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

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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.

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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]

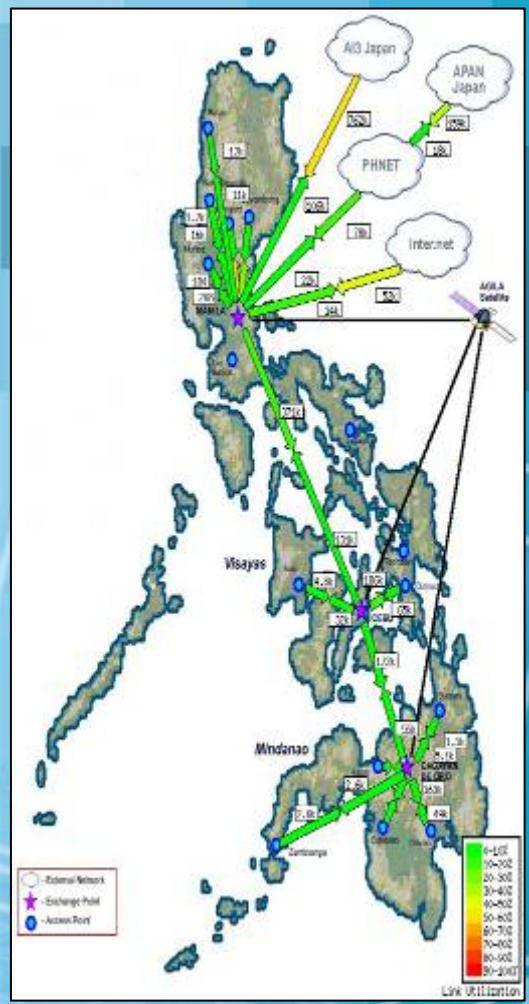
[1] Program Director, Open Academy for Philippine Agriculture
[2] Information Technology Officer II, Philippine Rice Research Institute

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



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

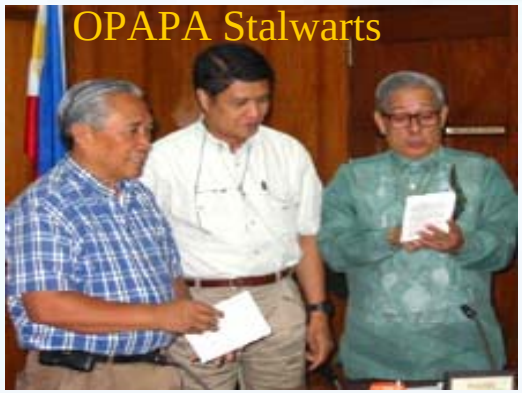
Meeting of the minds

MOU signing between DA and DOST July 2003

First Advisory Council Meeting

Soft Launching Nov 2003

OPAPA Stalwarts



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

Farmer

Farmers Coop

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.

