookkeeping, farmers who realize the fact that personal computers are necessary for the improvement of their farm management compose only an overwhelming minority. Using personal computer, however, we can do not only bookkeeping, document and table preparation, but also make fiends in the world through active application of information network. Potential value of these aspects should be stressed with more emphasis. Through expanded communication with many potential friends, we can widen and deepen our points of view. Thus, we can facilitate exchange of useful information and linkages through the use of computers, and we can increase our potential to make higher farm income as well.

ACTIV APPLICATION OF INFORMATION NETWORKS

PRESENT AND FUTURE PROSPECT

Toshiro Takatsuka
TAKATSUKA FARM

INTRODUCTION

1.General outline of Takatsuka Farm

2.How to use the personal computer

3.Types of information networks I use

4.AZE MICHI Network

5.Future prospect of development

General outline of Takatsuka farm

```
                    ┌──────────────┐
                    │    Rice      │
                    │    970a      │
                    └──────┬───────┘
        ┌──────────────────┼──────────────────┐
┌───────┴──────┐   ┌───────┴──────┐   ┌────────┴─────────┐
│   Fruits     │   │  Vegetable   │   │ Food processing  │
│   130a       │   │   100a       │   │   Factories      │
│              │   │              │   │   54㎡           │
└──────────────┘   └──────────────┘   └──────────────────┘
```

Rice
970a

Fruits
130a

Vegetable
100a

Food processing
Factories
$54\,\mathrm{m}^2$
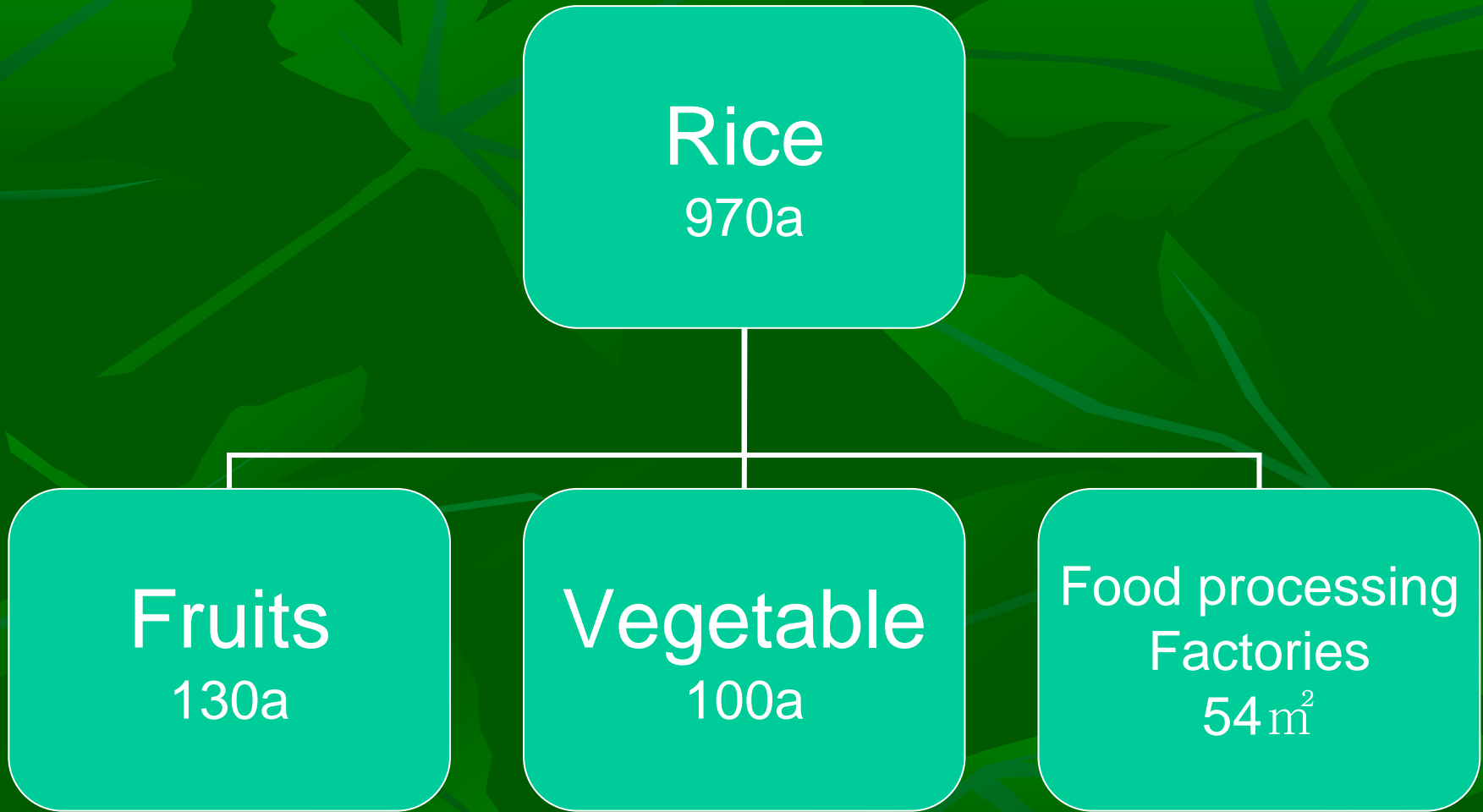
Rice crop section

Fruits section

Persimon(kaki)

Vegetable section

Food processing section

PRESENT STATUS OF THE APPLICATION OF INMORMATION NETWORKS

1. Introduction of personal computer

2. The chronological table of the application of information networks

3. Present status and problems of

   AZE MICHI network

4. The approach to facilitate the application of information network

The Chronological table of the application of information Networks

	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
Use of the Internet										
Open of Home Page										
Participation of AZE MICHI network										
Use of Mailing List										
Open Diary Through "Web log"										

Open of Home Page

Participation of AZE MICHI network

Farming diary through `Web log`

Present status and problems of AZE MICHI network

1. To give personal ID's to the agricultural extension officers

2. To increase the number of board operators

3. To increase awareness of the presence

4. To organize face-to-face meetings

Off line meeting at Niigata Prefecture

Top page of RAKUTEN

The approach to facilitate the application of information network

Letters and fax

↓

E-mail

↓

E-learning

Ｆｕｔｕｒｅ　prospect of development

1. Farmers should manage not only production but also food processing and merchandising

2. To widen and deepen personal relationships through communication with other business sectors

3. The introduction of marketing approach

It is imperative to use the tool of personal computers

Let's extend connections all over the world using a personal computer!

END

Thank you for your attention!

EXPERIENCES ON THE ULTILIZATION OF AGRICULTURAL TECHNOLOGY TRANSFER AND TRAINING NETWORKING SYSTEMS IN MALAYSIA[1]

Zulkifly Mohd. Zain [2]

SUMMARY

This paper discusses the measures taken to establish direct linkages and networking systems with the various government agencies entrusted with the extension and the overall development of agriculture. The system involves development, promotion, transfer of technology, training and commercialisation. It focuses on commodities such as tropical fruits, tobacco, rice, livestock and poultry, and entrepreneurship development in the food processing industry. Successful agricultural technology transfer and training mechanisms involving rice and tobacco are highlighted. Farmers and large-scale operators have benefited through implementation of the technology promotion and transfer programme via the extension agencies, and direct commercialization. ICT is being used as enablers in carrying out the programme

---

INTRODUCTION

Rice and tobacco, being important socio-economic crops, have been subjected to heavy intervention by the government in the market place. In the rice industry, a host of interventions are in place, including monopoly on imports; GMP for paddy; controlled prices at milling; wholesaling and retailing; and fertilizer and price subsidy. In addition, the government also provides drainage and irrigation facilities and undertakes R&D for rice. For tobacco, apart from being protected by high tariffs, the Malaysian tobacco industry also receives other forms of support from the government. The major interventions include licensing of curers and cigarette manufactures and registering of growers, implementing production quotas to balance production with demand, setting proper grading and pricing of green and cured leaves, and control and regulating the marketing of green and cured leaves.

Currently, Malaysia is not competitive in rice and tobacco production. The ratios of wholesale price to world price of these commodities were consistently more than 1. For rice, the average ratio increased from 1.17 for the 1985 -1990 period to 1.51 for the 1991-1996 period, indicating increasing economic efficiencies and decreasing competitiveness (Tengku Mohd Ariff, 1998).

Agricultural technology transfer and extension for farmers in Malaysia have been implemented through various approaches by relevant agencies under the Ministry of Agriculture and Agro-Based Industry (MoA).

The Malaysian Agricultural Research and Development Institute (MARDI) has been entrusted with R&D, promotion and transfer of technology (TOT) while the Department of Agriculture (DOA) is responsible for carrying out extension and regulatory services.

2

Other agencies are also involved through the MoA Inc. concept whereby the various agencies work together towards achieving a specific goal. This helps to facilitate and enhance the delivery of support services to the farmers, fishermen and private sector enterprises.

An effective agricultural technology promotion, transfer and training programme must be able to increase farmers' productivity. It can be done by offering technology, advice and help to farmers to enable them to analyse and identify problems and opportunities.

This paper discusses the implementation of agricultural technology transfer and training system in Malaysia with special reference to the mechanism for rice and tobacco, in an attempt to increase their production efficiencies and competitiveness in facing the challenges of globalization.

