REPUBLIC OF THE PHILIPPINES

THE SURVEY ON AGRICULTURAL INFORMATION SUPPORT SYSTEM WITH THE USE OF ICT

FINAL REPORT

MARCH 2012

JAPAN INTERNATIONAL COOPERATION AGENCY

SANYU CONSULTANTS INC.

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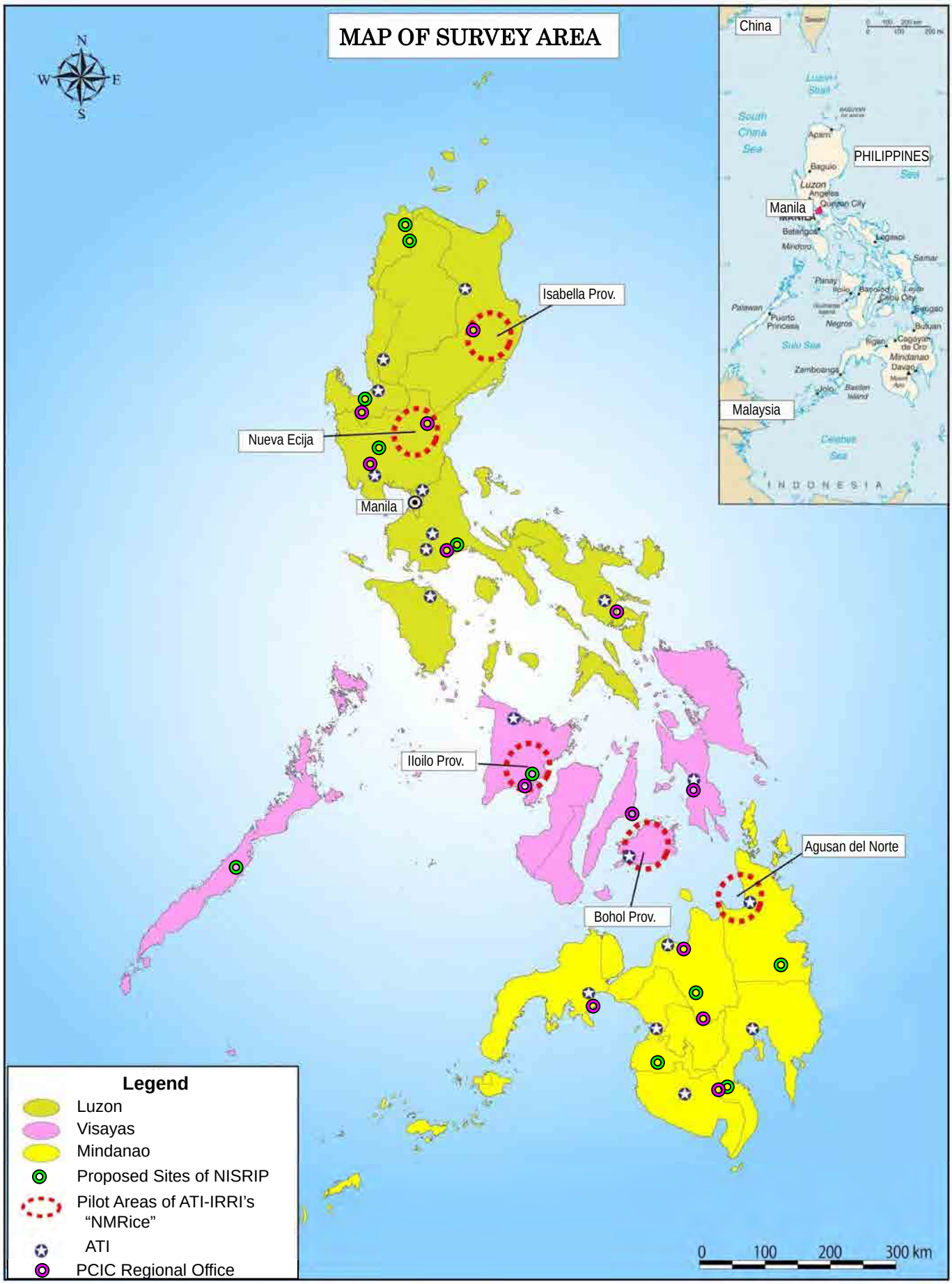
MAP OF SURVEY AREA
N
W
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S
China
PHILIPPINES
Manila
Malaysia
INDONESIA
South China Sea
Luzon Strait
Celebes Sea
Sulu Sea
Isabella Prov.
Nueva Ecija
Manila
Iloilo Prov.
Agusan del Norte
Bohol Prov.
Legend
Luzon
Visayas
Mindanao
Proposed Sites of NISRIP
Pilot Areas of ATI-IRRI's "NMRice"
ATI
PCIC Regional Office
0
100
200
300 km

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ACRONYMS AND ABBREVIATIONS

2G	2nd Generation
3G	3rd Generation
AO	Administrative Order
A/P	Action Plan
ACEF	Agriculture Competitiveness Enhancement Fund
ACPC	Agricultural Credit Policy Council
ACSP	Agricultural Credit Support Project
AF	Agriculture and Fisheries
AfDB	African Development Bank
AFEN	Agriculture and Fisheries Extension Network
AFMA	Agriculture and Fisheries Modernization Act
AFMIS	Agriculture and Fisheries Market Information System
AFNR	Agriculture, Forestry and Natural Resources
AFSIS	ASEAN Food Security Information System
AGFP	Agricultural Guarantee Fund Pool
AMAS	Agribusiness and Marketing Assistance Service
AMCFP	Agro-industry Modernization Credit and Financing Program
AFMP	Agri-Fishery Microfinance Program
AMRIS	Angat-Maasin River Irrigation System
ARB	Agrarian Reform Beneficiaries
ARBY	Area Base Yield Insurance Product
ARIS	Agricultural Resources Information System
ASEAN	Association of Southeast Asian Nations
ATI	Agricultural Training Institute
ATM	Automated Teller Machine
B2B	Business-to-Business
B2C	Business-to-Consumer
B2G	Business-to-Government
BAS	Bureau of Agricultural Statistics
BFAR	Bureau of Fisheries and Aquatic Resources
BOP	Base of Pyramid
BSP	Bangko Sentral ng Pilipinas (Central Bank of the Phlippines)
BSWM	Bureau of Soils and Water Management
C2C	Consumer-to-Consumer
CATV	Cable Television
CBAP	Cooperative Bank Agricultural Lending Program
CE	Collection Efficiency
CeC	Community Electronic Center
CFIA	Confederation of Irrigators Associations
CICT	Commission on Information and Communications Technology
CIS	Communal Irrigation System
CLIMBS	Coop Life Insurance & Mutual Benefit Services
CLP	Credit Lending Program
CSF	Credit Surety Fund
DA	Department of Agriculture
DAR	Department of Agrarian Reform

DBP	Development Bank of the Philippines
DICT	Department of Information and Communications Technology
DLP	Digital Light Processing
DML	Direct Market Linkage
DOF	Department of Finance
DOST	Department of Science and Technology
DoS	Denial of Service
DS	Development Study
DTI	Department of Trade and Industry
EO	Executive Order
e-Commerce	Electronic Commerce
e-Farming	Electronic Farming
e-Government	Electronic Government
e-Learning	Electronic Learning
e-Trading	Electronic Trading
FIA	Federation of Irrigators Associations
FITS	Farmers Information and Technology Services
FMR	Farm-to-Market Roads
FS	Feasibility Study
FSCP	Food Supply Chain Program
FSSP	Food Staples Sufficiency Program
FUSA	Firmed-up Service Area
GAP	Good Agricultural Practice
GIS	Geographic Information Systems
GOCC	Government-owned and controlled corporation
GSM	Global System for Mobile communication
GPS	Global Positioning System
HVCC	High-Value Commercial Crops
IA	Irrigators Associations
ICT	Information and Communications Technology
ICT	Information and Communications Technology Office
IDO	Institutional Development Officer
IDP	Integrated Development Plan
IEC	Information, Education and Communication
IEC	Irrigation Engineering Center (of NIA)
IFR	Irrigation Fee Register
IFS	Innovative Financing Schemes
IMO	Irrigation Management Office/r
IMT	Irrigation Management Transfer
IRR	Implementing Rules and Regulations
IRRI	International Rice Research Institute
IS	Information Systems
IS	Irrigation Superintendent
ISAFI	Inventory System of Agriculture and Fishery Investments
ISF	Irrigation Service Fee
ISF-CBCS	Irrigation Service Fee-Computerized Billing and Collection System
ISF-CE	ISF Collection Efficiency
ISFCER	ISF Collection Efficiency Report
ISO	Irrigation System Office

ISP	Internet Service Provider
ISSP	Information Systems Strategic Plan
IT	Information Technology
ITCAF	Information Technology Center for Agriculture and Fisheries
ITU	International Telecommunication Union
JICA	Japan International Cooperation Agency
JMA	Japan Meteorological Agency
LAN	Local Area Network
LARIS	Land Resources Information System
LBP	Land Bank of the Philippines
LCE	Local Chief Executive
LGU	Local Government Unit
LID	Land Improvement District (of Japan)
LIPA	List of Irrigated and Planted Areas
LTE	Long Term Evolution
MAO	Municipal Agriculture Office/r
MC	Memorandum Circular
MFIs	Microfinance Institutions
MFO ESETS	Major Final Output on Extension Support, Education and Training Services
MID	Management Information Division
MIS	Management Information System
MOOE	Maintenance and Other Operating Expenses
MOU	Memorandum of Understanding
MSME	Micro, Small and Medium Enterprise
MTPDP	Medium Term Philippine Development Plan
NABCOR	National Agribusiness Corporation
NCC	National Computer Center
NDG	Nokia Data Gathering
NFA	National Food Authority
NFRS	National Farmers' Registry System
NGA	National Government Agency
NGO	Non-Government Agency
NIA	National Irrigation Administration
NIN	National Information Network
NIS	National Irrigation System
NISRIP	National Irrigation Systems Rehabilitation and Improvement Project
NMRice	Nutrient Manager for Rice
NPAAAD	Network of Protected Areas for Agricultural and Agro-Industrial Development
NTC	National Telecommunications Commission
ODA	Official Development Assistance
OFW	Overseas Filipino Workers
OPAPA	Open Academy for Philippine Agriculture
OS	Operating System
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Service Administration
PAO	Provincial Agriculture Office/r

PCAARRD	Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development
PCCAP	Philippine Climate Change Adaptation Project
PCIC	Philippine Crop Insurance Corporation
PCIUIS	Philippine Crop Insurance Underwriting Information System
PIM	Participatory Irrigation Management
PIS	Private Irrigation Systems
PD	Presidential Decree
PhilFSIS	Food Security Information System in the Philippines
PhilMech	Philippine Center for Postharvest Development and Mechanization
PhilRice	Philippine Rice Research Institute
PLDT	Philippine Long Distance Communication Company
PMA	Partner Member Agency
PPP	Public-Private Partnership
PS	Personal Services
R&D	Research and Development
RA	Republic Act
RatPlan/RP	Rationalization Plan
RFI	Rural Financial Institutions
RFU	Regional Field Unit
RICECOM	Rice Committee
RIO	Regional Irrigation Office
RS	Remote Sensing
S&T	Science and Technology
SAFDZs	Strategic Agriculture and Fisheries Development Zones
SAS	Service Area Scheme
SIS	Soil Information Systems
SMS	Short Message Service
SNS	Social Networking Service
STW	Shallow Tube Well
SUFs	Spectrum User Fees
SWIP	Small Water Impounding Projects
SWRFT	Senior Water Resources Facilities Technician
TCP	Technical Cooperation Project
TELOF	Telecommunications Office
TGP	Techno Gabay Program
TSAG	Turn-out Service Area Group
TV	Television
UEGIS	Unified and Enterprise Geospatial Information Systems
UN-ASPA	United Nation-American Society of Public Administration
UPRIIS	Upper Pampanga River Integrated Irrigation System
UPS	Uninterruptible Power Supply
WAN	Wide Area Network
WIBI	Weather Index Based Insurance
WiMAX	Worldwide Interoperability for Microwave Access
WRFO	Water Resources Facilities Operator
WRFT	Water Resources Facilities Technician
WRIS	Water Resources Information System

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CHAPTER 1 INTRODUCTION

1.1 Basic Concept of the Survey

The rapid development and innovation of communication technology, such as internet and mobile phone, made not only distant communication possible but also generating new business opportunities. Nowadays, various information distribution services have started for agricultural support, communication, insurance and financing in farming villages in many developing countries, utilizing Information and Communication Technology (ICT).

These services are already practiced in developing countries in Africa, India and Bangladesh as business by private enterprises, such as extension services, provision of marketing price information, remote purchase of farm equipment and fertilizer, and also weather index type insurance of which fee is saved upon ordering farming consumables by cellphone. Furthermore, introduction of ICT in development, so called "Information Communication Technology for Development", is being practiced also in education, medical care and rural finance. These movements attract attention as the system for utilizing ICT to support the development of the socio-economy of developing countries on which private sector forms partnership with international donor organizations.

The application of ICT in agricultural sector of the Philippines is also developing, as part of global movement of ICT utilization. In remote farming area, services for farmers through ICT have already started for the information distribution on farming technology, purchase of fertilizer and farming equipment by using telephone (including cell phone) and internet. Furthermore, some services cover other sub-sectors such as technical assistance on livestock sector, information exchange between trader and investors, etc.

However, it is observed that various agencies, such as Agricultural Training Institute (ATI), International Rice Research Institute (IRRI), Philippine Rice Research Institute (PhilRice), Information and Communications Technology Office (ICTO) under the Department of Science and Technology (DOST), joint undertakings of Department of Agriculture (DA), Department of Agrarian Reform (DAR) and DOST, provide similar information services for farmers.

Most of these services are being made with the purpose of delivering information from these government agencies to farmers and Agricultural Technologists. On such services, flow of technical information is limited in one way only, and not many services are designed for interactive communication, such as obtaining feedback from users to reflect on the improvement of services.