PINOY FARMERS' internet
Open Academy for Philippine Agriculture

Project Components

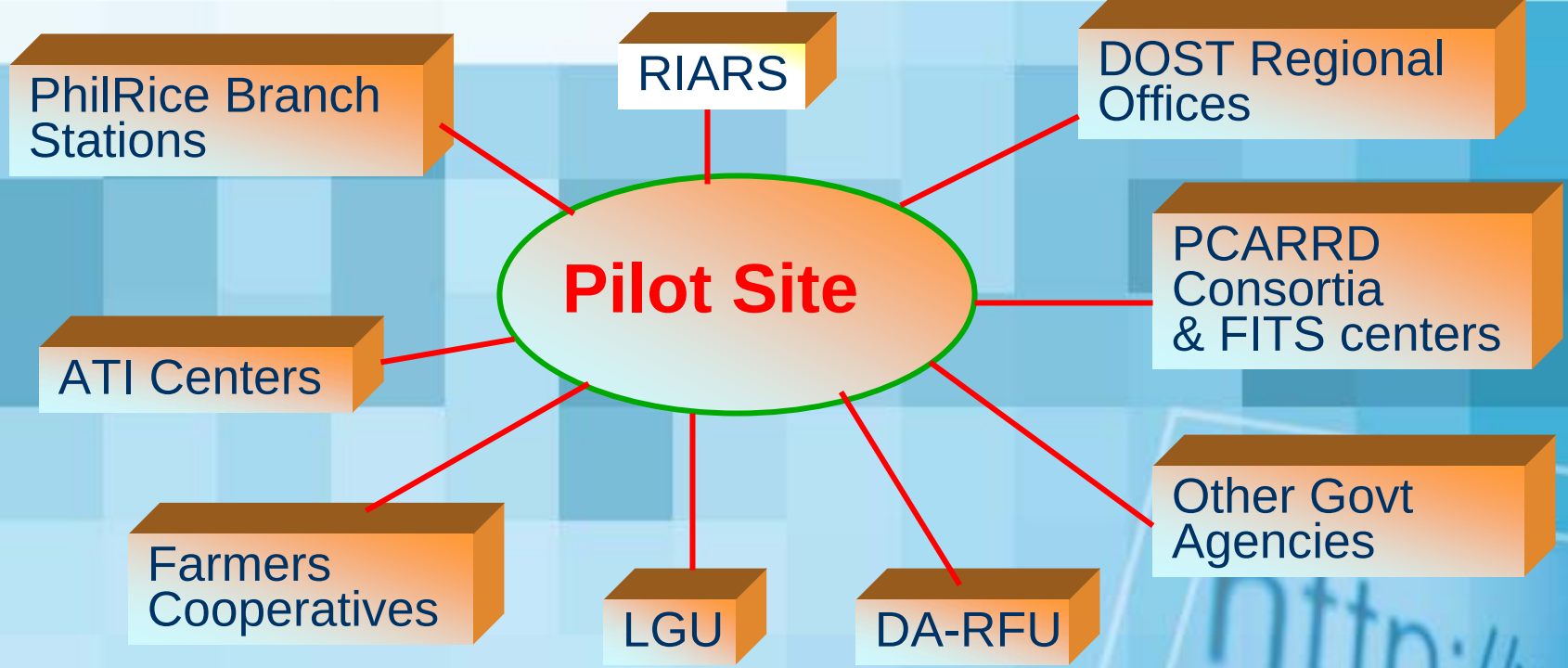
E-Learning

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

PINOY FARMERS' internet
Open Academy for Philippine Agriculture

Project Components

- Last mile connections of agencies to access points



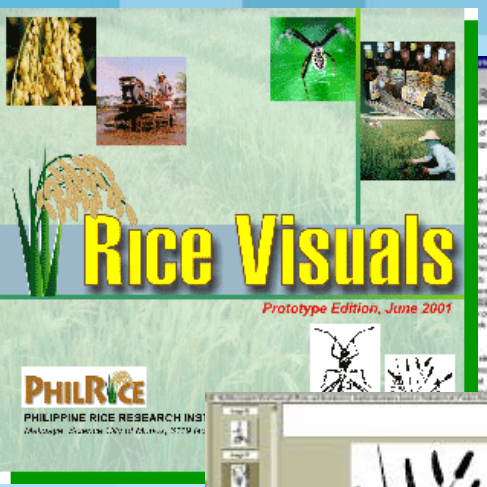
PhilRice ⟷ Pilot Site ⟷ ATI centers

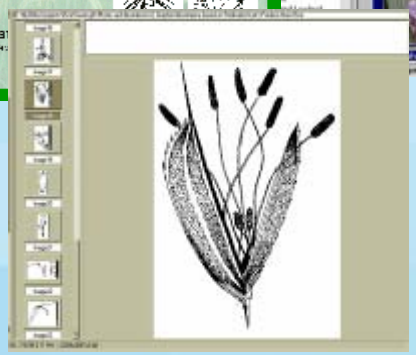
Content providers and learning centers such as PhilRice Branch offices, the DA-ATI Centers, the RIARCS, and state colleges and universities (SCUs) can be connected in a composite government high speed backbone