The paper also discusses the status of networking system on these commodity and agriculture in general.

AGRICULTURAL RESEARCH AND DEVELOPMENT

Agricultural research and development with respect to agricultural commodities (except oil palm, rubber and cocoa) and food has been entrusted to MARDI.

MARDI was set up by an Act of Parliament in 1969 to provide technological support for agricultural advancement of the country. Over the last 35 years MARDI has contributed significantly in terms of research and technology development.

With the challenges and demand of ASEAN Free Trade Area (AFTA) and World Trade Organization (WTO), new approaches would be needed to ensure that MARDI continues to be relevant in the country's main thrust and development.

MARDI has since redefined its role to provide the following core functions:

- Generate leading edge technology
- Transfer of technology (TOT) for public good and social economic consideration
- Commercialise technology & intellectual property (IP) for wealth generation
- Technical, scientific and expert service provision
- Leading towards K-economy entrepreneur with a K-intensive human resource development.

Several measures are being undertaken to establish networking systems with the various agencies entrusted with agricultural development. Close links are maintained with the BPM, DOA, FAO, FOs, IADPs, JPS, KADA, MADA and NTB in the form of MoA Inc++. These linkages and networking are very important as these agencies are directly involved with the farmers.

Examples of successful technology transfer mechanisms involving tobacco and rice are herein discussed.

TECHNOLOGY TRANSFER AND TRAINING

Rice – package technology for high yield rice production

Background

Rice is grown on double cropping in the 8 granary areas (MADA, KADA, Kemasin-Semerak, Ketara, Kerian-Sungai Manik, Seberang Perak, PBLS and Pulau Pinang) with a combined planting acreage of 440,000 ha per year. Small irrigated areas (secondary irrigation areas) contributed 30,000 ha. In addition, rainfed single crop areas, including dryland rice, make up a total acreage of around 150,000 ha (including Sabah and Sarawak). There are 150,000 farmers growing rice with an average farm size of 1 - 2 ha.

About 35% of our rice needs are imported. The government has set a target of 90% self sufficiency by year 2010. Among the problems cited for the failure to achieve self-sufficiency are the prevailing high labour and input costs.

A study on the productivity of the food sector in 2000 (Tunku Mahmud et al., 2002) showed that productivity index for paddy with subsidy was 1.38 and that without subsidy was 1.05. In other words, a ringgit spent on input would only yield a 5 sen return if subsidy was excluded. Rice yields also have not moved from the national average of 4 mt per ha.

Among the problems contributing to the poor yield and high cost include poor control of weeds, inefficient mechanization activities, the use of uncertified seeds, water management, lack of fertilizers and poor adoption of IPM strategies.

Although technology is available from many research findings, in many instances, its adoption rate by individual farmers is still low.

With the adoption of technology and efficient TOT, productivity is expected to improve. Yield in the granary areas is expected to increase from 4.5 mt per ha per crop (2000) to 9.0 mt per ha per crop by 2005 and in the non-granary areas from 3.5 mt per ha per crop to 5.5 mt per ha per crop (Anon, 2003).

In terms of labour input, by 2000, working man-day has fallen from 47 days per ha per crop (1995) to 15 days per ha per crop. All these increases in productivity can be attributed to R&D, the use of mechanization and the system of TOT.

One of the more effective technology transfer examples is that of high yielding rice (HYV) varieties. MARDI has so far released 34 varieties which contributed immensely to the increase in the national rice production (Table 1). Among them are MR 84, MR 167, MR 211, MR 219 and MR 220. The package technology for high yield rice production is available (Alias et al., 2002).

Table 1. Characteristic of Four New Padi Variety Released

Variety	Cross	Maturity (day)	Height (cm)	1000 grain wt (g)	Yield (mt/ha)	Year Released
MR 219	MR 151/MR 137	105-111	76-78	27.11	6.0-10.7	2000
MRQ 50	MRQ34/Khawk Dawk Mali	123-125	65-70	20.42	4.0-5.0	2002
MR 220	MR 151/MR 137	105-113	76-78	29.15	6.8-9.5	2003
MRQ74	MRQ34/KDML/Kasturi///Q34	123-125	60-70	22.86	5.5-6.0	2004

Technologies promoted

- New HYV varieties MR 219 and MR 220
- Direct seeding
- Fertilizer recommendation
- Land preparation
- Efficient water management
- Weed management
- Pest and disease
- Harvesting and post harvest handling

Target groups

- Farmers
- Large scale commercial growers and seed producers
- Extension agents

Methods

- Endorsement of MR 219 and MR 220 varieties by the agency's Scientific Council
- TOT package technology through local verification trials, up-scaling and pilot project (40 ha).

- Distribution of breeder seeds and foundation seeds to implementing agencies.
- Supervision in the production of registered seeds and certified seeds by implementing agencies and seed providers.
- Training of the extension agents through courses, seminars and farm visits.
- Commercialisation involving large scale operator.
- Impact assessment through continuous monitoring.
- Use of ICT in transferring, compiling, sharing information, product and services.

The flow of the TOT processes is shown in Figure 1 while that specific for quality seedling production in shown in Figure 2. The estimated rice yields from a 1.6 ha TWG project with KADA for four seasons (2003 - 2006) have been shown to increase from 4 mt/ha to more than 7 mt/ha. This project also functioned as a demonstration plot for the rest of the 40 ha collective farm.

Figure 1: Lingkages among the various sectors of the rice industry

IPB

BREEDER SEEDS

MARDI

MARDI's SCIENTIFIC COUNCIL

Foundation Seeds

Registered Seeds

Certified Seeds

TECHNOLOGY (HYR)

FARMER

PILOT PROJECT (1 ha)

UPSCALING (1-5 ha)

LARGE SCALE COMMERCIAL GROWER PADI MINI ESTATE (40 ha)

Figure 2: Processes for the quality seed production

New Paddy Varieties   Farmers

```
┌───────────┐     ┌───────────┐     ┌───────────┐     ┌───────────┐
│ Breeders  │ ──> │ Foundation│ ──> │ Registered│ ──> │ Certified │
│  Seed     │     │  Seed     │     │  Seed     │     │  Seed     │
└───────────┘     └───────────┘     └───────────┘     └───────────┘
```