This Survey will be the basis of the recommendation for the future programs/projects, not only by recommending use of ICT to support agricultural sector of the Philippines, but also by blending ODA with undertakings of private sector as one of future possibilities, with services and know-how accumulated in private sector. Such arrangement is called Public-Private Partnership (PPP) in the Philippines.

By considering actual situations of services by ICT to reflect needs in the field, the recommendation can contribute firmly to the agricultural development as well as systems for

sustainable operation and maintenance. The recommendation will include programs/projects which lead to new innovation to provide fields on which private sector can actively participate as well as form partnership with JICA. In such aspects, the strategy and methodology of the Survey were designed for the contribution to the development and giant leap of the agricultural sector in the Philippines.

1.2 Background and History of the Survey

1.2.1 Japan's Past Assistance for the Agricultural Sector of the Philippines

Japan has been extending continuous assistance to the agricultural sector in the Philippines through Yen Loan, Grant-Aid and Technical Assistance. These assistances, though including institutional development such as strengthening of Irrigators' Associations, have been concentrated mainly in the provision of infrastructure such as irrigation systems, construction of research facilities, etc. These assistances have contributed in the development of agriculture in the country. However, poverty rate of the country is still high, and income of 15% of total population remains less than one US dollar ($1) per day (1990-2005).

The poor mainly consists of small-scale farmers and fishers in rural area. Since these people have limited access to financial sources, farming technology and post-harvest facilities, it is difficult for them to improve their economic status in poverty. In such situation, the Government of Japan intends to provide assistance to the agriculture sector in the Philippines by focusing new aspects in information services for micro-finance and farming technology, in addition to the continuous assistance in infrastructures.

Recently, ICT has become a major factor to bring benefit on economic development, not only in developed country but also in developing countries. On the other hand, it cannot be denied that a digital gap exists within the same country which may widen economic gap as well. In Japan, international cooperation in the field of ICT is regarded as important part of assistance for sustainable development as declared in Japan's Official Development Assistance (ODA) Charter. It is expected that with the introduction of ICT to agricultural sector by applying schemes such as dispatch of experts and trainings, assistance for the human development in various sub-sectors would be made possible through the provision of Japanese technology, knowledge and human resources.

1.2.2 Application of ICT to Agriculture Sector in Japan

Japan's agricultural system is facing a number of challenges such as aging workforce, increase in uncultivated land areas, and decrease in the national food self-sufficiency ratio. Fundamentals of which are further confronted with the possible introduction of free trade. In this context, "the Fifth ICT Vision Conference (June 2009)" urged medical care, education and agriculture to be the primary sectors for computerization and thus the use of ICT in agriculture sector is now promoted by the government of Japan.

A typical example is a "visualization of production process" as one of main factors for agricultural production, such as air temperature, amount of solar radiation, soil temperature, and soil

moisture, are monitored and digitized. Furthermore, agricultural producers are encouraged to be able to grasp the detailed and itemized costs of production - "visualization of farm management" - for which working hours and prime cost can be clarified by using Global Positioning System (GPS). Other examples in using ICT in agriculture include internet-based direct marketing from producer to consumer, information sharing among producers, buyers, and restaurants, and monitoring of market trend.

1.3 Objectives, Survey Area and Concerned Agencies of the Survey

1) Objectives of the Survey

The Survey aims to collect information for the future direction of JICA's assistance to the agricultural sector, through the confirmation and analysis on the policy, investment plans, undertakings under donor countries, and intentions of private sector, for ICT utilization in the agricultural sector in the Philippines, as well as reflecting proposals from private sector including Japanese and Philippine enterprises.

2) Survey Area

The Survey Area covers nationwide. However, field surveys were made in selected areas in Luzon and Visayas.

3) Concerned Agencies

The Survey does not focus on any particular counterpart agencies due to its broad targeted field, but calls for collaboration with agencies in the Government of the Philippines and international organizations that are in-charge of agricultural extension, agricultural marketing, water management and ICT promotion. These agencies include DA, its attached agencies (ATI, National Irrigation Administration (NIA), PhilRice), IRRI, Philippine Crop Insurance Corporation (PCIC) and Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development (PCAARRD) under the DOST. Main coordination works for overall survey activities were made by DA-PDS (Project Development Services).

1.4 Methodology of the Survey

For the execution of the Survey, information collection on status of ICT in agricultural sector in the Philippines, stakeholder analysis, and needs analysis were intensively made in the first work period in the Philippines. For the second work period in the Philippines, analysis was made on the result of the first work period through the series of discussions with concerned agencies, to make recommendations in the form of suggested programs/projects which can be implemented through various schemes by JICA.

As result, the programs/projects under ODA on which private enterprises can participate were packaged after the discussion and confirmation by JICA. On the discussions with concerned agencies in the Philippines, their opinions as well as situation of the country was widely reflected.

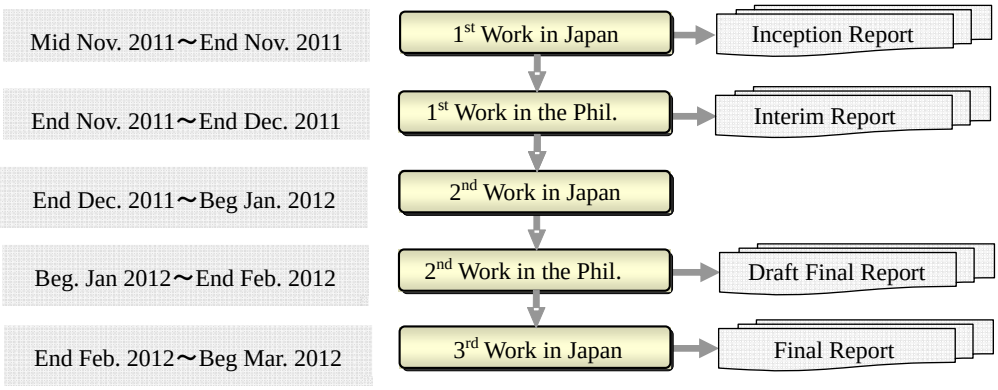


Figure 1.4.1 Work Schedule

1st Work in Japan (from Mid of Nov. 2011 to End of Nov. 2011)

The 1st work in Japan was the period to collect and analyze existing and basic information and investigate actual examples of ICT utilization on agriculture and application of weather index insurance by visiting private sector like agricultural cooperative and insurance company.

1st Work in the Philippines (from End of Nov. 2011 to End of Dec. 2011)

In the period of 1st work in Philippines, the Survey carried out collection of basic information and field survey to grasp current situation, constraints, and needs in terms of ICT introduction on all sub-sectors, namely: irrigation, agricultural extension, marketing, weather index insurance, micro finance, and others.

Collection of basic information was made in two parts: 1) interviews by Japanese Experts at the concerned agencies (mainly for the extraction of needs and constraints), and 2) research by the Philippine consultants (to be assigned for each expertise). Collected raw data and information by Philippine consultants was further analyzed by Japanese Experts.

In addition to the interviews and research to agencies and persons concerned, field survey was made for the purpose of observing operation of existing ICT utilized by programs/projects in the agricultural area. In addition, it was conducted for the purpose of needs analysis by the interviews with farmers, farmers' organizations, extension workers, and local government units (LGUs) (Municipality, Province) at the area where ICT-utilized programs/projects are not yet implemented.

Site selection for the field survey was made upon the commencement of the first work period, in consultation with the agencies concerned, especially from the viewpoint of local situation and peace and order conditions. In consideration of the limited Survey time, sites have been selected including candidate Irrigation Systems under NIA's proposed National Irrigation Systems Rehabilitation and Improvement Project (NISRIP). Upon the selection of sites for field survey, areas with different conditions shall be considered from the viewpoint of locality (natural and social conditions), to be able to respond to future programs/projects which may require location specific

technology. Therefore, the following areas are selected; 1) Nueva Ecija in Central Luzon, the rice granary of the country, under Coronas Type I climate, and 2) Iloilo in Visayas wherein plantation of sugarcane is dominant under Type III climate.

2nd Work in Japan (from End of Dec. 2011 to Beginning of Jan. 2012)

As 2nd work in Japan, the Survey looked closely into the results obtained in 1st work in Philippines. Then, based on it, the strategy for 2nd work in the Philippines was mapped out.

2nd Work in the Philippines (from Beginning of Jan. 2011 to End of Feb. 2012)

On the second work period in the Philippines, needs and constraints were analyzed based on the basic information collected in the first work period for the sub-sectors of agricultural extension, marketing, agriculture insurance and microfinance. Upon the completion of needs analysis and extraction of constraints on all sub-sectors, conceptualization of ICT-utilized programs/projects was started. These concepts shall be made for all six (6) sub-sectors stated above, and compiled as long list for two groups i.e. development/improvement of existing programs/projects, and newly suggested programs/projects.

As for the field reconnaissance surveys, the Team revisited two (2) National Irrigation Systems where field works were made during the first work period in Region-3, focusing on the understanding on the issues and concerns on the collection of Irrigation Service Fee, verification on the effectiveness of proposed new collection system with ICT, as well as survey on the ICT literacy among farmer members of IA. Furthermore, the Team made field survey on two (2) National Irrigation Systems in Camarines Sur (Region-5) wherein ISF collection efficiency is comparatively low despite of the delivery of adequate irrigation water. This survey also focused on the problem structure regarding ISF collection, as well as interview with IA Officers and members on their ICT literacy, such as possession of own cellular phone, internet environment and also on the financial management aspect (opening of bank account, etc.)

For the agricultural insurance, field works were made in Mactan (Cebu), Ormoc and Tacloban (Leyte) focusing on the interview of beneficiary farmers and cooperatives on agricultural Insurance, especially on Weather Index Based Insurance (WIBI).

For the agricultural marketing, field works were made by visiting Trading Center in Sariaya, Quezon Province, by focusing the flow of products and information between producers, middleman and retailers, etc.

During the 2nd Works in the Philippines, ”Project Formulation Workshop” was held on 30 January, 2012 by the participation of various organizations. The purpose of this workshop is to share the project concepts proposed by the JICA survey team, and also to improve the project proposal through discussions among the participants. Not only the representatives of various governmental agencies, there was an active participation from private sector such as telecommunication company and insurance company. See Attachment-4 and Attachment-5 of this Report for the presentation of project proposals/concepts from the Survey Team, and Minutes of Meetings, respectively.

By reflecting the result of these surveys for 2nd Work Period stated above and the result of the Project Formulation Workshop, the Draft Final Report was made.

3rd Work in Japan (from End of Feb. 2012 to Beginning of Mar. 2012)

Based on all activities stated above, the Final Report was made with project proposals on the introduction of ICT to agriculture sector in the Philippines, by reflecting comments from stakeholders on the Draft Final Report.

The table below shows agencies, persons and irrigation sites the Survey Team has visited during the Survey:

Table 1.4.1 Agencies, Persons and Field visited in 1st and 2nd Works in Philippines

Su-sector	Agency, Person and Filed visited	Items surveyed
Irrigation	・ NIA-NIS: Porac-Gumain (Region-3, Nueva Ecija) ・ NIA-NIS: UPRIIS (Region-3, Nueva Ecija) ・ NIA-NIS: AMRIS (Region-3, Nueva Ecija) ・ NIA-NIS: Santa Barbara (Region-6, Iloilo) ・ NIA-NIS：Tigman-Hinagyaman-Inarihan NIS（Regio-5, Camarines Sur） ・ NIA-NIS：Rinconada Integrated NIS（-do-） ・ NIA-MID (Management Information Division) ・ NIA-IEC (Irrigation Engineering Center) ・ Mr. AMANO (consultant for YLTA for Bago)	・ Irrigation water management ・ Irrigation Service Fee (ISF) ・ Needs to ICT in NIS ・ Interview to IA members and discussion ・ Plan of ICT utilization of NIA ・ ICT Literacy Survey on selected farmers
Agricultural extension	・ DA: ATI (Manila) ・ DA: RFU (Regional Field Unit, Resion-3and 6) ・ DA: PhilRice (Munoz) ・ DA: BSWM (Bureau of Soils and Water Management) ・ Dingle Municipality, Iloilo province ・ Pototan Municipality, Iloilo province ・ DA: BAS (Bureau of Agricultural Statistics) ・ DA-AMAS	・ E-extension modules currently promoted by different organizations (ATI, RFU, and PhilRice), including Farmer Contact Center, OPAPA, and NMRice ・ Challenges and opportunities in agricultural extension found at the field level including MAO and farmer groups ・ Current application of ICTs in agencies concerned
Marketing	・ University of the Philippines: Mr. Katsumi NOZAWA ・ ・ Trading Center in Sariaya, Quezon Province	・ Current situation of agricultural production and marketing, especially banana and oil palm ・ Field investigation of existing Public Market
Weather index insurance, Micro finance	・ PCIC (Philippine Crop Insurance Corporation) ・ ACPC (Agricultural Credit Policy Council) ・ University of the Philippines：Mr. Katsumi NOZAWA ・ Land Bank/Agricultural Credit Support Project (ACSP): Mr. Tetsunari GEJYO ・ ILO（Implemented Pilot WIBI in Agusan） ・ GIZ（Implemented Pilot ARBY in Leyte）	・ Possibility to introduce crop insurance and weather index insurance in Philippines ・ Current situation of micro finance in Philippines ・ Operation and management of oil palm and banana plantation transferred to agricultural cooperative by ARC policy, and possibility to introduce crop insurance and weather index insurance in Philippines ・ Current situation of financing in Philippines and policy of Land Bank, Possibility of participation in crop insurance business with weather index insurance ・ Possibility to introduce crop insurance and weather index insurance in Philippines

Su-sector	Agency, Person and Filed visited	Items surveyed
	・ CLIMBS（Implemented WIBI as part of Insurance for Cooperatives nationwide） ・ Malayan Insurance（Implemented WIBI in Iloilo in collaboration with MicroEnsure）	
	・ PAGASA	・ Present situation of weather (observation) data collection system, availability of data to be used for index type insurance, and Automatic Weather Stations.
Others	・ DA-ITCAF（Information Technology Center for Agriculture and Fisheries）	・ Contents and progress of UEGIS (Unified and Enterprise Geospatial Information Systems) ・ Contents and progress of AFMIS (Agriculture and Fisheries Market Information System)
	・ DA-JICA Expert：Mr. Hiroshi KODAMA	・ General information of agriculture sector and sub-sectors in Philippines
	・ SMART	・ Current condition of telecommunication business, possibility of participation in agriculture sector with new business mode

1.5 Staffing

Staffing for the Survey is summarized as the Table 1.5.1 below.