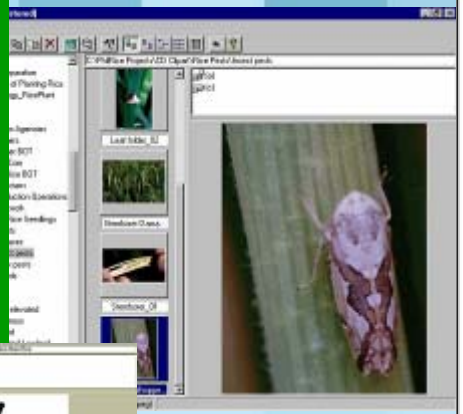
Project Components

- Advisory Services and General Knowledge in Agriculture

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







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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

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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

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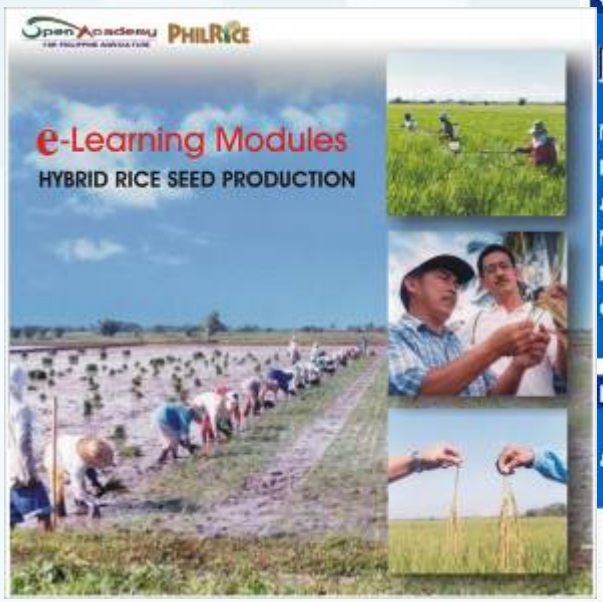
E-learning Modules in Hybrid Rice

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



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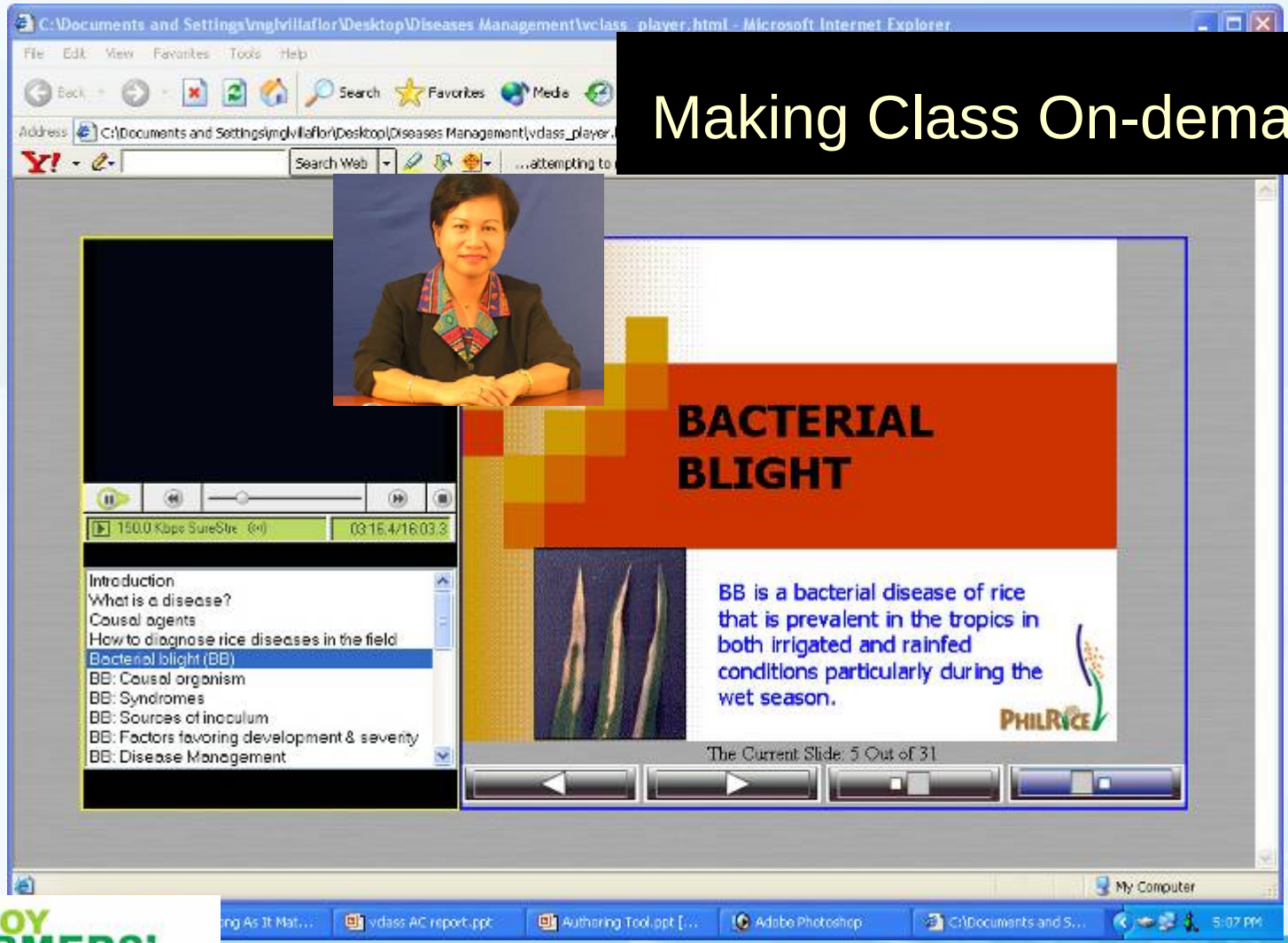
Virtual Class