MARDI

DOA, PPK
Commercial
Seed Producers

DOA, MADA,
KADA, PPK,
Commercial
Seed Producers
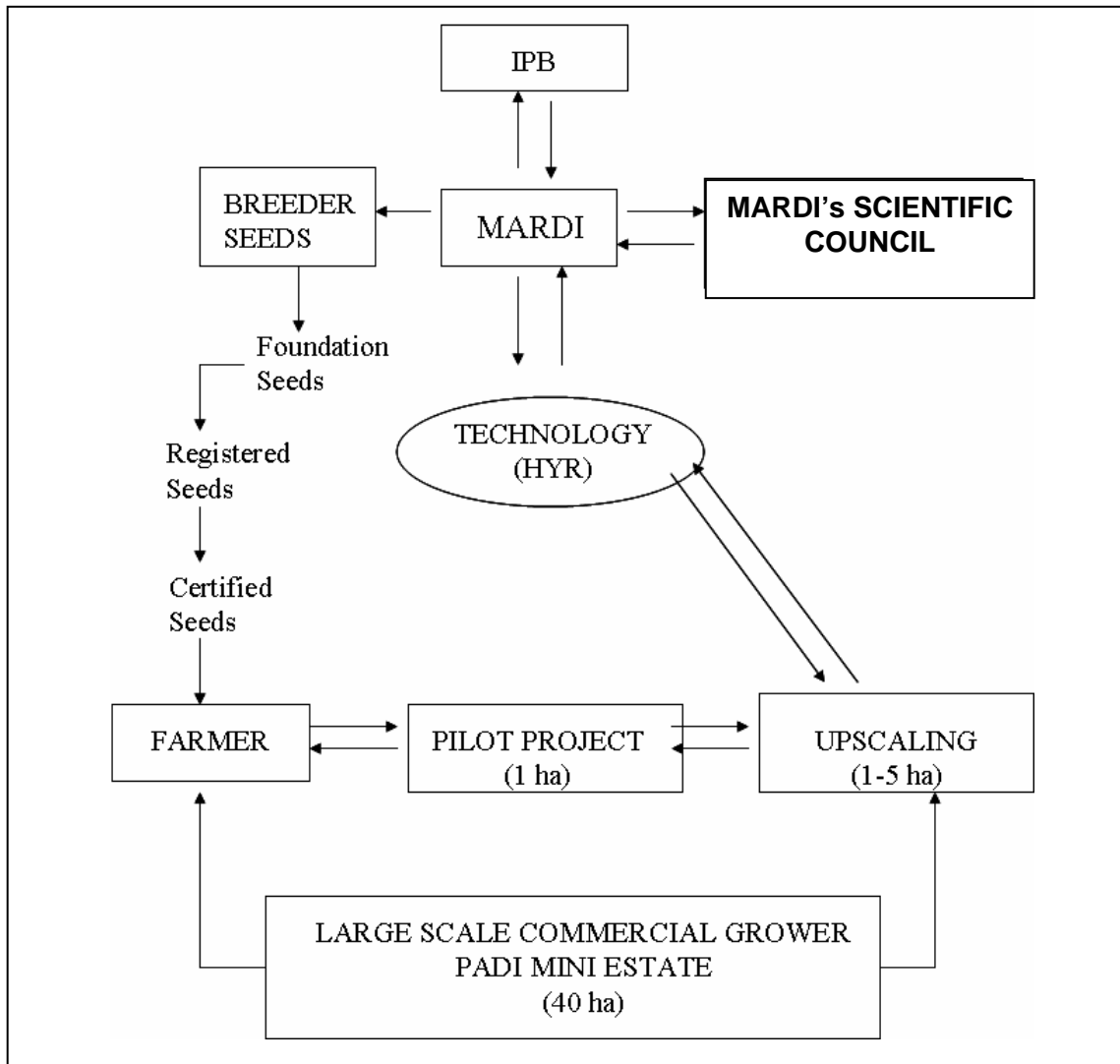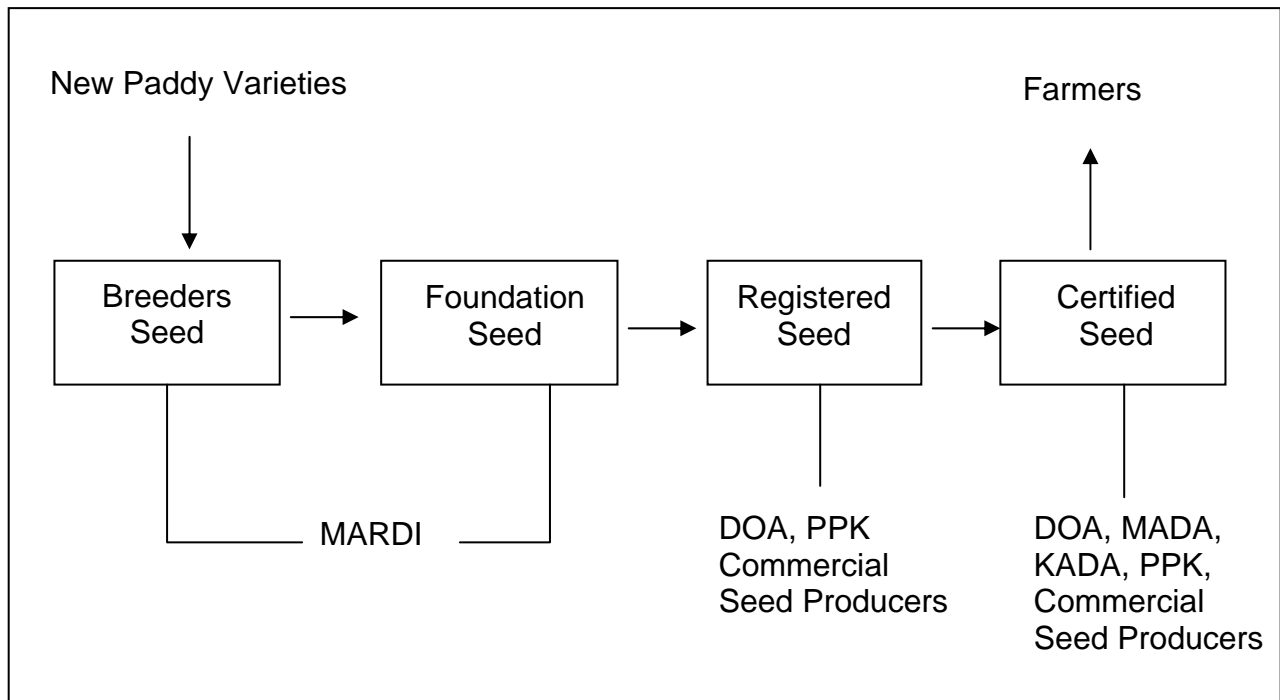
Success Factor

- Technology for HYV is practical and really useful to farmers, large scale growers and implementing agencies.
- Linkages and networking systems between seed suppliers, extension agents, farmers and commercial growers are well established.
- Use of slow mail, fax, telephone and internet is common.
- Concerted effort by the researchers to transfer the technology.

  However. for incremental productivity increase in rice production, more efforts are needed in the area of land levelling; weed, pest and disease management; and web based expert systems.

One of the more effective transfer technology strategies is to promote large scale integrated, precision farming and other high technology production systems. This will necessitate the participation of commercial farmers either at the corporate scale or highly organized GLC entities such as BERNAS.

Besides linkages among the research agencies, extension agencies, farmers and private entrepreneurs, linkages and networking with China in the form of genetic material, data exchange and training are also embarked.

Some funding from IRRI under the joint research on some aspects of breeding for quality is also being sought. IRRI's portal: www.irri.org is widely used by researchers and IT savvy large scale padi operators.

MARDI also takes part in global partnership and networking in rice genetic resources conservation and management as well as INGER (International Network for Genetic Evaluation of RICE where elite genetic materials from member countries were shared snd evaluated.

Tobacco - A new package technology for tobacco production.

Background

Tobacco is an important crop for the East Coast states of Peninsular Malaysia. Currently about 12,000 ha have been grown throughout the country with Kelantan and Terengganu contributing 80% of the area.

The local tobacco industry is protected by high import tariffs. Other interventions include compulsory licensing of curers and cigarette manufactures and registration of growers; production quotas to balance production with domestic demand; guaranteed minimum prices for both green and cured leaves; setting grades and prices of leaves; controlling and regulating the marketing of green and cured leaves; and also partly subsidizing farmers for fertilizer. Extension service to both curers and growers is provided. The government also provides incentives for them to exit the crop.

Under the Common Effective Preferential Tariff Agreement of the ASEAN Free Trade Area (CEPT of AFTA), all import duties of products from member ASEAN countries

need to be reduced to between zero to five percent. All non-tariff measures also need to be dismantled. Malaysia placed tobacco (and rice) in the "sensitive list", which will be subjected to liberalization requirements by 2010. There is a need to enhance productivity and competitiveness in tobacco production for the industry to have any chance of survival come 2010. The livelihoods of farm families that depend on tobacco farming as their main source of income will be greatly affected if the industry collapses.

The current production system is based on the traditional curer system. Under this system, the curers are given an annual production quota. This quota is determined based on the curers' past performance in terms of their capability to fulfill past production quotas that were allocated to them. The curers would subsequently divide and allocate the quota to tobacco growers to produce the green leaves. This system separates the process of green leaf production from that of cured leaves. This system is not conducive to the production of high quality tobacco.

The new package technology is to fulfill the technological needs of the new system to make tobacco production more cost-efficient, and is targeted at tobacco growers – curers system.

The complete package technology is described in various reports provided by Musa et al. (1989); Wan Azman and Salbiah (1989); Musa and Mohd Farid (1993); and Zulkifly et al. (1993).

Technologies Promoted
- New variety "Coker Gold"
- Float seedlings
- New fertilizer formulation and recommendation
- Mechanization of farm operations
- Good agricultural practices (GAP)
- Topping flower buds and axillary buds (suckers) control

Target Group

- Grower curer
- Extension Agent (NTB)

Methods

- Endorsement by the agency's Scientific Council
- Endorsement by National Committee for Development and Transfer of Tobacco Technology (NCDTTT)
- TOT new package technology through up-scaling and pilot project
- Training of extension agents and tobacco growers - curers
- Commercialization of this new package through the implementation of pilot project (1 ha farm) and large scale grower curer (15 ha)
- Impact assessment through continuous monitoring and evaluation
- Use of ICT for information retrieval technology, dissemination and data processing.

The flow of the processes is shown in Figure 3.