Table 1.5.1 Staffing Schedule through the Survey

Expertise	Name	2011		2012		
		Nov.	Dec.	Jan.	Feb.	Mar.
Team Leader /Rural Development	SUDO, Akira(Mr.)			■	■	
Co-Team Leader /Irrigation Water Management	IEIZUMI, Tatsuya (Mr.)	■	■			
ICT	SAKURAI, Hitohiro (Mr.)	■	■	■	■	
Agricultural Extension	HIRUTA, Hideaki (Mr.)	■	■	■		
Weather Index Insurance /Micro-credit	HIRAYAMA, Kota (Mr.)			■	■	
Work in Japan		□	□		□	□
Reporting		▽ Inception Report	▽ Interim Report		▽ D.Final Report	▽ Final Report

Aside from the inputs above, local consultants were assigned for major four (4) sub-sectors (agriculture, irrigation, insurance/micro-credit, and ICT), for joint survey activities with Japanese Experts in equivalent expertise, all through the Survey period.

1.6 Structure of the Report

This Report (Final Report) consists of the following contents:

Chapter-1 (Introduction)

Chapter-2 (Condition of Agriculture in the Philippines):

Result of the Survey on general condition of agriculture in the Philippines, including irrigation development, agricultural extension and marketing.

Chapter-3 (ICT Situation in the Philippines):

Present situation of the use of ICT such as internet, cellular Phone, and actual use in the field of agriculture and irrigation development. (Note: ICT situation in agricultural Insurance is described in Chapter-4.)

Chapter-4 (Agricultural Insurance):

Actual present situation and analysis on agricultural insurance, focusing on the Weather Index Based Insurance (WIBI). Analysis on agricultural insurance are not limited on its ICT aspect but for overall condition, issues and concerns

Chapter 5 (Proposed Projects):

The proposals on the use of ICT in agricultural sector are divided into two (2) categories; 1) "Project Proposals" on prioritized projects which are considered as most realistic and necessary in three (3) sub-sector (agricultural extension/marketing, irrigation and agricultural insurance), with detailed description in Attachment-1 to Attachment-3 of this Report, and 2) the other projects which are not regarded as less priority by the Survey, are consolidated as "Project Concepts" in this Chapter. Also, relations between projects in different sub-sector (synergy effects) are also indicated in this Chapter.

Chapter-6 (Participation of Private Sector and Possible Implementation under ODA):

Considerations were made in this Chapter on the possibility, mode of participation by private sectors to the proposed projects, as well as on the possible schemes to be applied for the implementation under Japan's ODA programs.

Chapter-7 (Lessons Learned and Recommendation)

Attachments:

Project Proposals for three (3) Prioritized Projects, Presentation at Project Formulation Workshop on 30 January, 2012 and its Minutes of Meetings, Pictorial Record

CHAPTER 2 CURRENT SITUATION OF AGRICULTURE SECTOR

2.1 Agriculture

2.1.1 Policy and Institution

Agriculture sector in the Philippines has been spearheaded by the Agriculture and Fisheries Modernization Act of 1997, simply known as AFMA, which seeks to modernize the Philippine agriculture for the country to compete in the global market. In pursuing modernized agriculture and thus improved living condition under AFMA, there are various activities supporting the production and marketing aspects of agriculture and fisheries development.

Foremost is the identification and development of Strategic Agricultural and Fisheries Development Zones (SAFDZ). SAFDZ is designated agricultural zones aiming to serve for food production and security in the country. Another relevant policy under AFMA is the Network of Protected Areas for Agricultural and Agro-Industrial Development (NPAAAD). NPAAAD includes irrigated and irrigable lands, other lands suitable for agriculture whether irrigated or not; highland areas planted with crops or have the potential to grow high value crops; and all fishery areas—SAFDZ and NPAAAD areas are given higher priority for agricultural modernization.

In line with AFMA, the Department of Agriculture (DA) recently launched the *Agrikulturang Pilipino* or Agri-Pinoy, which is the over-all strategic framework of the DA that guide the various services and programs of the DA from 2011-2016 and beyond. In Agri-Pinoy program, there are four (4) guiding principles: 1) food security and self-sufficiency; 2) sustainable agriculture and fisheries; 3) natural resource management; and 4) local development.

To realize the food security and self-sufficiency, the DA has started up the “2011-2016 Food Staples Sufficiency Program (FSSP),” through which staple food self-sufficiency should be achieved by 2016. Specifically, targets are set as: 1) produce at least 21.11 and 22.49 million tons of rice by end of 2013 and 2016; 2) maintain per capita rice consumption at 120 kg/year; 3) increase production of non-rice staples by 3.5% annually.

In the FSSP, there are three components: 1) increasing and sustaining the gains in production; 2) mechanizing and reducing post-harvest losses; and 3) managing consumption. Production interventions, a) irrigation, b) extension, c) research and development (R&D), d) access to quality seeds, and e) upland rice development, are given importance and structural/systematic intervention, a) National Food Authority (NFA) Reforms, b) credit, and c) insurance, are emphasized. In terms of the priority commodities, the DA promotes seven commodities: 1) rice, 2) corn, 3) livestock, 4) fisheries, 5) High-Value Commercial Crops (HVCC), and 7) coconuts.

Furthermore, the DA is currently boosting the promotion of organic agriculture, given ever-increasing concern on safety and healthy food among the consumers. To accelerate the momentum, “an act providing for the development and promotion of organic agriculture in the Philippines and for other purposes,” known as Organic Agriculture Act of 2010, has been enacted by the Congress (Republic Act (RA) No. 10068).

2.2 Irrigation

2.2.1 Policy, Institution and Programs

1) Policies and Programs

Policies and Programs of the National Irrigation Administration (NIA), the Government-owned and controlled corporation (GOCC) under the Department of Agriculture, are embodied in its Corporate Plan. The Plan includes, among others, relevant laws, policies and directives, circular and issuances that affect its operations and the formulation of an indicative irrigation program with physical and financial targets.

The latest Corporate Plan of the NIA is the NIA CORPORATE PLAN 2010-2020 circulated on June 9, 2010. NIA's Plan is directly influenced and consistent with the thrust of the updated Medium Term Philippines Development Plan (MTPDP), policy directions and programs of the DA and the Board of Directors of NIA and the related provisions of AFMA of 1997.

Pursuant to those general policies and considering the challenges and issues of the period, NIA has identified the following thrust and strategies under the plan. Most of these are already translated into concrete action plans and programs by the concerned sectors and operating units.

a. Accelerate completion of ongoing projects and complete within the approved budget and time table.
b. Irrigate more farm lands by resorting to a balanced strategy of applying labor intensive and cost efficient methods.
c. Focus on small scale labor intensive irrigation projects.
d. Prioritize implementation of projects in economically depressed area particularly in Mindanao Island.
e. Build up capacity to promote LGU participation in irrigation development.
f. Pursue big projects funded by multilateral and bilateral institutions.
g. Sustain Operation and Maintenance (O&M) of NIS.
h. Maximize use of equipment to support operation and maintenance.
i. Accelerate Irrigators Association Development towards partial or full turnover of O&M under Irrigation Management Transfer (IMT).
j. Rehabilitate, protect and manage the watersheds of NIS.
k. Strengthen and enhance research capabilities.
l. Review of irrigation pricing policies (ISF rates, volumetric pricing)
m. Intensify revenue generation and prompt payment of IA share.
n. Evolve a lean, strong, well-trained and sustainable organization.
o. Promote good governance.

2) Institutions

Irrigation development in the Philippines is vested upon NIA which was created in 1963 through RA 3601. NIA is a Government-owned and controlled corporation (GOCC) under the DA. In order to accelerate irrigation development, Presidential Decree (PD) 552 amended RA 3601 followed by PD 1701 to further broaden the powers of NIA which are summarized below:

a. To investigate, study and develop all available water resources in the country, primarily for irrigation purposes.

b. To operate, maintain, rehabilitate, and upgrade all National Irrigation Systems (NIS).

c. To delegate the partial or full management of NIS to duly organized and registered Irrigators Association (IA).

d. To charge and collect Irrigation Service Fee (ISF) to all beneficiaries of NIS under such terms and conditions imposed by the Government.

e. To recover funds or portions thereof expended for the construction and rehabilitation of Communal Irrigation Systems (CIS).

f. To construct multi-purpose water resource projects where irrigation is the main function with secondary function for hydro-electric power, domestic water supply and flood control.

g. To acquire by any mode of acquisition, real and personal properties and easements in connection with the development of projects by NIA and to exercise the power of eminent domain in the manner provided by law for the execution of expropriation proceedings.

h. To impose a 5% administration and engineering overhead (management fee) on the total cost of project implementation.

The NIA also implements small irrigation projects (those less than 1000 HA) through inter-agency collaboration particularly with the Department of Agrarian Reform (DAR). DAR programs and projects especially those funded by foreign financial institutions normally include an Irrigation Component where NIA takes an active role.

The Bureau of Soils and Water Management (BSWM) of the DA is also involved in the construction of small irrigation projects through its Small Water Impounding Projects (SWIP), shallow tube wells (STW) and small farm reservoirs.

Private individuals and corporations are also implementing small irrigation projects but are very limited and few.

2.2.2 Irrigation Development

The Philippines has a total land area of about 30.0 million hectares with about 10.3 million hectares classified as agricultural lands. Of this, NIA has estimated a potential irrigable area of 3.1 million hectares based on areas with slope of not more than 3.0%. Most of the areas are those primarily devoted to rice and corn. In 1992, NIA with the assistance from the World Bank through its Agriculture Sector Review has estimated that the potential irrigable area can be increased to 6.1 million hectares if it includes areas up to 8% slope. These include areas planted to sugar, coconuts and

other plantation crops. It is, however, difficult and expensive to provide irrigation facilities to these areas.

As of December 31, 2010, the total service area developed was 1,542,668 ha which represents about 49% of the estimated potential irrigable area of 3,126,340 ha if based on the 3% slope criteria which NIA is adopting. Therefore, about 1,584,232 ha remain without irrigation facilities or 51% of the potential irrigable area. Table 2.2.1 shows the status of Irrigation Development as of December 31, 2010. NIA has categorized the developed areas into three (3) basic categories based on their management responsibility as shown below:

Category	Constructed by	Operated and Maintained by	% of Irrigation Area developed
a. National Irrigation System (NIS)	NIA	NIA	49%
b. Communal Irrigation System (CIS)	NIA, DA, LGU	IA	36%
c. Private Irrigation System (PIS)	Individuals, Institutions	Individual	15%

Table 2.2.1 Status of Irrigation Development as of Dec. 2010

Region	Estimated Total Irrigable Area (a)	Service Area (ha)					Remaining Potential Area to be Developed
		National Irrigation System	Communal Irrigation System	Private Irrigation System	Total (b)	Irrigation Development (%)=b/a	
CAR	99,650	22,622	35,486	22,912	81,020	81	18,630
1	277,180	57,567	96,722	27,329	181,618	66	95,562
2	472,640	142,674	42,088	23,095	207,857	44	264,783
3	498,860	202,897	78,228	20,555	301,680	60	197,180
4	246,960	53,146	53,246	17,962	124,354	50	122,606
5	239,660	22,573	68,554	29,484	120,611	50	119,049
6	197,250	52,216	20,433	5,499	78,148	40	119,102
7	50,740	10,040	22,651	2,539	35,230	69	15,510
8	84,380	19,144	30,158	4,466	53,768	64	30,612
9	76,080	15,162	19,760	1,972	36,894	48	39,186
10	120,700	26,419	24,053	14,764	65,236	54	55,464
11	149,610	33,971	15,639	25,915	75,525	50	74,085
12	293,610	62,736	22,471	17,296	102,503	35	191,107
ARMM	156,720	16,520	7,125	225	23,870	15	133,410
13	162,300	29,319	21,719	3,316	54,354	33	107,946
Total	3,126,340	767,006	558,333	217,329	1,542,668	49	1,584,232

Source: NIA Annual Report 2010

Note1: Region2, Region3 include MARIIS, UPRIIS respectively.

Note2: Although ARMM belongs to Region12, the table above indicates Region12 and ARMM separately.

NISs are irrigation schemes directly managed and operated by NIA while CISs are managed by IA with limited support by NIA for major rehabilitation. In principle, irrigation systems with less than 1,000 ha should be categorized as CIS. However, due to historical background (before the classification) some NISs has area of less than 1,000 ha while some CISs have area of more than 1,000 ha.

There are presently 212 NIS nationwide with a total service area of 751,787 ha (at the beginning of 2010) under 90 National Irrigation System Offices and 48 Irrigation Management Offices under the new NIA set-up. Table 2.2.2 shows the Irrigated Area of NIS, Wet and Dry for CY

2010 while Table 2.2.3 shows the Service, Irrigated and Benefited areas in National Irrigation Systems for 2000 to 2009.

Latest figure from the NIA shows that 529,810 ha was planted during the dry season cropping (November 2009 to April 2010) and 546,363 ha during the wet season cropping (May 2010 to October 2010) plus 26,222 for the third cropping. The cropping intensity attained was 147%.