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Fact Sheets Fusion (FSF)

http://www.openacademy.ph/knowledge/40kgcertifiedseeds/

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.

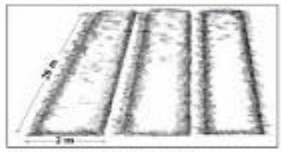
• Broadcast approximately 1 kg per 10 sq m.

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

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ICT Trainings

IPR Training Room, PHILRICE

Inside the Mobile Internet Bus

Internet Cafes

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Farmers' Call Center

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

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opapa@openacademy.ph;

Experts Online

Pinoy Farmers' Internet | Experts online - Mozilla Firefox

File Edit View Go Bookmarks Tools Help

http://www.openacademy.ph/experts.html

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Google Search: Web Portal

About Us | Knowledge Bank | Advisory Services | E-Learning | E-Commerce

Home « Advisory services « Experts online

Advisory services
- Experts online
- Diagnostic tools
- Text tips & queries
- Email & forums

View resources on
- Rice
- Other crops
- Livestock & Poultry
- Fisheries & Aquaculture

Experts online

Extension workers and farmers may interact with experts who have signified their willingness to participate in the project. For now, they can be reached by email, where they can give analysis and recommendations on farming problems. Note, however, that they can only give options, not prescriptions. As the portal develops, other messaging and interaction capabilities such as live chats and forums will be made available.

- **Dr. Ravindra Joshi** - Crop Protection
- **Dr. Rolando T. Cruz** - Soils, Crop and Nutrient Management
- **Mr. Hermenegildo Gines** - Soil and Nutrient Management
- **Mr. Jovino de Dios** - Water Management
- **Dr. Eulito Bautista** - Farm Machinery
- **Dr. Madonna Casimero** - Weeds Specialist
- **Mr. Rizal Corales** - Cropping Systems
- **Ms. Aurora Corales** - NGO Collaboration
- **Dr. Renando Solis** - Biotech
- **Dr. Emmanuel Tiongco** - Diseases
- **Dr. Alejandra Estoy** - Insects
- **Dr. Gerardo Estoy** - Insects
- **Mr. Salvador I. Yabes** - Training
- **Engr. Eden Gagelonia** - Postharvest
- **Engr. Ricardo Orge** - Postharvest
- **Dr. Bernard Tadeo** - Environment & Conservation, Farm Machinery and Management, Biomass and Energy
- **Dr. Manuel Regalado** - Postharvest
- **Dr. Cesar Tado** - Agricultural Engineering
- **Engr. Leo Javier** - Irrigation, Crop Management
- **Engr. Reynaldo Castro** - Agricultural Engineering
- **Ms. Thelma Padolina** - Rice Varieties, Breeding
- **Dr. John de Leon** - Hybrid Rice
- **Dr. Rodolfo Escabarte** - Soils