Figure 3: Linkages among the various sectors of the tobacco industry
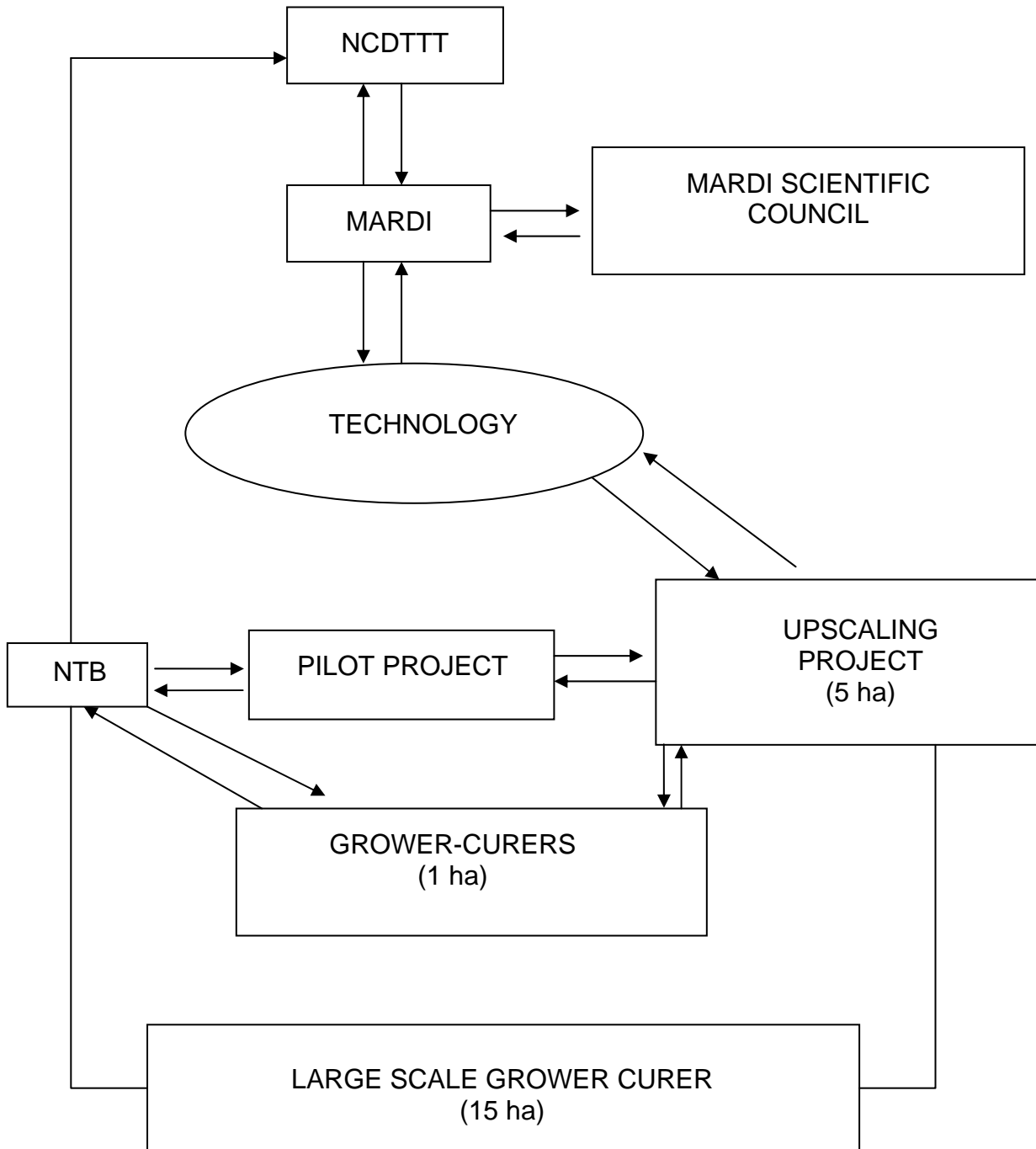
Success Factor

- The efficient linkages with various sectors of the industry.
- The innovativeness of the TOT on tobacco plays an important part on the successful implementation of the system.
- Researchers spend more than 30% of their time on TOT, mainly giving seminars, running courses in the form of training of trainers, plot demonstration and farm visits.
- ICT is used as enablers in technology transfer and training.

The transfer and commercialization of this system lead to the following benefits:
- Improved yield of tobacco leaf production by 25% compared with the current system
- Improved quality of cured leaf to be at par with international standard
- Achievement of full self-sufficiency (current import level is 30%)
- Reduction of overall cost of production by 45% (from RM 11.00 to RM 6.00 per kg of cured leaf)
- Increase in yield and quality, together with reduction in cost of production of 45% will ensure Malaysia's competitiveness in tobacco production post-AFTA

MARDI and NTB also take part in seminars, conferences and field visits, organized by CORESTA as part of the international linkages and networking systems.

LESSON LEARNT

The success of agricultural development depends very much on the commitment of the government. Clear policy direction on the commodity has to be set right from the start. The government has drawn up the Third National Agricultural Policy (Anon, 1998) which outlines various measures to be taken in order to fulfil the aim of being a net exporter of food by year 2 010.

The active participation of the private sector is essential for the successful implementation of the modernisation and commercialisation of agriculture. The public sector will facilitate and enhance the delivery of support services to farmers and private sector enterprises to enable them to achieve their income and business objectives.

Infrastructure development including good ICT facilities and last mile connection is being provided.

The importance of linkages among the various agencies entrusted with agricultural development is highlighted. Close links are maintained with the various agencies in the form of MoA Inc++. Bilateral programmes and TWGs between theses agencies are very important as these agencies are directly involved with the farmers.

Electronic networking exists among the various agencies through the Ministry of Agriculture's Information Highway, the *Agrolink* (www. moa agrolink.my). This agriculture information portal provides information on the Ministry, its department and agencies and agriculture in general.

The various agencies have embarked on their own electronic networking system. One such system was also illustrated for FOA (Ahmad Puzi, 2005).

For example, information on agro marketing by FAMA is through the portal: www.famaexchange.org and www.agribazaar.com.my,   while those concerning technologies are available in community-based portal :   www.padinet.com.my; www.tfnet.org ; www.myfruits.org.

Other sources of electronic agricultural information is Mardinet (www.mardi.my) . A few databases and system tools have been developed by CABI International in collaboration with MARDI and other local research institutions. This includes CABI Databases, Crop Protection Compendium, CAB Publishing's Primary Journals and other system tools such as Decision Support System and Expert System.

Successful utilization of technology transfer and training system are that of packaged technologies for rice and tobacco.

The mechanism involved includes direct training, technical advisory services, up-scaling, pilot project and large scale commercialisation.

The success of rice and tobacco highlights the importance of technology transfer and networking systems among research institutions, extension services, farmers organization and private sector in order to achieve productivity and increase farmers' income.

The role of a researcher in technology transfer, training and repackaging the technology to a suitable form is important. A researcher's understanding of the industry set-up, problems that need to be solved and technology interventions that need testing would determine the adoption rate of new technology. The need for follow-through support from researchers is also important. The supporting staff should be knowledgeable and competent in handling the new technology. They should also be provided with the necessary logistics including ICT to enable them to carry out their job effectively.

CONCLUSION

From the examples forwarded, it could be concluded that the system of agricultural technology, transfer and training discussed is effective. ICT is important and functions as enablers. This system could be applied in some of the APEC member countries. There is a need to further enhance networking among APEC member countries especially in the areas of rural poverty eradication, capacity building and human capital development in order to ensure sustainable progress and competitiveness.

REFERENCES

Ahmad Puzi, A.B. (2005) Networking initiatives in promoting changes to counter the Adverse effect of globalization among farmers organization group. Proceeding Seminar on Networking of the Agricultural Technology Transfer and Training. APEC – Agricutlural Technology Transfer and Training (ATT&T). Jakarta and Bogor, Indonesia 28 Nov – 1 Dec 2005.

Alias, I., Muhamad, H., Mahmad, N., Othman , O., Mohd Aris, J., Abu Hassan, D., Azmi, M., Saad, A., Abd. Rahman, A.B. dan Ariffin, T. (2002). Penanaman padi berhasil tinggi 48 hlm MARDI.

Anon (1998). *Third National Agriculture Policy* (1998-2010). Ministry of Agriculture Malaysia. 265 pp.

Anon (2003). Agricultural Development, 1996-2005. Chap 1. Malaysia Agricultural Directory and Index 2003/04. Agriquest - UMAGA.

Musa, Y, dan Mohd. Farid, S. (1993). TAPM 26, variety tembakau awet panas yang baru untuk industri tembakau di Malaysia. *Teknol. Tembakau* 9:1

Musa, Y, Hamidon, D. Wan Faridah, W.J. dan Rosiah, H. eds. (1989). Panduan Penanaman Tembakau. 92 hlm. MARDI

Tengku Mohd Ariff, T.A. (1998). Effects of trade liberalization on agriculture in Malaysia: Institutional and Structural Aspects. Working Paper 34 – Bogor : CGPRT Centre. 112pp.

Tunku Mahmud, T. Y, Salbiah, H., Raziah, M.L. and Tajaruddin, J. (2002). Productivity of Food Sector. Ministry of Agriculture.

Wan Azman, W.I. and Salbiah, H (1989) Effects of nitrogen fertilization rates on yield and quality of flue-cured tobacco grown on sandy soil in Malaysia. *MARDI Res. Bull. 17(2)*: 194-199

Zulkifly, M.Z., Wan Azman, W.I. dan Wan Zaki, W.M. (1993). Kesan ketinggian mengasi terhadap hasil dan mutu tembakau awet panas Malaysia. *Teknol. Tembakau* 9:9-12.