Table 2.2.2 Irrigated Area of NIS

Region	No. of NIS	Service Area (ha)	Irrigated Area (ha)			Irrigated Cropping Intensity (%)
			Wet Season	Dry Season	Third Crop	
CAR	3	22,622	15,106	15,008	30	133
1	25	55,967	32,785	25,131	134	104
2	21	142,141	110,386	116,593	-	160
3	23	193,472	142,545	147,954	22,286	162
4	45	53,146	29,381	24,626	-	102
5	18	22,573	16,719	16,435	-	147
6	12	52,216	38,985	29,668	1,240	134
7	3	10,040	6,234	6,586	-	128
8	17	19,144	16,192	15,528	-	166
9	4	15,162	13,286	12,807	-	172
10	6	26,411	19,116	19,132	2,531	154
11	9	33,971	29,766	28,872	-	173
12	13	59,498	50,129	46,795	-	163
ARMM	5	16,105	8,736	7,878	-	103
13	8	29,319	16,997	16,797	-	115
Total	212	751,787	546,363	529,810	26,221	147

Source: NIA Annual Report 2010

Note1: Dry season – November 2009 to April 2010, Wet season – May 2010 to October 2010

Note2: Region2, Region3 include MARIIS, UPRIIS respectively.

Note3: Although ARMM belongs to Region12, the table above indicates Region12 and ARMM separately.

Table 2.2.3 Trend of Service, Irrigated and Benefited Areas in NIS: 2000-2009

(in Thousand Hectares)

Year	Service Area	Actual Irrigation Area			Irrigation Cropping Intensity (%)	Benefited Area			Benefited Area As % of Irrigated
		Wet Season	Dry Season	Total		Wet Season	Dry Season	Total	
2000	689	490	460	950	137.92	435	413	848	89.31
2001	689	504	475	979	142.04	440	451	891	91.06
2002	689	485	469	953	138.32	440	420	860	90.20
2003	690	493	461	954	138.12	456	398	854	89.51
2004	690	486	480	966	140.02	456	442	898	92.96
2005	696	496	476	973	139.80	464	441	905	93.02
2006	705	485	479	965	136.89	423	441	864	89.57
2007	706	489	481	970	137.31	458	448	906	93.42
2008	729	547	542	1,089	149.27	500	486	986	90.55
2009	746	546	591	1,137	152.30	433	496	929	81.73

Source: NIA Corporate Plan 2010-2020

2.2.3 Irrigators Associations and Farmer Beneficiaries

Irrigators Associations (IAs) are mutual partners of NIA in the operation and maintenance of NIS including collection of ISF. They are the central element to the attainment of successful and cost-effective operations of NIS. Figure 2.2.1 indicates the structure of IAs built by five layers from TSAG (Turn-out Service Area Group) to CFIA (Confederation of Irrigators Associations).

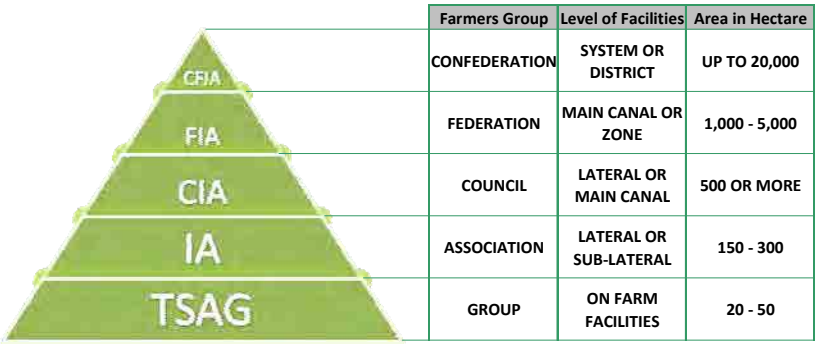


Figure 2.2.1 Basic IA Structure

NIA, through its Institutional Development Officer (IDO), is in charge of organizing the IA as early as during the construction period. It is expected that by the time the project is completed the IA is already a duly-registered entity, its officers fully-trained and capable of handling the affairs of the IA.

The moment the IA becomes self-reliant, the IDO is shifted to other assignment. The functions of the IDO will be taken over by the O&M personnel, usually the Water Resources Facilities Technician (WRFT) of NIA, commonly referred to as Water Master, and the Water Resources Facilities Operator (WRFO), commonly referred to as Gatekeeper, and so on.

As of December 2010, there are about 2,832 IAs in the NIS and 3,827 IAs in the CIS or a total of 6,659 IAs covering 1,219,547 ha with 830,913 farmer beneficiaries. Of the total number of IAs in the NIS, about 97% are duly-registered while only about 46% have contracts or MOA under various IMT categories with the NIA. Out of the 513,002 farmer beneficiaries in the NIS, only about 499,898 or 90% are members of the IA. Table 2.2.4 shows the Status of IA organized, registered and with O&M contract with the NIA as of December 2010.

Table 2.2.4 Summary of the Status of IA Organized, Registered and with O&M Contracting

Particulars		NIS	CIS	TOTAL
IA organized	No. of IA Organized	2,832	3,827	6,659
	No. of Actual Farmers-Members	513,002	317,911	830,913
	No. of Potential Farmers-Members	563,233	348,407	911,640
	Area Covered, ha	788,698	430,849	1,219,547
IA registered	No. of IA Registered	2,759	3,801	6,560
	No. of Actual Farmers-Members	499,898	418,697	918,595
	No. of Potential Farmers-Members	548,620	-	-
	Area Covered, ha	768,367	42,792	811,159
IA contract	No. of IA w/ Contract Memorandum of Agreement	1,314	3,791	5,105
	No. of Actual Farmers-Members	388,050	407,595	795,645
	Area Covered, ha	450,539	41,267	491,806

Source: NIA Annual Report 2010

2.2.4 Situation in Selected National Irrigation Systems Visited

During the Second Work in the Philippines, a field visit survey interview were conducted to the four (4) national irrigation systems (NIS), namely; Porac-Gumain Irrigation System, Upper Pampanga River Integrated Irrigation System (UPRIIS), Tigman-Hinagyaman-Inarihan River Irrigation System (THIRIS) , Rinconada River Integrated Irrigation System (RIIS) for Region 3 and Region 5, respectively.

Among the concern in the field visit to the NIS's are on the irrigation system operation advancement particularly on data collection and databank/database. The data include the update of parameters and variables specifically on geographical spatial data and hydro-meteorological data, which are essential to irrigation water management. Geographical spatial data is associated to extent of irrigation service area and soil characteristics, while the hydro-meteorological data relates to water requirement. Both data are necessary in calculating availability of water for the irrigation system.

One concern is the gap between service area and irrigated/planted area. The reasons for the area gaps are a) defects in construction of facilities during the project implementation stage, b) inundation during wet season, c) drought during dry season, d) sea water tidal influence, e) deteriorated irrigation facilities, and f) inadequate or inefficient drainage system. In RIIS, LGU imposed limitations of operating water level about 40 centimeter below the weir of the diversion works from its source at Lake Buhi, beyond this level would inundate houses along the perimeter of the lake. In the interview, they reveal that there was no update of using geodetic survey to ascertain the present boundary of the irrigation service area. Most of the NIS relied on the geodetic survey conducted more than three (3) decades by the project implementation office. Today, in the ocular observations that several land conversions from irrigated area to residential, commercial, or industrial areas just happened, not to mention the road establishments and expansions. However, there are potential areas also transformed to irrigable area served by irrigation water through gravity or pump irrigation. There are also cases presented to the Survey Team that areas transformed is either reported, partially reported, or not reported, such irrigation area development is described in Figure 2.2.2 and gap in area is shown in Table 2.2.5.

Table 2.2.5 Gap between SA, FUSA and LIPA as of Dec.2010

Particular	Porac-Gumain	UPRIIS Div-3	THIRIS	RIIS
	ha	ha	ha	ha
1. Service Area	4,004	29,846	3,542	7,208
2.Firm-up Service Area	3,101	26,211	3,085	5,738
3.Irrigated Area (Program)				
a) Wet Season	2,046	25,322	2,670	4,720
b) Dry Season	2,857	24,623	2,788	5,256

Source: NIA-Y2009

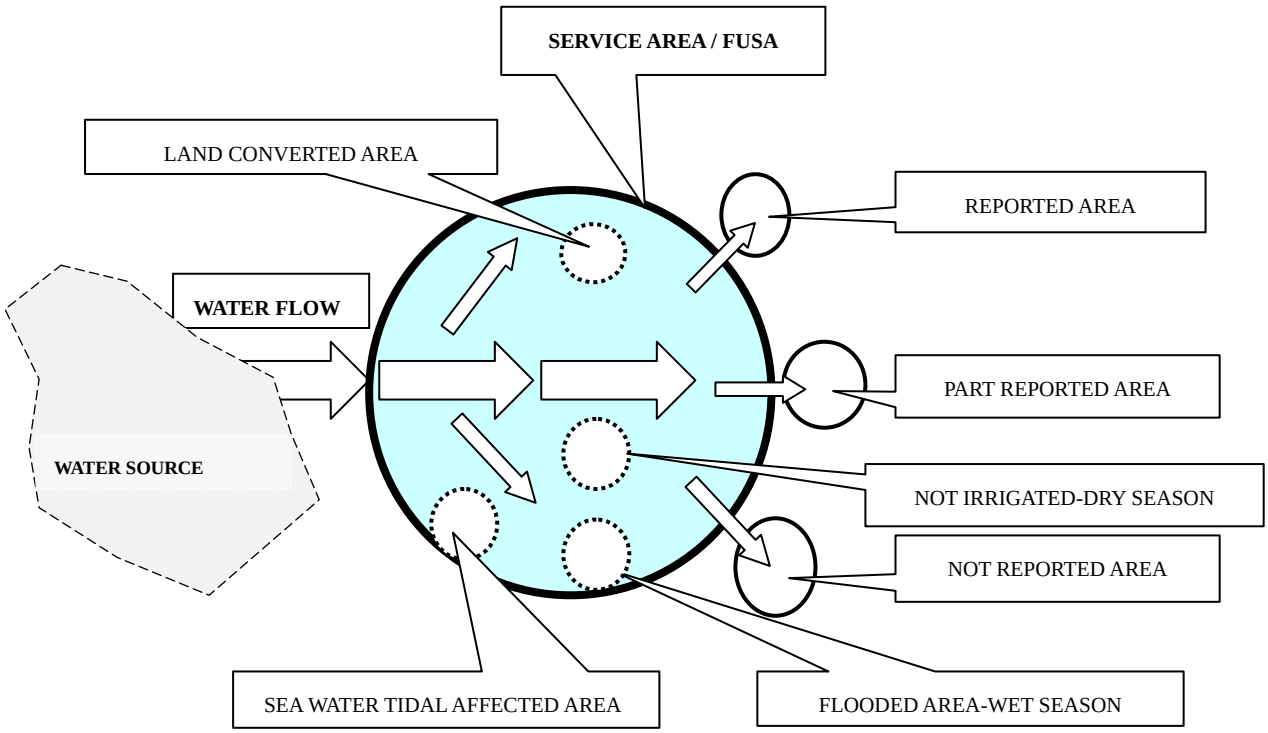


Figure 2.2.2 Irrigation Service Area Development

Another concern is the scarcity of water, farmers are always complaining on the inadequacy of irrigation water supply, particularly at the tail-end of the irrigation system. Correspondingly, the NIA is pointing to the deforestation activity in the watershed. On the technical point of view, the scarcity of water was unverified.

Based on interview from the NIA Staff of the four (4) NIS and observations, there are no available of meteorological instruments, but readily available 50 kilometers or more from the service area. There is no clear also on the availability of rain gauges for reading rainfall intensity at required distance in the rice field.

In addition, it was not sure whether the system had conducted infiltration test at farm level or TSAG using the infiltrometer as instruments to measure the rate of water infiltration into soils. In the field, not all irrigation canals have installed with staff gages particularly at canal head gates. The survey on IWM tools and instruments used or accessibility of data in the irrigation system as shown in Table 2.2.6.

Table 2.2.6 Availability of Data at four (4) selected NIS

No	Description	Availability			
		Available	Partially Available	Not Available	Not Sure of Availability
1	Meteorological Stations			O	
2	Hydrorological Stations			O	
3	Irrigation Water Supply/Delivery Data		O		
4	Main Canal Farm Gages		O		O

5	Lateral Canal Farm Gages			O	
6	Farm Canal/Ditches Gages			O	
7	Farm Level Soil Physical Properties Data			O	
8	River Discharges	O		O	
9	Rainfall Gauges			O	O

Source: Field Survey at UPRIIS, Porac-Gumain IS, THIRIS, RIDA

Looking on the above matrix, there is serious consideration or action to ascertain the availability of water resources and the amount of water conveyed form the river to the farm level. Further, conveyance leakage is common to earth canal or concrete lined canal. Furthermore, leakages along main farm ditches (MFD) and overflow over the paddy dike is very common.

2.2.5 Irrigation Service Fee (ISF)

Irrigation Service Fee (ISF) is a major source of revenue to the NIA. In 2010, the net ISF collection was PhP1,103 Billion or about 48% of the total revenues generated by NIA. Farmer-beneficiaries of IAs are expected to pay ISF in cash or in kind, which is computed according to scheme and crop cultivated in NIS. Table 2.2.7 indicates the basis for calculation of ISF while Table 2.2.8 shows the Summary of Income and Expenses of NIA (2000-2010).

Table 2.2.7 Basis for Computation of ISF

Scheme/Crop	Wet Season (cavan)	Dry Season (cavan)
A: Diversion		
Rice	2.0	3.0
Other crops	60% of the rate for rice	60% of the rate for rice
Fishpond	Cash equivalent to 5 cav of palay/ha/season	Cash equivalent to 5 cav of palay/ha/season
B: Reservoir/Storage		
Rice	2.5	3.0
Other crops	60% of the rate for rice	60% of the rate for rice
Fishpond	Cash equivalent to 5 cav of palay/ha/season	Cash equivalent to 5 cav of palay/ha/season
C: Pump		
Rice	2.0 – 10.0	2.75 – 12.0
Other crops	60% of the rate for rice	60% of the rate for rice
Fishpond	Cash equivalent to 15 cav of palay/ha/season	Cash equivalent to 15 cav of palay/ha/season
Annual crops	Cash equivalent to 15 cav of palay/ha/year	

Note-1: Cavans for palay per ha or cash equivalent computed at the prevailing government support price for palay
Note-2: For 3rd crop, the rate is equivalent to 1 cavan per ha.