Select languag
English

Online tools
- Web mail
- Forums
- SMS

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Done

start | AirCard® ... | 2 Yahoo! ... | ICT RoadS... | Windows M... | K-AGRINET | Pinoy Farm... | 52% | 6:09 AM

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Cyber Forum using DA-NIN VSAT Facilities

Audio and Video Conference

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

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Pampanga Agricultural College (PAC) Pilot Site

Radio+Internet+SMS

- Announcer gets information from internet; broadcasts info
- Farmers text feedback, query;
- Announcer emails experts, broadcasts answer;

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Pinoy Wi Fi antenna

Low Cost internet access 2 km range

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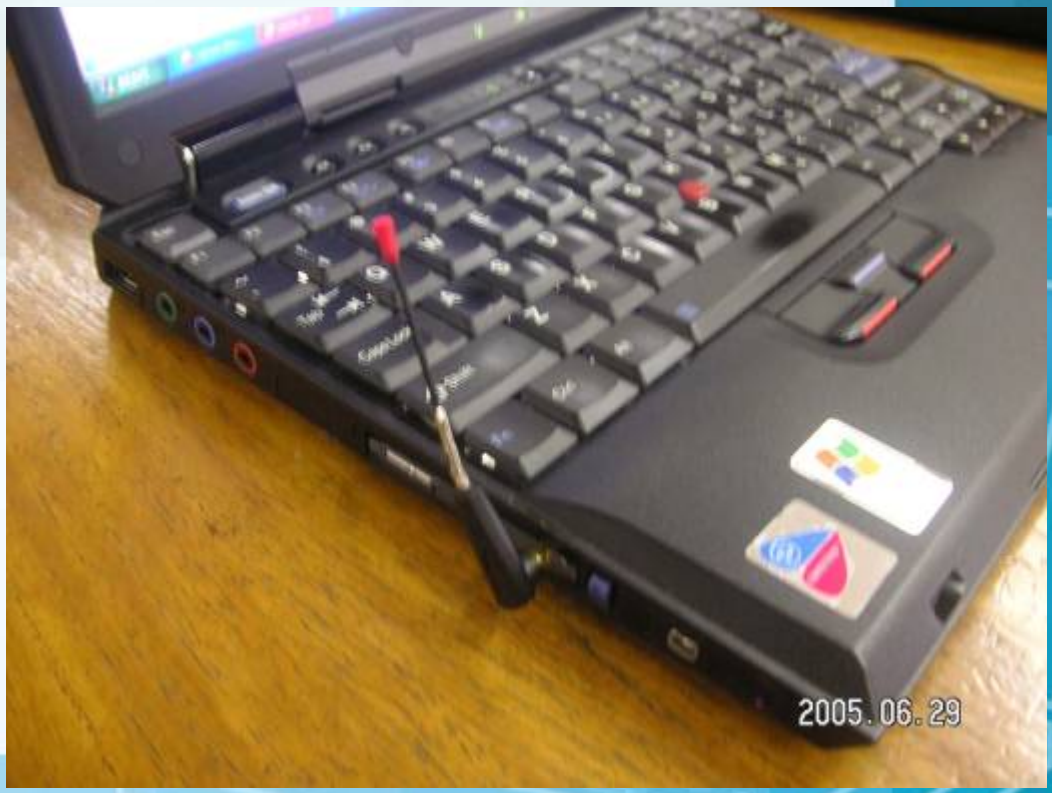
Last Mile Connectivity: wireless

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)



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Linking Farmer Cooperatives

Internet to Farmers Coop

Magsaysay Farmers' MultiPurpose Cooperative,Inc.