GLOSSARY OF ACRONYMS

AFTA   -   ASEAN Free Trade Area

BPM   -   *Bank Pertanian*
                 Agriculture Bank

BERNAS   -   *Padiberas National Bhd.*

CORESTA   -   Cooperation with respect to tobacco

DOA   -   Department of Agriculture

FAO   -   Food and Agriculture Organization

FOs   -   Farmers' Organizations

GAP   -   Good Agricultural Practices

GLC   -   Government linked company

GMP   -   Guaranteed Minimun Rice

HRD   -   Human Resources Development

IADP   -   Integrated Agricultural Development Project

IPB   -   *Bahagian Industri Padi dan Beras*
                 National Paddy and Rice Division

IPM   -   Integrated Pest Management

JPS   -   *Jabatan Pengairan & Saliran*

Department of Drainage and Irrigation

KADA   -   Kemubu Agricultural Development Authority

MARDI   -   Malaysian Agricultural Research and Development Institute

MoA   -   Ministry of Agriculture and Agro-Based Industry

MoA Inc++. -   Ministry of Agriculture Incorporated plus other agency

NAP3   -   Third National Agricultural Policy

NCDTTT   -   National Committee for Development and Transfer of Tobacco
                         Technology

NTB   -   National Tobacco Board

PPK   -   *Pertubuhan Peladang Kawasan*
                         Farmers Area Development

R&D   -   Research and Development

RM   -   *Ringgit Malaysia, (1USD = RM 3.70)*
                         Malaysian Ringgit

TOT   -   Transfer of Technology

TWGs   -   Technical Working Groups

WTO   -   World Trade Organization

EXPERIENCES ON THE ULTILIZATION OF AGRICULTURAL TECHNOLOGY TRANSFER AND TRAINING NETWORKING SYSTEM IN MALAYSIA[1]

BY
ZULKIFLY BIN MOHD. ZAIN[2]

[1] Paper presented at Workshop on the Utilization of ATT&T Networking System, September 18 – 22, Medan-Indonesia

[2] Senior Researcher Malaysia

TOPICS DISCUSSED

GENERAL POLICY DIRECTION
- ❑ NAP 3
- ❑ Commodity Development

LINKAGES AMONG THE VARIOUS SECTOR
- ❑ Rice
- ❑ Tobacco

TRADITIONAL "NETWORKING"

ICT SUPPORT IN AGRICULTURE
- ❑ Technology and Innovation Content
- ❑ Information System Networking

GENERAL REQUIREMENTS/ISSUES ON THE USE ICT IN AGRICULTURE

LESSON LEARNT

CONCLUDING REMARKS

AGRICULTURE IN MALAYSIA

Important Component of National Economy

❑ **GDP contribution**

Dual Production System

❑ **Small holding (1 ha)**

❑ **Large Scale / Estate / Mini Estate (MEP) 40 ha**

Third Engine of Growth

❑ **R & D Expected to play import role**

❑ **K – based Agriculture**

❑ **Agriculture is business**

PROBLEM AND CONSTRAINTS

- **Increasing food import bill**

- **Acute labour shortage**

- **Low productivity and uneconomic farm size not competitive**

- **Limited development of high value –added products;** and

- **Concern for environment**

NAP3 (1998-2010)

Objectives :

- **Enhance food security**

- **Increase productivity and competitiveness**

- **Establish / Improve linkages**

- **Create new sources of growth**

- **Sustainable development**

LINKAGES

Figure 1: Lingkages among the various sectors of the rice industry
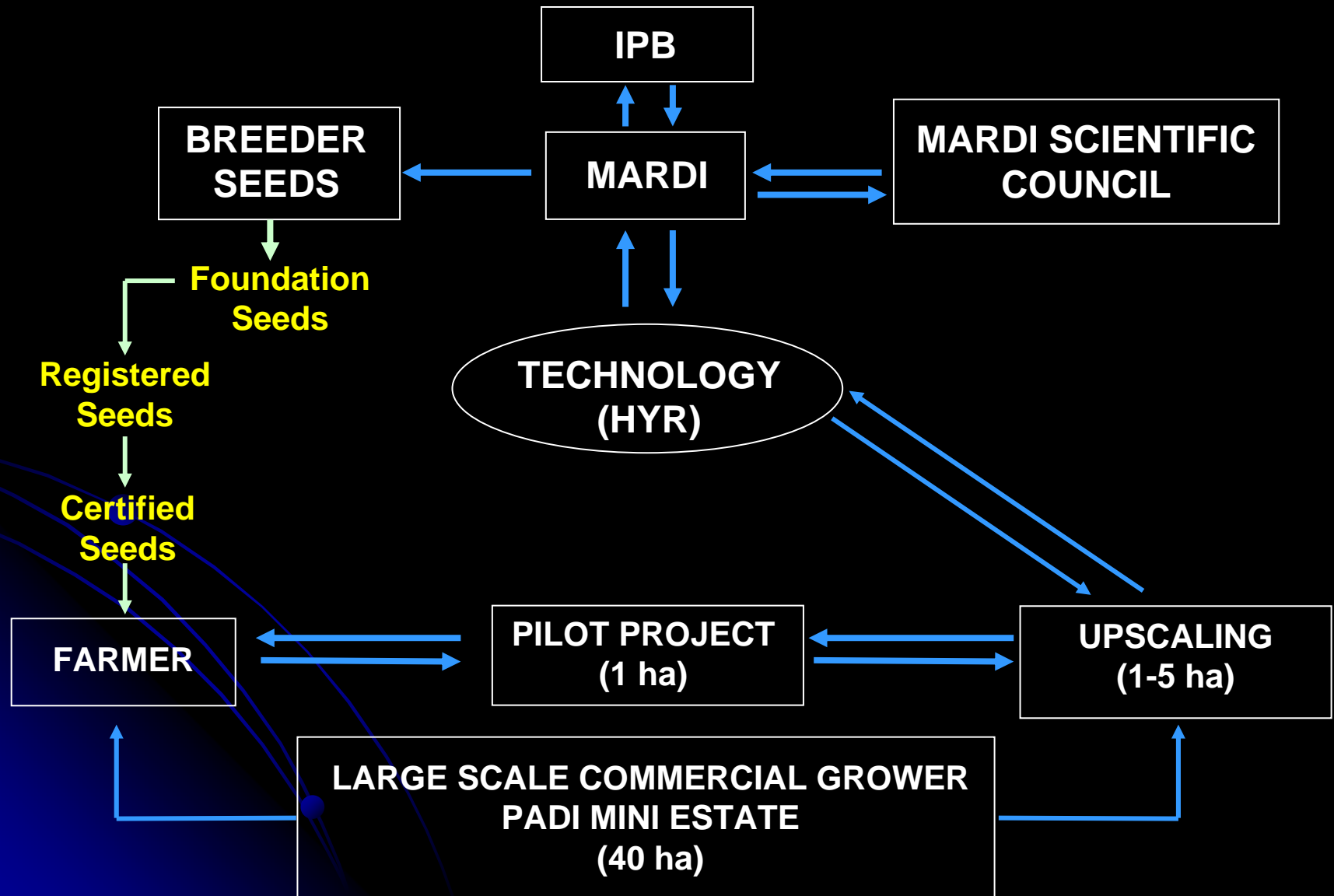
Figure 2: Processes for the quality seed production

New Paddy Varieties

Farmers

Breeders Seed → Foundation Seed → Registered Seed → Certified Seed

MARDI

DOA, PPK Commercial Seed Producers

DOA, MADA, KADA, PPK, Commercial Seed Producers
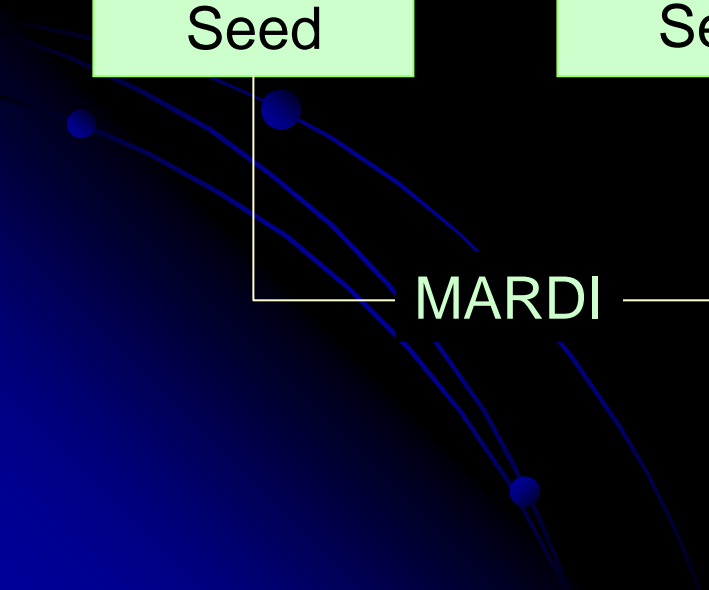
Figure 3: Linkages among the various sectors of the tobacco industry
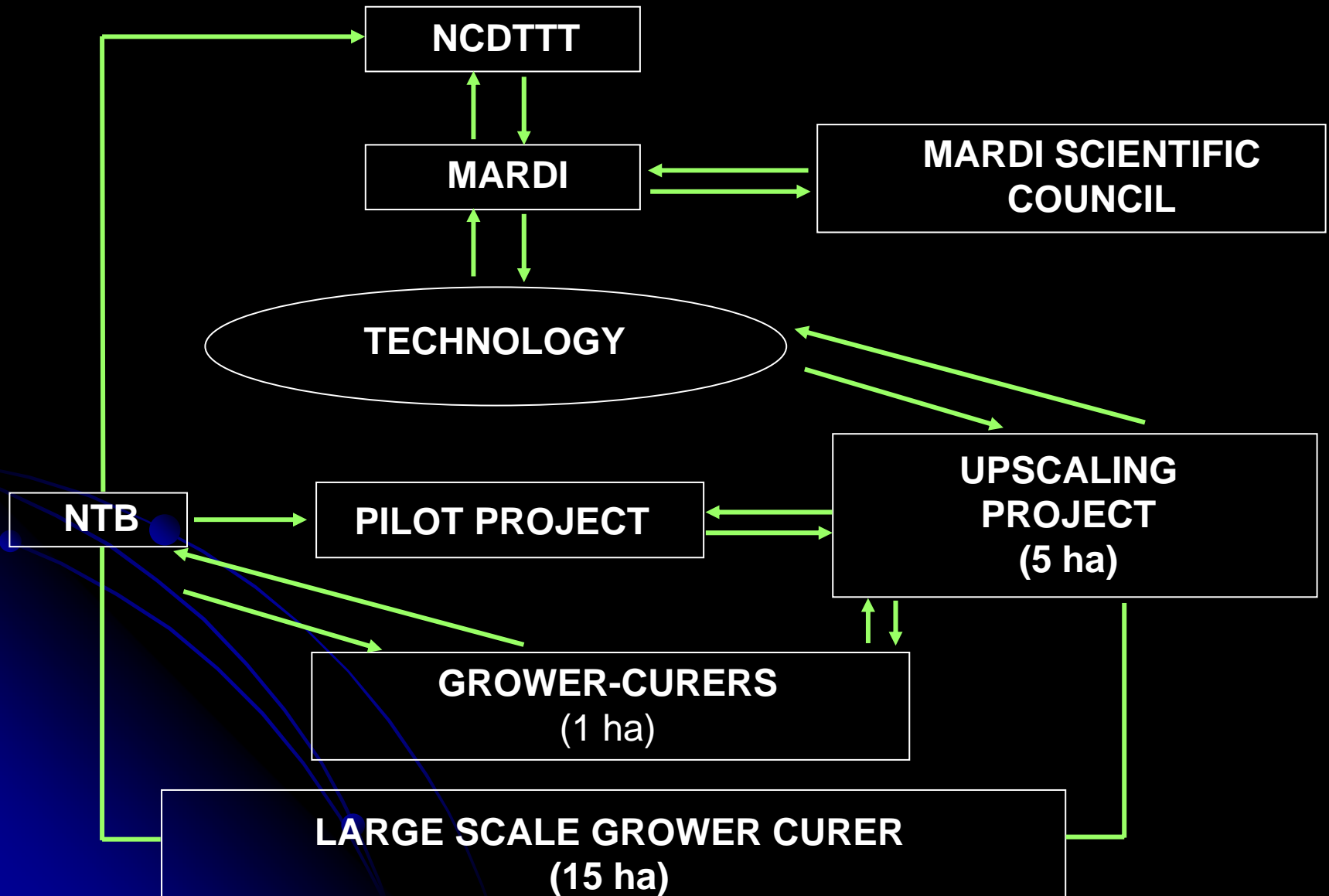
TRADITIONAL "NETWORKING"