Table 2.2.8 Summary of Income and Expenses of NIA (2000-2010) (in Million Pesos)

Year	Income			Expenses			Net Income
	ISF	Others	Total	Personal Services	Mode	Total	
2000	393.19	759.64	1,152.83	1,067.70	733.08	1,800.78	-647.95
2001	455.11	870.29	1,325.40	1,094.29	524.06	1,618.35	-292.95
2002	626.11	804.27	1,430.38	1,137.76	788.19	1,925.95	-495.57
2003	661.64	863.39	1,525.03	1,210.47	737.61	1,948.08	-423.05
2004	740.95	682.41	1,423.36	1,112.33	442.75	1,555.09	-131.73
2005	755.77	873.37	1,629.14	1,178.30	575.74	1,754.04	-124.90
2006	773.51	857.86	1,631.37	1,229.85	732.15	1,962.01	-330.64

Year	Income			Expenses			Net Income
	ISF	Others	Total	Personal Services	Mode	Total	
2007	789.84	946.49	1,736.33	1,280.30	733.52	2,013.82	-277.49
2008	892.14	1,973.26	2,865.40	2,056.80	1,072.21	3,129.01	-263.61
2009	1,105.92	1,566.20	2,672.12	1,595.08	1,101.02	2,696.10	-23.98
2010*	1,103.00	1,588.85	2,691.85	1,256.58	564.04	1,820.62	(+871.23)

Sources: NIA Corporate Plan for 2000-2009, *NIA Annual Report 2010

Note: Mode- Operation, Maintenance and other expenses

Others- Equipment rental, management fee, CIS and Pump amortization

ISF is the main source of fund to cover O&M cost (i.e. for personal services of field personnel and maintenance and other operating expenses). Collections, however, are below 60% overall which is not adequate to support the desirable level of O&M. Table 2.2.9 shows the ISF Collectibles and Collection in 2009 by Region while Table 2.2.10 shows the 10 year irrigation service fee accounts and collection efficiency (CE). The amount collected from the ISF has been increasing steadily when several strategies to increase ISF CE were put in place. ISF CE rose significantly from 46% to 52% in 2002 and peaked at 63% in 2008. However, the CE decreased to 55% in 2009 to 2010.

Table 2.2.9 ISF Collectibles and Collection (2009) (in Million Pesos)

Region	Current Account			Back Account		
	Collectible	Collection	Collection Efficiency (%)	Collectible	Collection	Collection Efficiency (%)
CAR	49	33	68	181	4	2
1	68	32	47	433	10	2
2	120	81	67	385	8	2
MARIIS	215	146	68	1110	27	2
3	112	53	47	572	11	2
UPRIIS	325	182	56	1870	38	2
4	71	63	89	360	12	3
5	55	18	33	339	10	3
6	106	28	26	545	13	2
7	17	11	63	30	1	5
8	81	28	35	159	4	3
9	105	17	16	288	3	1
10	66	39	58	314	9	3
11	100	73	74	167	8	5
12	194	117	60	936	18	2
13	29	23	80	100	3	3
Total	1,713	945	(Ave) 55	7,789	180	(Ave) 2

Source: NIA Cooperation Plan 2010-2020

Note1: Although MARIIS and UPRIIS belong to Reg2 and 3 respectively, the table above indicates them separately.

Note2: Region12 includes ARMM.

Table 2.2.10 Trend of ISF Collectibles and Collection (2000-2009) (in Million Pesos)

Year	Current Account			Back Account		
	Collectible	Collection	Collection Efficiency (%)	Collectible	Collection	Collection Efficiency (%)
2000	729	332	46	5,319	96	2
2001	749	391	52	5,815	97	2
2002	1,038	552	53	6,307	123	2
2003	1,035	574	55	5,548	146	3

Year	Current Account			Back Account		
	Collectible	Collection	Collection Efficiency (%)	Collectible	Collection	Collection Efficiency (%)
2004	1,079	612	57	6,074	168	3
2005	1,172	640	55	6,261	161	3
2006	1,134	615	54	6,734	198	3
2007	1,123	653	58	7,035	167	2
2008	1,220	767	63	8,195	170	2
2009	1,713	945	55	7,789	180	2

Source: NIA Cooperation Plan 2010-2020

The ISF current account collectible for any given year was below the desirable level of O&M. This means that even at 100% CE, the ISF is not adequate for the sustained O&M of NIS. Actual ISF collection averaged only about 35% of the desirable level of O&M. In 2009, the ISF current account collectibles of PhP 1.713B represented only about 62% of the desirable level of O&M cost which is at PhP 3,681 per ha. Such lack of adequate funds for O&M cause the delay of or inadequate repair and maintenance activities resulting in the need for more rehabilitation and restoration works.

During the period of 1st work in Philippines, the Survey Team visited some NIA sites: Porac-Gumain RIS, Santa Barbara RIS, UPRIIS and AMRIS. This was done to see the situation of irrigation management, especially water management, ISF CE and ICT utilization on the field level. ISF CE is particularly the concern of the Team to study a possibility/opportunity of introduction of ICT to improve ISF CE. ISF-CE actually varies widely by IA and by system. Some indicate relatively high ISF CE ranging from 60% to 70%. There are IAs showing good effort with more than 80% of ISF CE, while some are still low like 30% or so.

As a common issue/problem of ISF-CE, inadequate water management is pointed out, which is a basic concern for most farmers. It is said to motivate farmers to surely pay ISF if the issue is addressed better. Reasons for water management issues include: i) unsynchronized cropping calendar among farmers; ii) gap of timing between crop growing stage and water delivery which relates to i); iii) decrease of water resource like river or dam as water storage; iv) silting at intake and in canal; v) aging and/or deterioration of irrigation facility including unlined canals, and so on. These negative factors result in lack of proper water management and lessen the motivation of farmers to pay for ISF.

As for operations side to manage ISF billing and collection, planted area which is used for computation of ISF is estimated without any accurate measuring means, even for measuring FUSA (Firmed-up Service Area). In order to secure transparency and numeral accuracy as well, this could be a possible point for introduction of ICT in improving ISF CE as an attached system to ISF-CBCS which has already started in some IMOs.

Furthermore, the current way of ISF collection is inconvenient for the persons concerned. Farmers are expected to visit NIA field office like IMO or IA office for payment of ISF even if he/she lives in distant place from the office. There is another way in which the NIA officers like the water master and ISF collector hired by NIA or designated by the IA visit farmers place to collect ISF, spend a lot of time and incurring expenses. Even in this situation, there could be opportunity/possibility to

utilize ICT for smooth and safe collection of ISF.

As mentioned above, good water management deeply relates to collection efficiency of ISF from the viewpoint of technical side. Broad measures are likewise needed such as having a synchronized farming, introducing a system for getting micro-credit for purchasing farming inputs so they can follow the cropping calendar, conducting a proper maintenance and rehabilitation of facilities, giving water delivery information to IA and its farmers, and so forth. In addition to measures from technical side to cope with water management issues, it could be considered that there is still a room to apply ICT to operation side not only for ISF collection but also institutional strengthening of NIA officers and IA/Farmers as well.

2.2.6 Challenges in Irrigation Service Fee (ISF) Collection

In the second field survey, the challenges are analyzed according stages in the operation which virtually affecting the ISF collection efficiency. These stages in operation starts from the identification of the Service Area (SA) or Firmed-up Service Area (FUSA), List of Irrigated and Planted Area (LIPA) , Billed Area, ISF Collection (BA/ISFC), Harvested Area (HA), Benefited Area (BA), Collected ISF Area (equivalent), Uncollected ISF Area, inevitably becomes Back Account ISF Area (BA), Target Back Account ISF Area (TBA), and on the Actual Collected Account ISF Area (ABA).

The challenges in every level of activities incurred affecting ISF collection varies in many reasons, either “man-made” or “act of nature”. As listed in Table 2.2.11, among the problems affecting the ISF collection or payment are attributed to man-made interventions, such as; a) accuracy of the declared irrigation service area or the firmed-up service area, b) accuracy of declared list of irrigated and planted area, c) transparency in irrigation service fee collection, d) convenience in ISF collection and remittances, e) economic sustainability of farming, f) efficiency in irrigation water delivery and utilization, and g) attitude of farmers.

The socio-economic status of individual farmers is an important factor to consider, like the capacity to pay in full and prioritization of payment of other family needs rather than the ISF. Another is the non-access of farmers to capital lending or due to many paper requirements by banks to avail loans.

Socio-political is also an issue that contributes the reduction of ISF collection, for instance, the former president of the country President Estrada’s pronouncement on free irrigation water to farmers. This pronouncement mislead many irrigation rice farmers, which drastically decrease the collection efficiency for some time and until now, it is still haunting on irrigated rice farmers. In the interview, few Barangay Leaders are currently holding position in the IA, are influenced by politics advocating political agenda through government agencies in promoting agricultural inputs and implements to selected IA members or clusters of farmers identified as member in political circle, eventually this creates division among IAs.

Socio-cultural or psychological attributes affects ISF Collection like “putting tomorrow of

what you can do for today", beating the last day deadline, collector is rival of another family circle, may it in politics or business and the like.

Table 2.2.11 Reason of low ISF Collection Efficiency

CHALLENGES AFFECTING ISF LOW COLLECTION EFFICIENCY AND NON-PAYMENT		
No	**PARTICULARS**	**CHALLENGES**
1	SERVICE AREA / FIRM UP SERVICE AREA (FUSA)	a) Gap in area between service area due to flooding, drought, water scarcity, defective construction implementation, other usage of water source
		b) Uncertainty of area due to land conversion
		c) Some additional areas may be reported, partially reported, and not reported
2	LIST OF IRRIGATED & PLANTED AREA (LIPA)	a) Portion of irrigation facilities are under rehabilitation,
		b) Some irrigation facilities are under repair,
		c) Immediate damaged irrigation facilities ,
		d) No technical basis on measurement of irrigated and planted areas or measurement of areas rely on farmers' hired contractors for farming activities using ropes/string/survey chain
		e) Lack of irrigation water, No basis on declaration of scarcity of water
		f) Measurement of irrigated and planted areas relied on farmers declaration
3	BILLED AREA	a) Crop Failure b) Pests Infestation c) Natural Calamity (Flood, Drought, Typhoon, Heavy Rain, Strong Wind)
4	HARVESTED AREA	
5	BENEFITTED AREA	
6	ACTUAL ISF COLLECTED AREA	a) Lack of motivation among NIS Collectors
		b) Non-location of farmers during collection
		c) Inconvenience of time and high fuel expense incurred by collector
		d) Weather condition affects collection
		e) Collectors are "On-Leave" either on family or business matters
		f) Delay in delivery of bills
		g) Political leaders advocating non-payment of water
		h) Attitude and willingness of farmers to pay ISF
		i) IAs displeasure due to delay of payment of incentives
7	UNCOLLECTED ISF AREA/ BACK ACCOUNTS	a) Farmers not satisfied on NIA Services
		b) Farmers priorities payment on debt or owed financial responsibilities from Traders or informal lenders with high interest rates
		c) Tenant farmers declare bankrupt
		d) Late or partial payment due to delayed payment by traders
		e) Farmer is waiting for good prices after the harvest
		f) Non-remittance of ISF-Collector to NIA.
		g) Delayed remittances of ISF-Collector to NIA
		h) Cannot afford to pay due to Small Land Holdings and Low Production
		i) Farmers located at canal tail-end difficulty in receiving irrigation water

2.2.7 Irrigation Management Transfer (IMT) Program

1) Policy Framework

Irrigation Management Transfer (IMT) is defined as the transfer of management operation and maintenance of NIS to IA either wholly or partially, depending on the size of the NIS and capability of the IA. Such eventual transfer from the NIA to IA is all cited directly or indirectly in the following relevant laws:

a. Section 2: Powers and Objectives, RA 3601 of 1963, the NIA Charter, as amended by PD552 and PD1701

b. Section 20: Access to Irrigation Service, RA 7607 of 1992, The Magna Carta of Small Farmers

c. Section 30: The NIS, RA 8435 of 1997, the Agriculture and Fisheries Modernization Act (AFMA)

d. MC No. 14 of 1987, 1989, 1990, MC No. 6 of 1991 and MC No.35 of 1993. All these MC's are related to the earlier Participatory Irrigation Management (PIM) program which is the forerunner of the IMT.

Earlier studies particularly that of World Bank in 2004 indicated that the beneficiaries want the IMT program to continue and found some improvements in the system performance. Considering the various recommendations of the study to improve the effectiveness of the IMT program, the NIA instituted the IMT policy and implementing guidelines in 2008 to serve as reference in the planning and implementation of irrigation development programs particularly in the O&M of NIS. This IMT policy and implementing guidelines has been updated and modified in 2011 with some amendments particularly on NIS-IA ISF sharing and compliance with IMT contract.

The IMT program covers all NIS, including new projects under construction and existing ones under rehabilitation and modernization. The program aims to establish and develop the following:

a. Duly organized, functional and self-reliant IA, capable and willing to operate and maintain the NIS, wholly or partially.

b. Improve the performance of NIS for more equitable water distribution, better and timely delivery of water, higher cropping intensity and higher ISF collection efficiency.

c. Higher opportunities to farmers for better and more profitable agricultural production as farmers are expected to benefit from better irrigation service in terms of higher yields and farm incomes.

d. Sustainable and financially viable IA and NIS O&M.

There are four IMT model contracts defining the responsibilities of NIS and the IA. The models to be adapted by the IA depend upon their willingness and capability to perform their obligation under such model. Hereunder, Table 2.2.12, shows the different model contracts indicating NIA and IA responsibilities.