PHUSFIMCO Hagonoy Farmers' Cooperative

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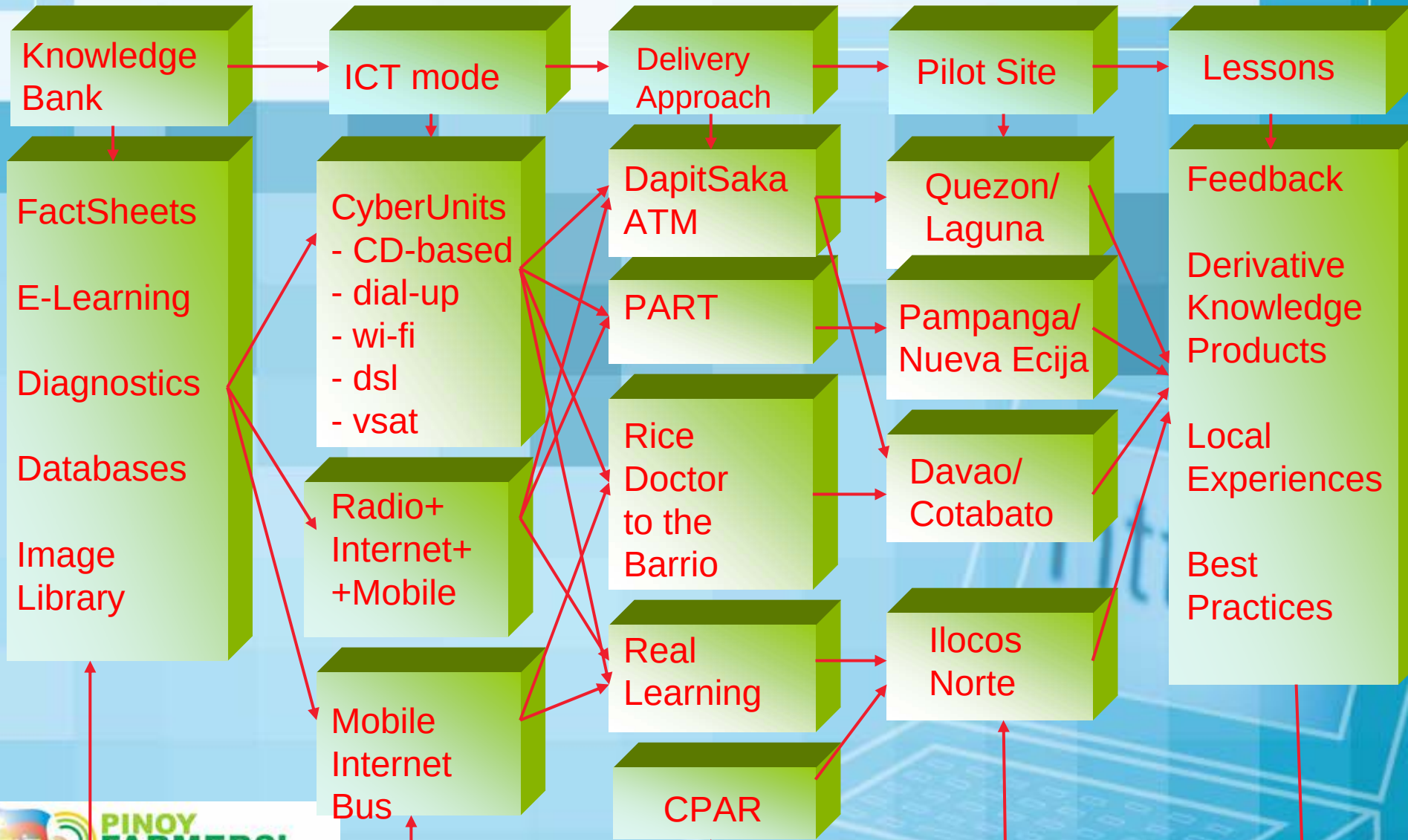
Internet Village Framework



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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.

FARMERS' internet
Open Academy for Philippine Agriculture

Project Milestone

- ICT for Extension Workers: Busting the Fear Factor

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Project Milestone

Knowledge Management and Content Development

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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

PINOY FARMERS' internet
Open Academy for Philippine Agriculture

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.

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.**

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.

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.