- **Runners/Direct/face to face contact**

- **Slow Mail**

- **Telephone**
  - Fixed line
  - Hand held mobile
    Now (*3G phone)

- **Fax**
    Now (* internet, email)

TECHNOLOGY CONTENT

- **"Matured" and "Appropiate" Technology**

  eg. All padi verieties released go through the following processes:

Varietal Trial (VT) → **IVT LVT Adaptation Trials** → **Pilot Project** → **Upscaling Project**

Pilot Project ↓

- **Farmer**
- **Large Scale Grower**
- **Mini Estate**
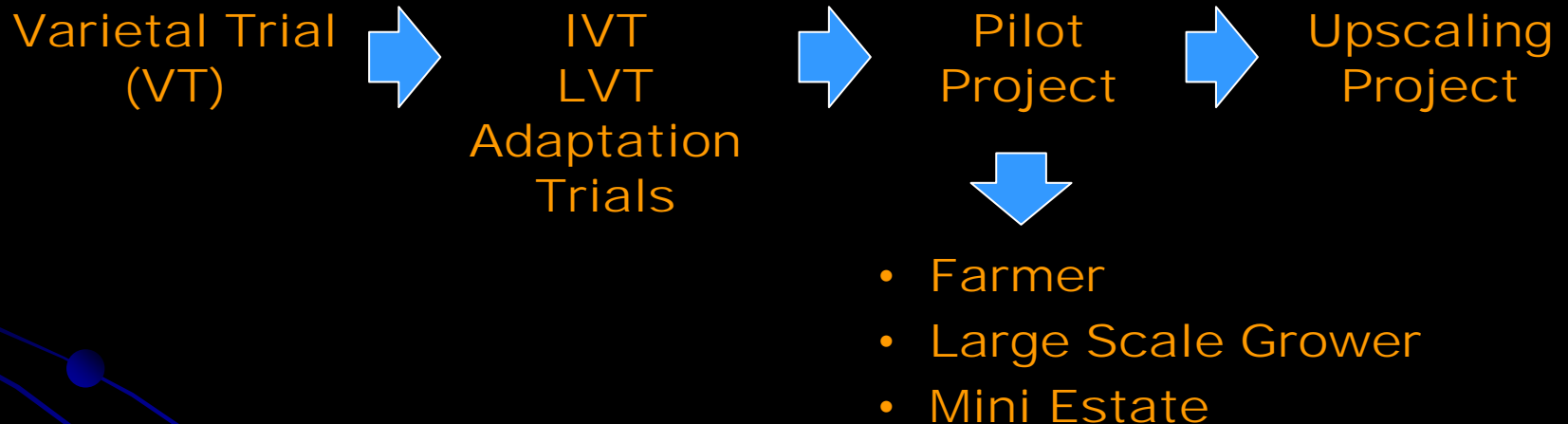
- **34 varieties** → **4 choosen for ATT&T + Commercialisation ©**

  ✓ High Yield Rice (MR219/MR220) Project * 2003-2005
  ✓ Commercialisation of Aromatic Rice (MRQ50/MRQ74) Project * 2005-2007

INFORMATION NETWORKING SYSTEM

- ❑ **Locally, and for Internal Use**
  - ❖ **Genetic Database**
  - ❖ **Diagnostic System**
  - ❖ **Expert System**
  - ❖ **Precision Farming**
- ❑ **Regionally; and**
- ❑ **Globally**
  - ❖ **IRRI**
  - ❖ **INGER**
  - ❖ **Hybrid Rice Project with China**

ICT SUPPORT

- Information Networking Systems **"The Agrolink"**

  (www.agrolink.moa.my)

- Other sources of electronic agricultural **"The Mardinet"**

  (www.mardi.my)

- Several community-based portals are also developed such as:

  - "Taninet" (www.taninet.com.my)

  - "Padinet" (www.padinet.com.my)

  - "Tropical Fruitnet" (www.tfnet.org)

    (www.myfruits.org)

AGROLINK INFORMATION CONTENT

- ❖ **INTEGRATED AGRICULTURE DEVELOPMENT PROJECT**
- ❖ **POLICY AND LEGISLATION**
- ❖ **MAIN PUBLICATIONS**
- ❖ **CALENDER AND EVENTS**
- ❖ **PARLIAMENTARY QUESTIONS AND ANSWERS**
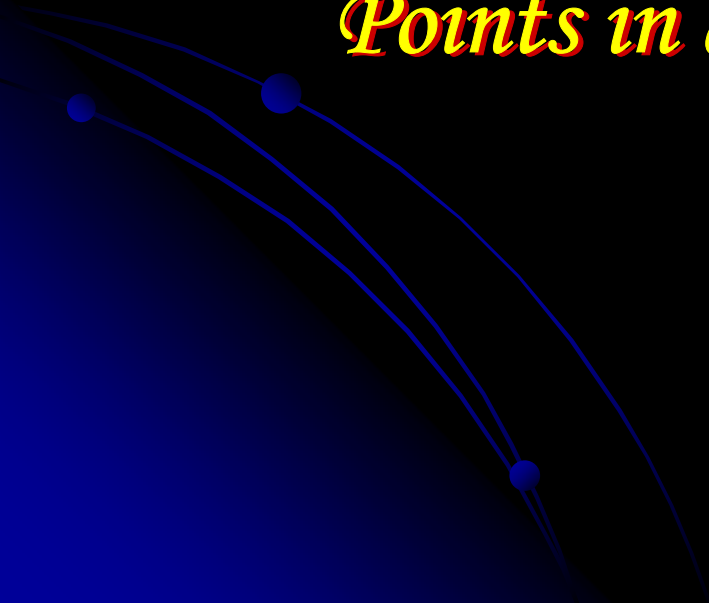
BUSINESS DEVELOPMENT CENTER

One stop center electronically linking the four Dept.
and eight Agencies with other relevant focal Points in agricultural development

BUSINESS DEVELOPMENT CENTER

ICT INFRASTRUCTURE

- **The National Information Technology Agenda (*NITA*)**

- **Government Linked Companies (GLC) are the two main Internet Services Provider (ISP)**
  1. www.tmnet.com.my
  2. www.jaring.com.my
     Over 1 million users registered with thes 2 ISPs
     Services @ 56 kbs → 2 Mbs speed

- **3 G Lincense given to them and another GLC**
  3. www.timedot.com.my

ICT SUPPORT BENEFITS

- **Helps new agricultural entities to operate effectively and efficiently through information network**

- **Provide information on land resources**

- **Provide information on incentives and finance**

- **Provide specialised information network**

- **Established of interactive and collaborative networks nationally, regionally and globally**

GENERAL REQUIREMENTS/ISSUES ON USE OF ICT IN AGRICULTURE

- **Infrastructure**

- **Digital divide**

- **Human resources and capacity building**

- **Relevant technology/innovation content**

- **Public awareness**

- **Other issues –**
  - Standard, economic, physical and social obstacles

CAVEATS

"Although all R&D and universities can be accessed via the internet, public access to the information is still limited to corporate and some information about function of the organization.