Table 2.2.12 Models of IMT

IMT Model	NIA Responsibilities	IA Responsibilities
Model-I	♦ Manages the entire system ♦ Compensate IA for canal maintenance ♦ Provide share to IA from ISF collection under agreed sharing arrangements.	♦ Maintains specific length of canals like cutting grasses on canal embankments, removal of debris from structure inlets and remedial measures to prevent overtopping of canals. ♦ Operation activities such as discharge or water level monitoring on specific points of the system ♦ Preparation and submission of LIPA to NIA ♦ Distribution of ISF bills, campaign for payment and assist in collection of ISF.
Model-II	♦ Manages the main system from headwork to the main canal up to the main gates of lateral canal. ♦ Compensate IA for canal maintenance ♦ Provide share to IA from ISF collection subject to negotiation with the IA based on the concept of fair sharing of burden and benefits.	♦ Manages the laterals, sub-laterals and terminal facilities. ♦ Undertake minor repair, maintenance, O&M planning and monitoring. ♦ Equitable distribution of water from the lateral headgate to the different turnouts. ♦ Preparation and submission of LIPA to NIA ♦ Preparation of individual ISF bill and collection of ISF ♦ Establishment and maintenance of Irrigation Fee Register (IFR) of individual farm lot.
Model-III	♦ Manages the headworks and portion of the main canal down to the junction of the first lateral (usually named lateral A). ♦ Compensate IA for canal maintenance. ♦ Provide share to IA for ISF collection subject to negotiation with the IA based on the concept of fair sharing of burden and benefits.	♦ Equitable distribution of water of the main canal down to the different laterals and sub-lateral head-gates and all turnout inlets. ♦ All maintenance works on the irrigation facilities under the coverage ♦ Preparation and submission of LIPA to NIA. ♦ Preparation of individual ISF bills and collection of ISF. ♦ Establishment and maintenance of IFR.
Mode-IV	♦ Completely transfer the management of the entire system including the headworks. ♦ Responsible for monitoring and evaluation, collection of seasonal or annual payments from IA. ♦ Provide technical assistance as maybe required by the IA.	♦ Manages the entire system and becomes responsible for all O&M activities. ♦ Setup its own ISF rates provided such rates shall be sufficient to cover its O&M costs and payment of each obligation to NIA. ♦ Prepare its own improvement and modernization program. ♦ Pay to NIA a technical assistance fee for the cost of supervision and amortization cost in the major repair and maintenance of the system.

The IMT program is being funded through the following:

a. For new NIS under construction -Project Funds

b. For existing NIS under rehabilitation and modernization -Project Funds

c. For existing NIS not covered under any projects or repair programs -Yearly allocation of NIA for repair and rehabilitation funds

Since the major cost of the IMT program is the infrastructure component and the IA strengthening and development component, they shall be incorporated and synchronized with the IA development. This is accomplished by giving priority to IA and each member on civil works contracts and/or in labor employment for the financial viability of the IA. Table 2.2.13 shows the current status of IA under IMT as of 2009.

Table 2.2.13 Status of IA under IMT as of 2009

Region	No. of NIS	FUSA	No. of IA	Farmer Member	Category of IA					
					without Contract		under Model-I		under Model-II and Model-III	
					No. of IA	Farmer Member	No. of IA	Farmer Member	No. of IA	Farmer Member
CAR	3	22,622	94	12,416	35	1,702	59	10,714	-	-
1	25	45,825	164	56,032	37	10,654	102	24,435	25	16,436
2	17	47,551	111	39,972	30	8,342	43	13,715	38	17,915
MARIIS	4	86,253	361	61,351	0	0	117	26,105	244	42,882
3	18	60,430	328	54,749	86	13,926	218	37,574	24	3,309
UPRIIS	5	118,338	381	63,823	18	2,014	316	52,447	46	9,362
4	45	43,414	95	24,999	31	7,988	45	10,709	17	6,302
5	16	18,785	69	30,797	9	529	37	19,390	23	10,878
6	12	48,835	109	38,845	48	18,268	54	18,706	7	1,871
7	3	5,512	21	4,434	5	795	13	2,981	3	688
8	17	18,560	80	18,810	15	3,311	51	11,252	14	4,247
9	4	15,162	44	10,913	22	1,509	19	8,153	3	1,251
10	6	21,175	48	12,311	15	1,784	25	5,526	8	5,001
11	9	29,898	122	21,714	5	1,035	116	20,588	1	91
12	18	76,064	250	53,989	19	6,470	228	45,009	3	2,510
13	7	19,661	103	15,321	19	19	72	12,811	12	2,510
Total	**209**	**678,085**	**2,380**	**520,476**	**394**	**78,327**	**1515**	**316,896**	**468**	**125,253**
			%		16.60%		63.70%		19.70%	

Note1: FUSA- Firmed Up Service Area

Note2: Model-III is just an expanded form of Model-II.

The only difference is in the management of Main Canal. In Model II, NIA manages the entire length of the main canal while in Model III, NIA manages only part of the main canal which starts at the headwork up to the junction of the first lateral canal usually called Lateral A.

Note3: Although MARIIS and UPRIIS belong to Reg2 and 3 respectively, the table above indicates them separately.

Note4: Region12 includes ARMM.

2) IMT Program (2nd Edition) and Field Condition

Memorandum Circular 27 S2011, a memo for the issuance of the Second Edition of the IMT policy and Implementing Guidelines supersedes Memorandum Circular 47 S2008 entitled “The NIA IMT Policy and Implementing Guidelines”. The second edition of the IMT is the result of the orientation workshop on IMT attended by the Regional Irrigation Managers (RIM) and Irrigation

Management Office (IMO) in Y2009 and Y2010.

This reiterated the NIA Board of Directors Resolution No. 7497-08 S2008 as reference in the planning and implementation of irrigation development and improvement programs in the management of the operation and maintenance of all NISs in the Philippines. In the same memo, it states, any program that implements the policy and guidelines within the scope of the IMT shall denote IMT Program. The IMT program encompasses all the programs of NIA relating to the organization and development of IA's in all NISs including all ongoing construction irrigation projects, rehabilitations, and/or modernization.

This implied further, "existing NIS management contract shall be reviewed and modified or revoked to conform to the IMT Policy subject to consultation mutual agreement by both parties except for the Type-3 and Stage-3 Contracts (which covers asset turn-over), unless otherwise renegotiated to the IMT Models. All new IMT contracts shall conform to the models set forth in this IMT Policy and Implementation Guidelines".

The amendments of the IMT Policy would highlight the following topics.

a) Clear descriptions of IMT Contracts, Compensation, Payment Schedules, and Payment Criteria,

b) Specific Topics on IMT Guidelines are provided with distinct Annexes,

c) Improved clear instruction in IMT Contract Template,

d) In determining O&M Cost using "Break-Even Point" as basis for the NIA-IA ISF Collection Sharing Scheme, a reduction in percentage share from 13% to 10% considering that NIA-CO had other source of income such as Management Fee and Equipment Rental,

e) Detailed NIA and IA responsibilities for the different models,

f) Detailed scheme on determining IA remuneration for maintenance and NIA-IA collection sharing scheme,

g) Included clear topics on compensation on Back Accounts,

h) Attached clear NIA-IA IMT Performance Evaluation,

i) Clearly recommended, "That ISF collection shall be considered for transfer as IA Responsibility depending on capability and willingness of the IA",

j) For Model 2, 3, & 4 Contracts, in adoption of the ISF Bill Automation, IAs needs to procure computer system and the development of computer knowledge and skills. Flexibility on the part of the RIO and IMO for the transfer of the preparation of bills is recommended, considering that computer knowledge and skill cannot be acquired in short time, hence capacity shall be tested along with the adequate equipment acquired by the IAs.

In the field condition, most of IA's at Porac-Gumain is in Model-2 and Model-3, UPRIIS Division-3 is in the process of strengthening program for Model-1, THIRIS in Model-1, and RIIS in Model-2.

At Porac-Gumain, canal concrete lined (vertical flume) maintenance would take only one (1) day having less effort in removing trash form the canal. According to IAs', cleaning of irrigation canal with concrete lining is easier relative to earth line canal. In UPRIIS, the maintenance of earth lined canals under contract can be done in three (3) to four (4) days, done twice a year particularly before land preparation of the calendar cropping season. Cutting of grasses for both systems are made using grass cutter fuel fed equipment.

As to equitable distribution of available irrigation water supply, farmers are practicing on the number of day's delivery method of irrigation water and tail end area served last. As observed, lateral canals and farm level canals have no staff gages or any water measuring structures.

In Region 5, only few IA's are now on IMT, mostly are on the process of strengthening and training of farmers for this program. IA's are complaining on the degree of coverage of responsibility against the sharing scheme of incentives or payment of the labor in managing the irrigation facilities. The release of payment or incentives from NIA to IA's is always late, which affects morale of farmers in collection of ISF. The delay of payment of incentives could have domino effect on the plan of the IA's to acquire computer system unit and skilled operators.

On the automation of ISF Billing and transfer to IA's, RIIS had learned early experiences based from the initial test. During the review of the output by the NIA Billing Staff, flaws in the data entry was checked, thus this compelled to withdraw the arrangement for IAs to prepare automated ISF Billing.

2.2.8 Issues, Concerns and Opportunities in Irrigation Development

1) Issues and Concerns

Water is now being a scarce resource in the Philippines and the Agriculture Sector accounts for about 80% of the total water use, more so in the irrigation sub-sector which is the biggest user of water. There is now a demand for a more efficient use of irrigation water so that other competing uses such as domestic, industrial and public sector can also be equitably served.

In order to reduce irrigation water requirements, there is a need to a) review basic irrigation design to minimize conveyance and farm losses; b) use of early-maturing varieties of seeds; c) practice good water management; and d) planting of alternative crops. Discussions on raw water pricing, volumetric pricing and tradable water rights have been initially started although this policy has yet to be institutionalized.

Only about 49% of the total irrigable area has been served with irrigation facilities and the need to develop new areas becomes necessary if only to catch up with the demand of a growing population. Thus, while focusing on rehabilitation of existing systems, which are lower in cost and can produce

immediate results and benefits, development of new areas must also be earnestly pursued. However, since most of the "easy" projects were already developed, the new ones left are relatively difficult and expensive to develop.

NIA is facing difficulty in providing adequate funds for the O&M of NIS as NIA relies mainly on ISF collection to pay for personal services (PS) and maintenance and other operating expenses (MOOE). Since ISF collection efficiency is very low (average of 55%), funds for O&M is not enough even for sustainable level of O&M in the NIS. Thus, NIS rapidly deteriorates and the vicious cycle of rehabilitation and restoration becomes more often.

Environmental degradation particularly in the watersheds of the NIS has resulted in the decrease in the quantity and deterioration of quality of water in the river system for which irrigation water comes from. Denuded watershed causes rapid soil erosion and introduces silt deposition into the dams and canals which translate to more costly O&M and frequent rehabilitation.

With climate change, heavy rainfall causes high flood peaks or flash floods during *La Niña* phenomenon while prolonged drought is experienced during *El Niño*. There is therefore a need for the agriculture sector to support the proposed Philippine Climate Change Adaptation Project (PCCAP) to at least mitigate the adverse effects of climate change.

The idea of transferring the O&M of NIS, whether partially or wholly, started in 1987 when NIA launched the PIM program under MC No. 14 of 1987, which is the forerunner of the present IMT program. This was further stressed under Section 30 of AFMA (RA 8435 of 1997) which states that "the NIA is mandated to gradually turn over the O&M of NIS secondary canals and on-farm facilities to IA's". Rule 30.3 of the Implementing Rules and Regulations (IRR) of AFMA under DA Administrative Order (AO) No. 6 dated July 10, 1988 states that "the turnover of the O&M of existing NIS structure shall be completed on or before June 30, 1999 provided that:

Rule 30.3.1: The physical and technical capacity to deliver and distribute adequate and timely irrigation water is not impaired;

Rule 30.3.2: The relevant IA is deemed jointly by the DA and the NIA to be prepared to assume the responsibility of O&M, according to criteria and capacity-building activities agreed upon between the Department, NIA and the Federation of IAs; and

Rule30.3.3: Appropriate transition measures are provided for any personnel who may be adversely affected by the turnover.

The IMT however is based on two major conditions which both NIA and the IA finds it difficult to attain. One is the condition that IA is strong enough and has the capability to take over the O&M of NIS. The other is that the IA is hesitant to accept its transferred responsibilities if the NIS is not fully functional (the canals, structures, headworks, gates and other facilities are not in good running condition) before the turnover. There is therefore a need for synchronizing the strengthening of the IAs and the rehabilitation of the NIS, not one after the other.

The rationalization plan (RatPlan/RP) of the NIA was implemented with the signing of EO No. 718 in 2008. There are two major components of the RatPlan: a) phased implementation of RatPlan for a 5-year period (2009-2014); and b) accelerated implementation of the IMT program. Under the RP, the total number of positions in the entire NIA was reduced from the old structure of 11,455 positions down to only 3,813 positions, or a tremendous reduction of 67%. With the accelerated irrigation development programs and the doubling of the budget of NIA (46% of the entire DA budget, year 2012 approved), such reduced personnel can hardly cope up with the increasing activities, and such constraint delays enhancement of IMT Program.

Accurate, up-to-date and reliable information is vital for all aspects of NIA's operation. The full use of information technology through ICT in view of the organizational change (the need for computerizing database to offset the reduced personnel) and accelerated programs and strategies (increase ISF collection efficiency, accelerate IMT program, etc) is therefore necessary.

2) Opportunities

There is now a renewed effort from government to support the agricultural development particularly the irrigation sub-sector. NIA is now receiving 46% of the entire DA budget which will enable the agency to fully implement its plans and programs.

International financial institutions still continue to provide financial assistance to the agriculture sector, particularly to NIA which still have confidence in the agency's capability to implement irrigation development projects.

Most irrigation projects are predominantly located in rural areas and almost all of the beneficiaries are the rural people. Thus, irrigation significantly contributes to the improvement of the living standards of the rural people and the government program of poverty alleviation.

It is being said that irrigation development helps in the improvement of communities. In Luzon, the town of Santiago in Isabela became a bustling city only a few years after the completion of the Magat Multi-purpose Dam. In Visayas, the town of Pilar, Bohol was transformed from a sleepy town into an agricultural center with the completion of the Bohol Irrigation Project I. In Mindanao, in the town of Carmen Cotabato, rebel soldiers and sympathizers lay down their arms and pick up their shovels instead after the completion of the Malitubog-Maridagao Irrigation Project I. These are just a few examples of irrigation projects that help builds prosperity to a number of rural communities.