Except information provided on the homepages, most of the information system developed are still not accessible to the public electronically.

Most of the information is exclusively for internal use."

LESSON LEARNT

- **Strong commitment from the Government**

- **Clear policy guideline**

- **Good linkages among the various sectors of industry**

- **Mature technology/innovative content**

- **Good information system networking**

- **Good ICT infrastructure support**

CONCLUDING REMARKS

- **Utilization of ATT&T Networking System is effective**

- **Direct face to face contact**

- **Use of ICT as enablers**

- **Need to enhance networking among APEC member economics in areas of rural poverty eradication, capacity building and human capital development**

THANK YOU
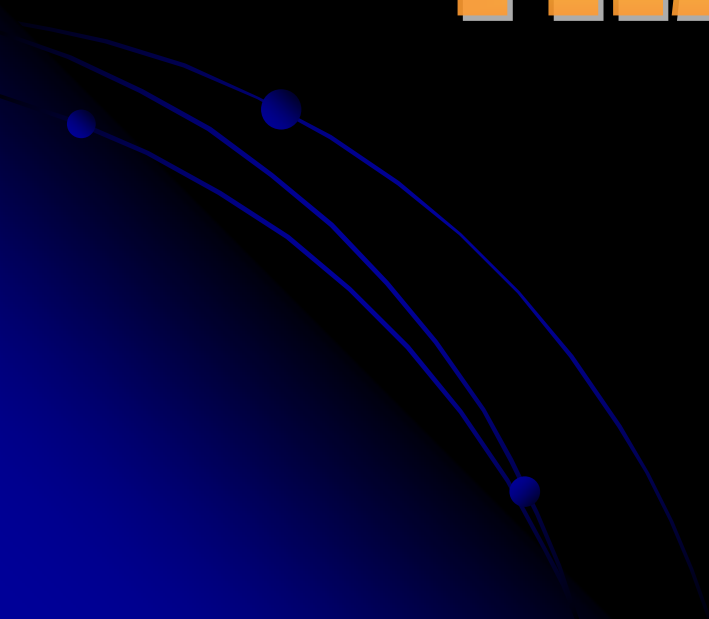
How we, Tenha Organic Farm, use the internet resource?

Tenha Organic Farm

Tai An Chen

Director

What kind of resource we get?

- Search engine
    - Searching the knowledge we interested
    - Find us
    - News searching
- Homepage –
    - information sharing
    - Platform sharing
    - http://www.tenhagroups.com.tw/   (under construction)
- Internet store
    - http://tenha.supergood.com.tw
- E-mail – communication, contact with us
- Traceability connection
    - Find out our products information from internet
    - http://taft.coa.gov.tw/

Search Engine

Searching Result

Internet store

Back Office control

E-mail function

- Reconfirm the information that you want.
- Request some documents when you need.
- Communication with your friends or staffs world wide only spend few minute.
- Saving Time and $
- efficiency

Traceability system in ChineseTaipei

http://taft.coa.gov.tw

How to use traceability system in Chinese Taipei?

- Find out the trace code on package of product.

- Scan the bar code in the store, or

- Go into the website, http://taft.coa.gov.tw/, then put the trace code in.

Traceability Vegetable

Trace Code Label

Old Version

New Version

Advertisement Label

Input the trace code

trace the growth records

a.gov.tw/index.asp?a=lpx&ctNode=69&CtUnit=45&BaseDSD=26&htx_ResumeCode=3833868

○ Culturivation record

❀VIPS Code：466080011104455

❀Info for communication

Brief introduction of farmer

- Name：李惟裕
- Place of Origin：
  臺南縣仁德鄉
- Production Organization：巨農有機農場
- TEL：06-510-3248

Culturivation information ‖ Culturivation record
After harvest ‖ Examined information ‖ Accreditation

❀ **Culturivation information**

Culturivation No.：	10041406280001
Producer：	李惟裕
Identity：	Normal
Production Organization：	巨農有機農場
Culturivation section：	臺南縣仁德鄉十三甲段1219號
Culturivation area：	0.1 ha.
Organic：	Yes
Crop(variety)：	wax gourd (吉峰二號)
Harvest：	Yes

2006/8/26	harvesting	harvesting	採收量：冬瓜167公斤
2006/8/25	harvesting	harvesting	採收量：冬瓜217
2006/8/24	harvesting	harvesting	80+137 採收量：冬瓜15公斤
2006/8/22	harvesting	harvesting	採收量：冬瓜3公斤
2006/8/4	weed control field management	manpower weeding	
2006/8/4	weed control	manpower weeding 理蔓除蔓	
2006/8/3	weed control	manpower weeding	
2006/8/2	fertilizing	fertilizing	施用肥料：福壽實業股份有限公司福壽牌菜籽粕60000g
2006/7/31	other	other	
2006/7/31	other	other	
		other	

What benefit we got from the internet?

- Consumers find us from the internet.
- Share our information or news to interested people
- Sale our vegetables from internet
- gather the demands of consumers
- Consumers place more reliance on traceability vegetables via internet connection.

Thank you

very much

Vietnam Agriculture Extension System and services to farmers

Vo Ngan Giang - National Agricultural Extension Center

Ministry of Agricultural and Rural Development, VIETNAM

Content

- What is the agriculture extension system in Vietnam?

- What have been done in 1993 up to now?

- What we will do in future?

ADMINISTRATION MAP - VIETNAM

SCALE : 1/7 000 000
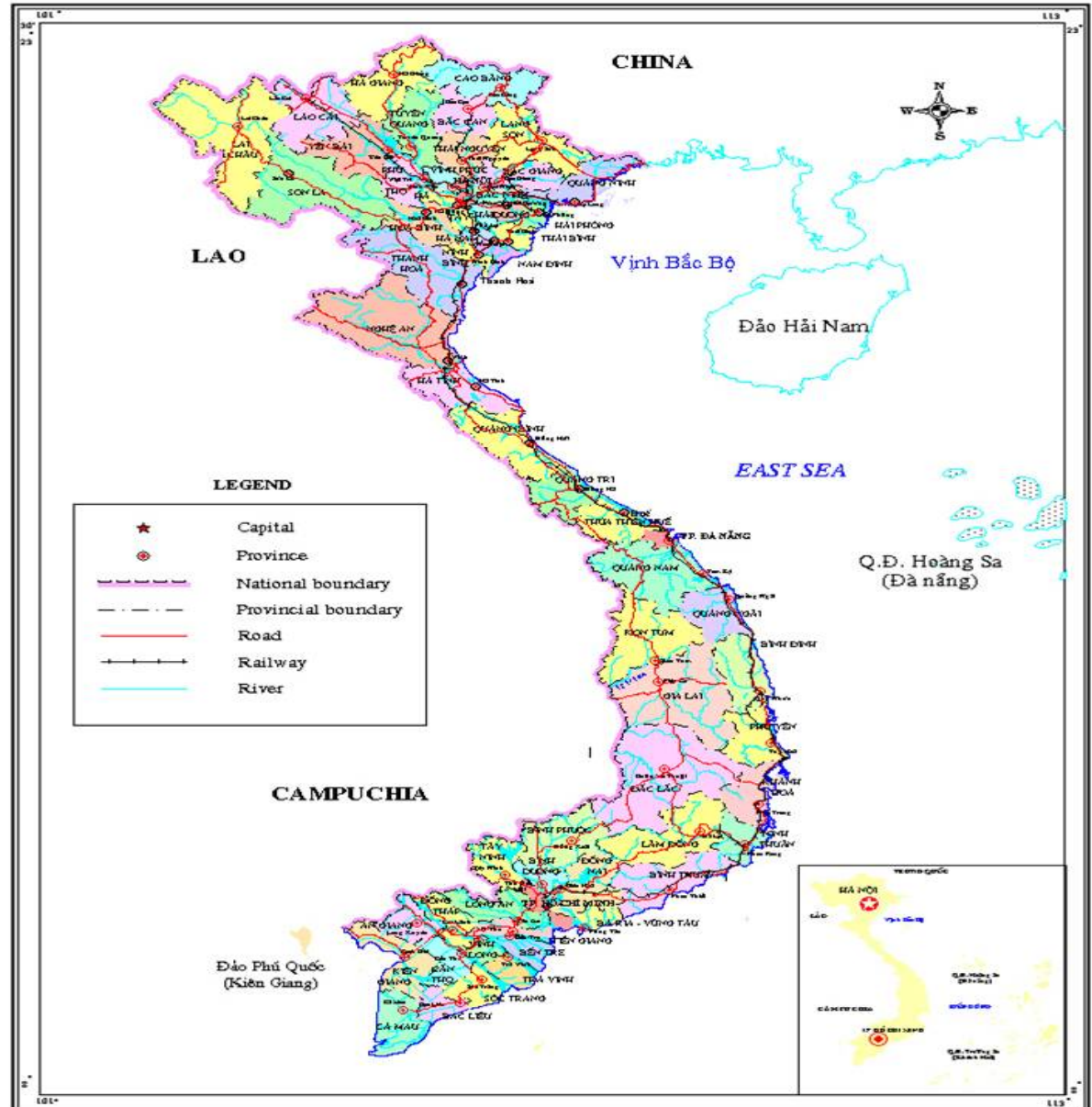
What is the agriculture extension system in Vietnam?