2.3 Agricultural Extension

2.3.1 Policy and Institution

Since the enforcement of the Local Government Code of 1991, agricultural and fishery extension services have been transferred from DA to local governments, by which agricultural extension workers (AEWs) had been transferred from DA (as national government civil servant) to the LGUs. This move was aimed to directly respond to the farmers' needs on the ground. Current estimates put a total of 16,000 to 17,000 LGU AEWs covering an average of 750 farmer households per person. Yet, the current extension system also faces some problematic issues.

There are essentially two major issues, institutional and technical, concerning agricultural extension. Typical problem in institutional aspect is the lack of financial stability due to decentralization as the local governments are, first of all, constrained by the limited revenue. In addition, information flow from the central research and development institutions to extension workers at the local level faces a bottleneck as the agriculture extension services and its delivery has been fragmented and dispersed. Moreover, lack of Local Chief Executives' (LCEs) consideration for the importance of agricultural extension sometimes hinders the activities of extension workers.

Other problematic issues include: lack of training opportunities for extension workers, lack of continuity or consistency in trainings, and inappropriate staff assignments. Those issues are further evidenced by a specific case in which extension workers' field work is prohibited by their Mayor. All these situations imply that the person-based knowledge integration and dissemination may not be able to perform as expected.

In technical aspect, it should be noted that the current extension systems have focused primarily on the dissemination of standardized cropping systems but did not always provide problem-solving technical services. For instance, farmers claim that location-specific countermeasures against the spread of particular pest or diseases are not always provided. Or, as the cropping system is too general, it may not be applicable to some area having special agro-ecological characteristics.

In the agricultural extension sector, there are various different institutions involved. The Agricultural Training Institute (ATI) is designated as a leading organization that caters information flow from government-led R&D to extension workers, based on which necessary information is supposedly delivered to clientele farmers on the ground by the extension workers stationed in the LGUs (provinces and municipalities).

Yet, R&D institutions also facilitate the dissemination of knowledge resources they developed. For instance, PhilRice maintains its own knowledge dissemination sites, while DOST-PCAARRD hosts Farmers' Information and Technology Services (FITS) Centers, aiming to facilitate computer-based information dissemination at the municipality or village level.

To date, most extension services from research agencies and central government institutions still rely on face-to-face communication (conventional information flow) for actual service delivery to the end users (farmers). While this physical method has been proven effective, the time needed to deliver services and the manpower required to do such activities remains a constraint. ICT is looked upon to link the fragmented system for AEWs and farmers, wherever they may be.

2.4 Agricultural Marketing

2.4.1 Policy and Institution

The Agribusiness and Marketing Assistance Service (AMAS) was organized after Republic Act 8435 or the Agriculture and Fisheries Modernization Act (AFMA) has been signed into law in 1997. AMAS, before its reorganization, is formerly known as the Agribusiness Investment Information

Service.[1] By virtue of RA 8435, AMAS is mandated to be the lead service unit of the Department of Agriculture (DA) in collaborating with and providing direct assistance to the private sector, including concerned NGOs and POs, in marketing ventures and in the conduct of market analysis, identification, and matching.

In addition, AMAS envisions a market-driven private sector-led agribusiness sector ready to face the challenges of intensified global competition and able to contribute to the growth and progress of the economy, leading to an improved quality of life for the Filipino people. To achieve this vision, AMAS has taken upon itself the mission of providing access to market information and development services and facilitator of an integrated market information exchange that enables agribusiness entrepreneurs to access industry information with which to formulate strategic business decisions.

In order to fulfill its commitment to the agribusiness sector, which is largely comprised of small and medium agri-based enterprises, the Service Unit is currently implementing five banner programs meant to address the sector's needs and to harness the full potential of agricultural marketing in the Philippines.

1) Market Access and Development

First on their programs is Market Access and Development which includes three major activities: market promotion and trade fairs, market-matching, and direct market linkage. The Service Unit provides assistance to starting agribusiness enterprises in joining local and international trade fairs for an opportunity to break into the wholesale market both in the Philippines and abroad. AMAS also facilitates market matching or one-on-one meetings between food producers and potential buyers (mostly institutional, consolidators or exporters). The Agriculture and Fisheries Marketing Information System (AFMIS), a result of the joint venture with the Information Technology Center for Agriculture and Fisheries (ITCAF) is a web-based platform aiming to provide ready information for farmers and to serve as venue to sell products online. For direct market linkage, AMAS undertakes several approaches such as providing direct market access to farmers and aquaculturists through food terminals and trading centers.

In addition, AMAS also implements efforts to organize farmers into groups for a stronger market presence and for better market matching. There are many times when industry buyers are looking for producers of raw materials and AMAS tries to do the matching. The challenge is to consolidate the supply or the supplier. This is why AMAS deems grouping the farmers into associations as an essential component in strengthening the marketing system.

2) Industry Support and Development

The second of its frontline programs, Industry Support and Development focuses in providing the backbone by which the agribusiness sector can operate and expand. AMAS is part of the National Marketing Umbrella, which by law is the national marketing group responsible for the country's

marketing policy direction, especially for the private sector. Another undertaking in this program is the promotion of product standards and quality systems which include certification for good agricultural practices (GAPs), organic production certification (initial stages, started in 2011), and logistics and distribution support.

Transporting food products from the farm gate to the market entails some costs (i.e. road users' tax, municipal taxes) and limitations (time f delivery). For that reason, it is expected that there is a wide gap between farm gate prices and those in the market. The Food Lane Project is being implemented to help bring down the costs for logistics so commodities from provinces can reach cities with lesser costs. The Project allows agricultural and highly perishable products to just pass through the roads and municipalities without paying taxes. The trucks or delivery vehicles used are also exempted from the truck ban being implemented in Metro Manila to ensure that fresh products will continue to arrive in the capital at any given time.

Apart from the Food Lane Project, there is also the Roll-On, Roll-Off (RORO) scheme. Since the country is an archipelagic nation, it takes a long time for fresh produce from Baguio (in the north) to reach Davao (in the south) and vice versa. The same is true for island to island transfer of precut products. The RORO system (the use of barge to transport trucks, jeepneys or vehicles) is being strengthened and expanded to shorten the travel time of commodities.

3) Investment Promotions

AMAS also promotes agribusiness investments through the conduct of investment dialogues or forums, seminars on agribusiness investment opportunities, and promotional campaigns to encourage Overseas Filipino Workers and Local Government Units to invest in agribusiness. In addition, the Service Unit issues certificates which entitle new or expanding agribusiness enterprises to tariff-free importation of agricultural inputs such as seeds, equipment and machineries.

4) Enterprise Development

Meanwhile, its fourth program, Enterprise Development, provides entrepreneurial trainings for starting agribusiness investors. In addition, the program also promotes compliance of enterprises to internationally-accepted product safety, health and environment standards. Enterprise development also promotes the use and dissemination of best practices in consumer welfare.

5) Market Research and Information

Currently, AMAS is conducting market research specifically for coffee and squash. As the current market research is to be completed in February 2012, it is hoped to be expanded to different commodities and other crops thereafter. The market research results will allow AMAS to have a more specific approach and learn more particular information (requirements, commodities, volume) for certain commodities to be traded in the local and international markets.

Results of market researches and other documents pertaining to marketing, cost and profit analysis, and product trading are usually made available to the public through AFMIS. The web-based platform, apart from being a venue to market products, has a greater function of providing valuable and up-to-date information required by agribusiness practitioners.

AFMIS contains several commodity and industry profiles, especially for those being prioritized by the Department. Several analysis reports on market intelligence, competitiveness, and supply chain can also be accessed online. Reports on supply and demand estimates of specific products are uploaded to AFMIS as well. Up-to-date agriculture related news and daily/weekly prices of commodities in major markets can also be accessed at the AFMIS site.

2.4.2 Local Marketing and Trading Activities

1) Local Public Markets

In the Philippine setting, especially in rural areas, local markets (barangay or municipal) remain as the main buying and selling area for wet (livestock, poultry, seafood, etc.) and dry (vegetables, fruits, clothes, etc.) goods. The usual situation is for farmers to bring their harvest from the farms to the closest local market early in the morning. Small farmers also double as local retailers, selling a variety of vegetables and fruits grown from their backyard. Some traders would also opt to go to the barangay areas during harvest period to get the lion share of goods. While it saves the time and money of the farmer for transportation, the goods may be bought at relatively lower prices.

Local Public Market in Cebu

Upon arrival, both wholesalers and retailers would swarm around the farmer bargaining for a sale. The tricycle or jeepney is “stopped” by the buyers even before it reaches the actual marketplace. It would usually take only about 5-10 minutes for the sale to be concluded. Prices can also easily fluctuate depending on the amount of supply and demand.

Traders “stopping” farmers

The local wholesalers would bring the products bought to neighboring municipalities where they would be able to command higher prices. Meanwhile, after collecting their desired the local retailers would start selling the goods in their stalls. In Metro Manila, the local markets may not be big enough to hold the number of retailers and consumers so sellers usually have make-shift stalls or carts positioned in the side walkways. And, since it’s a populous area, apart from the Barangay or City Public Market, there are smaller makeshift areas (called *talipapa)* for retail of products. There are also peddlers on the street, carrying the goods or rolling carts while going house to house and selling their goods at a higher price than in the markets.

2) Food Terminals

There have always been difficulties in linking the producers directly to the consumers and cutting through the middle-men layer in the traditional marketing system. The food terminals, previously known as Barangay Bagsakan for village-based retail outlets and Bagsakan Centers for wholesale markets, were seen as one of the possible solutions.

Launched in 2006, the Barangay Food Terminals (BFTs) and the Municipal Food Terminals (MFTs) have now reached 138 and 786, respectively (see Table 2.4.1). The MFTs are serving at least 4.3 million Filipino households, not to mention the number of food growers and buyers/traders nationwide. For BFTs, almost 760,000 families are served in the BFT area alone and an additional almost 2.3 million families in the catchment area.

Table 2.4.1 List of Operational Municipal and Barangay Food Terminals

(as of December 31, 2011)

REGION	Number of MFTs	Households Served (estimates)	Number of BFTs	Families Served (estimates)	
				BFT Area	Catchment Area
NCR	15	350519 (2) (plus 4 Barangays)	19	63744	139982 (4)
CAR	8	20023	108	52903	122568 (1)
Region 1	11	117795	7	4174	5819
Region 2	3	45440 (2)	63	34071	71982
Region 3	37	2866880	66	134530	719697
Region 4A	9	256410 (1)	29	57920 (1)	155655 (3)
Region 4B	14	160277 (2)	20	9892 (2)	4018 (15)
Region 5	7	88919	79	40289	169217 (4)
Region 6	5	16784 (1)	5	2384	4790 (3)
Region 7	4	95200	32	46408	262610 (6)
Region 8	8	58903	59	62592	121828
Region 9	5	3000 (1) (plus 7 Barangays)	43	29348 (2)	76231 (2)
Region 10	1	110793	29	22156 (6)	19544 (8)
Region 11	6	72497	76	63424	65369 (3)
Region 12	4	57986	77	62669	169802
CARAGA	1	(7 barangays)	47	46417	104998
ARMM	---		27	26012	72171 (1)
TOTAL	138	4321426 (plus 18 barangays)	786	758933	2286281

Notes:
(a) Some MFTs might serve the same market/households; (b) Households in some municipalities are not enumerated; (c) Some MFTs don't have enumerated households or number of barangays served; (d) (#) indicates the number of MFTs/BFTs without data

Region 3 has the most number of MFTs (37) and is able to serve at least 2.86 million households. For the BFTs, CAR has the highest number at 108 but the most number of families serves is still in Region 3 estimated at 134,530. It should also be noted that while there are only 19 BFTs in NCR, the number of families served is 63,744. This is comparatively higher than that of Region 4B

(20 BFTs; 9,892 families) and Region 11 (76 BFTs; 63,424 families).

The Food Terminal Project is a joint undertaking between the Department of Agriculture, the local government units, and the groups (women's associations, cooperatives, foundations, etc.) that are operating the MFTs and BFTs. In the case of MFTs, the Department usually constructs or improves the trading building and provides facilities (i.e. post-harvest, cold storage, market equipment, etc.). In some MFTs, hauling or delivery trucks were also included as well as trading and working capital. Meanwhile, the operators (usually the LGU) mostly provide the land by which the MFTs are built as well as the operational facilities (electricity, water). There are also cases wherein the building itself is put up by the LGU.

As for the BFTs, it is usually the LGU or the Operator that provides the land and constructs the actual BFT. In this set-up, the Department's nature of assistance would be in the form of equipment (chiller, freezer, weighing scale, etc.), cold storage facilities, and even grant (PhP 50,000).

3) Case Study: Sentrong Pamilihan Pang-Agrikultura ng Quezon (SPPAQ)

(Central Agricultural Market of Quezon)

One of the MFTs that received assistance from the Department is the Sentrong Pamilihan Pang-Agrikultura ng Quezon. The SPPAQ serves as a food terminal for the entire province of Quezon. The Center has been operational since 2006 and was launched on May 2008. The Trading Center was built through the Priority Development Assistance Fund (PDAF) of then Congressman and current DA Seceretary Proceso Alacala. The Center received one (1) refrigerated van and one (1) cold storage facility. The Center serves an estimated 22,914 households.

As of November 2011, the SPPAQ Foundation, Inc., the operator of the trading center, has about 546 members, all of which are farmer-producers of vegetables. These farmers supply their products to the center without passing through middlemen or traders. The Sariaya Trading Center was set up to help farmers increase their income by providing support services for production and marketing of products as well as in eliminating the "middleman" layer in the marketing system.