- **Central : National Argriculture Extension Centre (NAEC)**
- **Local : Provincial AEC, AE Station, AE network at commune/village level**

Our system

The Central level

Ministry of Agricultrual and Rural Development → National Agricultural Extension Center

Divisions:
- Administrative and Personnel Division
- Planning-Finance Division
- Crop Production Extension Division
- Forestry extension Division
- Livestock Extension Division
- Training Division
- Information-Propaganda Division
- Cooperative Economy & Rural Industry Promotion Division
- Representative Mission in HCM City

DARD → PAEC → DAES → CEW, VEC

Our system

❑ *The local level*

- Province: 64 Agriculture Extension Center: 1.446 staff
- District: 520/637 district have AE Stations (Acc. for 80%), 1.716 staff
- Commune: 7.343 staff (Acc. for 71% of total communes)
- Village: 3.918 AE clubs with 76.300 members

❑ *Coordinating agencies*

There are122 agencies including research institutes, research centers, training colleges, associations, mass organizations, enterprises, media and others

Our activities

- ❑   **Communication and advocacy**
- ❑   **Capacity building and training**
- ❑   **Demonstration plot and technology transfer**
- ❑   **Consultancy and service**
- ❑   **International cooperation**

What have been done in 1993 up to now?

What we have been done?

1. *Demonstrations plot and technology transfer*

- Yearly there are thousands of demonstration pilots set up throughout the country

- The most outstanding achievements are the technology produce hybrid rice variety F1, set up nursery plant siblings, re-plantation and intensive plantation forestry plants, industry plants, fruit trees, restructure of plantation, lean meat pig breeding technology, improving an yellow cattle breed, rehabilitation and development of village traditional vocation, conservation, processing agricultural product

What we have been done?

2. *Capacity building and training*

Hundreds of capacity building and technical training courses are yearly organized for 5,000 extension staff and 10,000 farmers.

3. *Communication and advocacy*

- Publish monthly 4,500 – 5,000 Agricultural Extension Bulletins, large number of extension document and books and distributed to districts, communes.

- Website set up and provides daily update information for extension workers, farmers and other.

- 200,000 books and 20,000 technical drawings, leaflets, 5-6 sets of technical CD are early produced.

- Coordinate with 40 media, newspaper, journal agencies internally and externally of the agricultural sector.

- Different TV, Radio Programs (Country Today, Disscus With Farmer About How To Become Get Rich, Telling Farmer)

Our Strengthen and weaknesses

Strengths and weaknesses of AE structure and management system; Human resource; Finance; AE services...

AE Structure and Management System

Strengths	Weaknesses
Formulation of AE system from central to locality	Grassroots AE system remains weak
Formulation of organization structure with roles and responsibility according to the Government degree	A network of coordination with outside organizations and agencies is not available
Sectoral management from central to locality	Monitoring and Evaluation system is not strong enough
Period planning of national AE programs	Limitation of local participation

Resources

Strengths	Weaknesses
Government support of finance and materials	Finance is not enough response to demands, dependence on the Government
Human resource is trained and distributed to province, district and commune	Shortage of quantity and quality human resource. Lack of effective and sustainable approaches
Farmers actively participate in and contribute to AE activities	Training and development of grassroots AE workers is not prioritized
Socialization of AE activities	Not maximized mobilization potential of organizations and private sectors in AE activities

Agriculture Extension Service

Strengths	Weaknesses
Diversified services: training, demo plots, technology transfer, market, product conservation and processing…	Quality of service is not satisfied. Cost/effectiveness analysis is not done for each kind of service
National wide	Expanded service, not focus on prioritized subject/zones
Macro orientation in line with Government policy and direction	Not yet compromise between local diversified demands and National strategic direction
Provide material, siblings, breeding animals, technology etc, for set up demo plots.	Subsidized service. Not existing a mechanism of profit estimation and division between delivers and recipients.

Opportunities and Challenges

Opportunities	Challenges
Agriculture production is main incomes of farmers	Low effectiveness of agriculture production
High demands of AE service	Small, cluster household production
Government has policies to support agriculture extension activities	Volume and quality of agriculture product is still low, informality, high production cost
Existing AE system from central to locality	AE service is not satisfied demands. Quality and effective of service is not high
Market for agriculture product exportation is available	Unstable market. Competitive with imported agriculture product.
Available rural labor resource	
Agriculture production diversity	
Agriculture extension socialization	

What we will do in future?

Vietnam agriculture extension system becomes strong, flexible and effective to response to the needs of agrriculture production and rual developmen, fit with a trend of international and regional economic integration.

Vietnam agriculture extension system bring more service to farmer.

Key Principles to work

- **Sustainability**
- **Effective**
- **Democracy** *(participatory)*
- **Transperancy**
- **Ownership**

Some pictures

Thank you.

Farmer livestock School (FLS/SLC)
A good example of delivery training to farmers

- Principles of FLS
- FLS Implementation Steps
- Successes and Limitations
- Suggestions and Recommendations

Small Livestock Component

- **is a part of the Agricultural Sector Programme Support (ASPS) sponsor by Danish International Development Agency (Danida). Small Livestock Component is hosted by the National Extension Centre, under Ministry of Agriculture and Rural Development (MARD)**

- **Objectives: SLC aims to improve the income and performance of small holders, particularly poor farmers, who engage in pigs and poultry production.**

- **Project period: from 2000 to Dec., 2006.**

- **Pilot sites: 3 provinces in the North of Vietnam (Thai Binh, Thanh Hoa and Nghe An) and expand into 3 more province in the North mountain area in 2006.**

- **One of the main SLC activities is organizing technical training courses for farmers through Farmer Livestock School (FLS)**

FLS Principles

- **Using Participatory Methods: oriented training, combine theory and practical learning exercises**

- **Suitable for farmers to learn: module contents, information provision and training manuals are basic, short and be summarized from the real life of small livestock production**

- **Focus on the farmers: farmers are provided additional knowledge based on their experiences and have chance to discover new techniques.**

FLS Principles (con't.)

- **Two ways of communication**: Trainers give guideline and provide favorable conditions for farmers to exchange their knowledge and experiences at the same time with provision addition knowledge and new techniques

- **Increasing the farmer's abilities to decide**: farmers apply new techniques into their livestock production

- Ensure the **sustainability of FLS model**

FLS Implementation Steps

- **Agreement on the approach methods**

- **Produce training manual**

- **Training of Trainer (TOT)**

- **Organizing FLSs for farmers (local trainers responsibility)**

- **Testing and piloting village livestock production model**

- **Capacity building for local service providers (training, equipment provision, study tour…)**

Produce Training Manual

- A set of FLS training manual was developed including Smallholder Semi-scavenging Chicken Production, Duck/ Moscovyduck Production and Pig Production.
- Each manual included: training method, using manual guideline and livestock technical modules
- Manual were compiled by livestock experts with additional experience from TOT and farmer training courses which were held in pilot sites
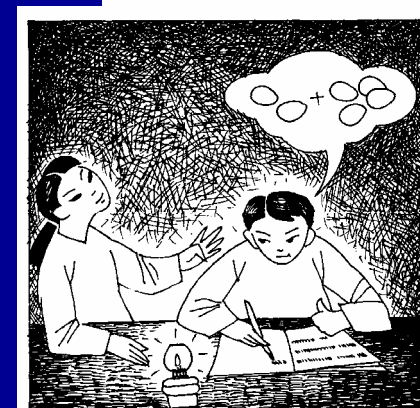
Organize training of trainer courses (TOT)

- **7 TOT courses (over 170 participants) on small livestock production (pig, chicken and duck) for 3 pilot provinces**

- **Training contents: Participatory training methods and basic techniques for small livestock raising**

- **Trainers: Local staffs were selected from Extension and Veterinary Units, Women Union, Farmer's Association at provincial, district and community levels.**

FLS training courses

- FLSs are intensive training courses for group of 20-25 farmers who meet on the weekly basic for 3 - 4 hours; each course is about 2,5 - 4 months.

- The training course included different training modules on animal health, husbandry, feeding, data recording, economics, manure management, etc.

- Trainers are local extension, livestock and animal health staffs.

Organize Farmer Livestock School (FLS)

▪ **Trainees are poor farmers from pilot communes who have done or are planning in small livestock raising (priority for women and farmers from ethnic minority).**

▪ **FLS Training organized in the village and practiced on-farm; timetable were decided by farmers**

▪ **Encourage trainees to exchange knowledge, raising problems and finding solutions for small livestock production**

Successes

- **Meet farmer's need, improve decisive characteristics for farmers in small household production.**

- **Training methods which based on practices (learning by doing) help farmers learning faster.**

- **Create friendly environment for exchanging information on animal production between trainers and farmers, farmers and farmers**

- **Contribute in capacity building for staffs at different levels on animal production, on knowledge transfer methods**

- **Social impacts: Improve relationship between staffs and farmers, Gender equality, and women role in society**

- **Farmers are more confident and being more respected**