Non-member Trading Area at SPPAQ: Retail Selling (less than 5-10kls) is strictly not allowed

The Sariaya Trading Center caters both to members and non-members (traders/wholesalers). The difference in membership lies in the services offered for each category and the handling or service fees being charged. The farmer-member is charged PhP .50 per kilo of produce that is being delivered to the center. The non-member farmers are charged upon entry (PhP .15 per kilo) of products that they bring to the center. These products can be sold on the spot to the awaiting

wholesalers (those who will buy and deliver in nearby municipalities or provinces) or the local farmer-traders (those who will sell it to local wholesalers and retailers).

There are more or less 300 accredited local traders in the Center. Unlike the members, the "ready market" assistance is not being extended to the non-members. These traders are being provided by the Center with an open market place but they must be the ones to find their own "market" or buyers. The open market place space used to be free, with traders being allowed to occupy spaces in a "first come, first serve" basis.

However, at the beginning of 2012, the non-member trading area has been divided into 136 blocks of "floor stalls". The local farmer-traders who occupy the blocks have to pay PhP 30 per block (near the center aisle walking area) or PhP 20 per block (at the second row) on a per day basis. This was decided upon by the Center's Management team in order to aid in the operation and maintenance expenses as well as allocate some funds for the building loan repayments.

Another area in the trading center is dedicated for squash traders and packaging area for other vegetables. A processing area for squash noodles has also been built. The general back area of the Center serves as parking lot for the trucks as well as space for a vermicomposting unit.

Services to Members:

Membership to the Foundation is free. The farmer only needs to be a tenant or a land-owner and must present a barangay clearance. To enjoy the services of the Foundation, the farmer must bring all his harvest to the Center and be diligent in paying his production loan. By doing so, the farmer-member can avail of the following services:

Marketing Assistance – the foundation provides a "ready market" for the farmers. This means that there is no need for farmers to look for buyers or traders as this will be the role of the "marketer" in the trading center. The farmer only needs to plant, harvest and bring his produce to the Center (or arrange for pick-up by the Center's trucks).

Technical Assistance – farmers who lack planting experience can attend trainings for techniques in production as well as learn about the results of planting "experiments" (testing of technologies) being done by other farmer-members. The technician consultant of the Center will also go to the farm of a farmer who wants to be a member to examine the soil (through portable soil testing kits) and determine the suitable crops that can be planted. This activity is also important in doing crop programming to avoid oversupply of commodities.

Vegetable Transport Extension – the Center has 1 reefer truck (4-wheeler), 2 elf trucks (6-wheeler), and 1 forward (8-wheeler). These trucks can carry the load of 3.5MT, 5MT and 7-8MT, respectively. These trucks are used to pick up the vegetables from the farms of members. This is done through pre-arrangement with the Center, usually through SMS or calling between the farmer-member

and the Center trucking staff or the farmer-member and the technician consultant. The pick-up service is free of charge. It has been a regular activity for the technician to monitor the area especially at least one week before the harvest. The technician then texts or calls the marketers to report the expected volume of crops that are coming in. An owner-type jeep is also used to pick up products in farther areas with smaller roads.

Truck provided by DA

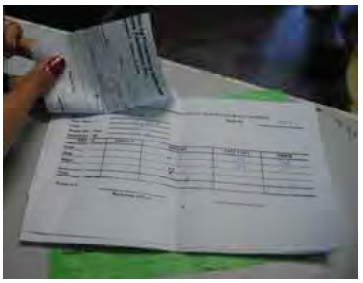
Extension – free seminars are being conducted quarterly, at the same time that the General Assembly of the members is being held. These seminars are usually being provided by private companies (seeds, pesticides, fertilizers, etc.) and Local Government Units (MAO and PAO).

Crop Production Loan – the Center also provides loans for its members at low interest rates (1% per month). This service is being extended in order for farmers to have another choice instead of borrowing money from lenders or traders. Loans are always provided in kind, in the form of seeds, pesticides, fertilizers, and tools that can be used for production. Payment is given at harvest period. Once a farmer brings his crops to the center and receives payment, a 70-30 division is being used. The farmer, who for instance sold PhP 1000 worth of tomatoes, takes home 70% of the total payment (PhP 700) while the 30% (PhP 300) will be left to the Center as payment for his loans. This division will continue until he has completed the total loan amount plus the 1% interest rate.

Actual Trading Activities – Members:

Farmer and Marketer/Center – Selling and Payment Process:

1. Farmer brings his products to the receiving area or pick-up point (for truck pick-up)
2. Marketer receives the product: (a) fills out the stub (name of farmer, date received); (b) evaluates quality (good, standard or rejected); (c) weighs and records the product's volume
3. Farmer agree to classification and weight, affixes his signature
4. Marketer affixes his signature
5. Farmer receives original of stub (without price) then heads home; Marketer keeps copy of stub and adds price after being sold.
6. At the end of trading day, the Marketer turns over the stub with the GSR (good, semi-good, rejected) form
7. Farmer returns to Center one or two days after to claim payment for his products from the Cashier (farmer payments)



GSR form for processing of farmers' payment

a. Farmer presents stub to the Cashier

b. Cashier gives waiting number to the farmer

c. Cashier checks the GSR form (or forms for farmers who accumulates many transactions before deciding to claim) and stubs for volume and prices

d. Transactions in the GSR forms are encoded to the farmers' transaction records (Excel spreadsheet)

e. Accounting issues cash voucher that lists the total amount to be paid and deducted (handling fee of PhP 0.50 per kilo and loan repayment, if any) for the farmer

f. Cashier pays the farmer based on the cash voucher

Marketer/Center and Trader – Buying and Payment Process:

Product prices are posted on the board daily based on prices in Balintawak and Divisoria Markets (two of Metro Manila's biggest wholesale trading market). Pricing decision, whether to increase or decrease the base price, is based on current demand and supply situation (i.e. marketer may sell string beans at higher price if there is limited supply and too many traders wanting to buy). In such cases, a quick auction or bidding for the products might be conducted.

1. Marketer sells the product to the trader. In a piece of paper, marketer writes down the (a) Date of transaction; (b) Name of Trader; (c) Type of Crop; (d) Name of Farmer from whom the product came from; (e) Volume (kilos) of products bought; (f) Price for the product per kilo
2. Marketer submits the piece of paper to the Cashier (trader payments).
3. Cashier creates a "Withdrawal Receipt" for the Trader, lists all products bought by the trader in the day. Entry includes (a) Quantity and Unit (kls, pcs, bag); (b) Type of Crop; (c) Name of Farmer; (d) Price of Product; (e) Total.
4. At the end of his transactions, the trader pays the cashier for all the commodities he bought within the day. Four copies of the receipt is made—one for trader, one for cashier (trader payments), one for the Cashier (farmer payments) and one for the Accounting.
5. At the end of the transaction day, the Cashier (trader payments) turns over the amount paid for commodities traded for the day and the two copies of receipts for the Cashier (farmer payments) and Accounting sections.

Center and Institutional Buyers – Selling, Shipping and Payment Process:

The Center, as a group, can enter into contracts and agreements with institutional buyers or directly to supermarkets or ingredients to food chains, restaurants and hotels.

1. Center and Buyer agrees to a contract price, volume and date of pick-up or delivery (usually on a daily or every other day basis)
2. Center encourages or closely monitors the production of the ordered commodity in order to meet the agreed upon demand
3. Ordered commodities, upon delivery of farmers to the center or pick-up from farms, are stockpiled and not marketed/sold to local traders. The Center prioritizes the fulfillment of the outside order for three reasons: 1) this ensures that the farmers' produce will be sold; 2) after satisfying the order, the lower supply of commodities and still high demand will increase its market price, giving more benefit to the farmers; 3) traders and wholesalers can still buy from the non-members of the Center.

Payment options can be arranged depending on Center-Buyer relationship (trust and payment track-record basis). A 7-day payment arrangement is usual for new buyers while 15-30-day terms can be offered to established buyers. Payment will be issued 7, 15 or 30 days after the bill has been sent by the Center (i.e. February 1-7 sales cut off on February 7. Bill issued on February 7. Payment will be on February 14 for 7 days, February 22 for 15 days, and March 13 for 30 days). The Center, however, limits the number of 15-30 day payment agreements due to financial liquidity issues (i.e. payment of farmers need to be made a day or two after products were delivered or bought).

4) AgriPinoy Trading Centers

To complement the MFTs and BFTs in major producing areas for agricultural crops, livestock and fisheries, AMAS has indicated that several modern trading and processing facilities has been lined up for under the current Aquino Administration (2010-1016) through the AgriPinoy banner program of the DA.

One of which is the Benguet AgriPinoy Trading Center (BATC) in the Cordillera Administrative Region. Funded by the Government of the Philippines, the construction for the new state-of-the-art trading and processing complex is already underway at a four-hectare lot within the compound of the Benguet State University. In addition, the Korea International Cooperation Agency (KOICA) is also extending a USD 2.5 million grant for the building of a modern vegetable processing plant.

Upland Vegetable Trading Center in Benguet, CAR

Once completed, the BATC will have three buildings for product trading, cold storage facilities, waste treatment plant, dormitory and lounge, commercial spaces, a bank, administrative and farmer cooperatives' office, and parking spaces for vans and delivery trucks, not to mention the vegetable processing plant. The BATC is being set up to complement the old vegetable trading center in

Benguet and to reduce the layers of middlemen in the marketing system.

Apart from the BATC, there are nine additional areas where similar facilities have been lined up for development (see Table 2.4.2 for initial list). Moreover, AMAS is continuously exploring other strategic locations wherein modern marketing facilities can be set up in partnership with LGUs and farmers' cooperatives or associations.

Table 2.4.2 List of Additional Areas

Location	Focus Commodity
Benguet	Upland vegetables
Nueva Vizcaya	Upland vegetables
Isabela	Lowland vegetables
Nueva Ecija	Lowland vegetables
Pangasinan	Vegetables and aquaculture
Camarines Norte	Vegetables and livestock
Iloilo	Livestock and fishery products
Cebu	Fishery and Processed Fruits
Cagayan de Oro	Grains, fruits and vegetables
General Santos City	Marine and aquaculture products

Source: Maunlad na Agrikultura Vol 2 No 7-2012

CHAPTER 3 CURRENT SITUATION OF ICT UTILIZATION

3.1 ICT Utilization

3.1.1 Communication Circumstance

1) Fixed-Line Phone

Despite the effort of the government, the penetration rate of fixed-line phone in the Philippines remained at 4% until 2008, and now it is starting to decline. The reason for this situation is due to the geographic factor (as the country is comprised of more than 7,000 islands), high phone call charges, and spread of mobile phone as the alternative to fixed-line phone.

In the Philippines, there are 70 local exchange operators, 13 inter-exchange carriers and 11 international carriers accredited as the fixed-line telecommunications carriers. PLDT (Philippine Long Distance Telephone Company), which is the Philippines' largest telecommunications company, occupies the majority of the market share - 53.1% (NTC 2010). In rural areas where private companies cannot expect the profit, the government agency TELOF (Telecommunications Office) provides the public telecommunications services.

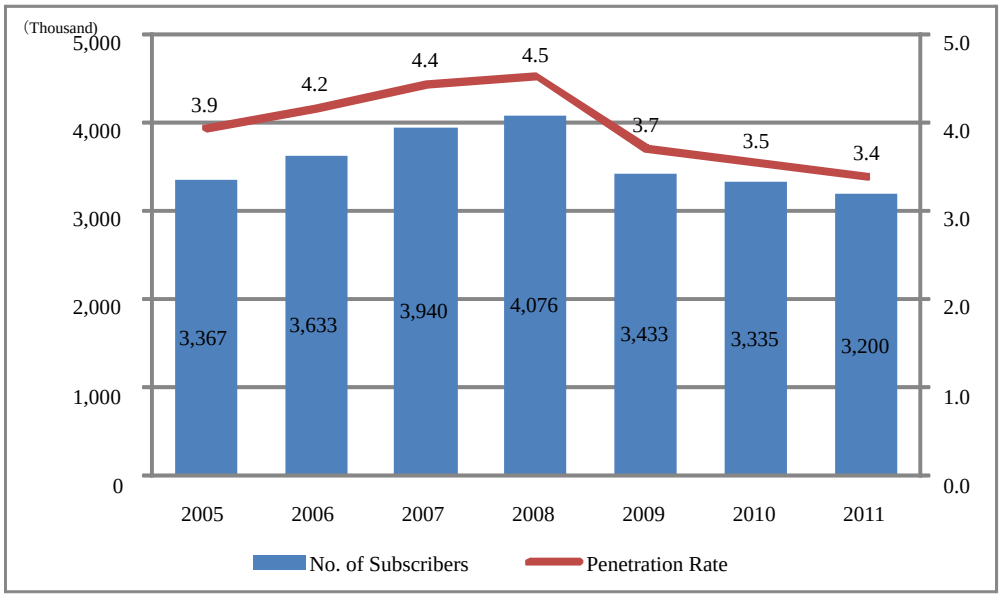


Figure 3.1.1 Transition of Fixed-Line Phone

Source: ITU Statistics for 2005-2008, NSO Report for 2009, NTC Report for 2010, BuddeComm Estimation for 2011

The "last mile access" problem is also one of the barriers for the popularization of fixed-line phone. The "last mile access" is the final leg of delivering connectivity from a telecom company to a customer. However, the actual distance of this leg may be more than a mile, especially in a rural area. This fact reflects the relatively high cost and blocks the reach of the connection of fixed-line to home.

To solve this problem, the wireless landline service was developed. The wireless landline service uses a wireless network instead of wired-line for the last mile access. It is similar to the mobile phone service except that the available area is limited. Additionally, the phone call charge is

cheaper than that of mobile phone service.

2) Mobile Phone

In 2010, the number of mobile phone subscribers reached approximately 83 million and its penetration rate was over 88%.Furthermore, in 2011, its number and penetration rate was estimated at 92 million and 98% respectively.

The population coverage rate of mobile phone service areas reached 99% therefore most people live in serviceable areas (WB 2009). One of the reasons for this explosive spread is that the prepaid plan offers affordable charge rates for low-income people. In addition, the wireless network can be built at a low cost and in a shorter time compared with fixed-line network which is costly and time-consuming.

The top carrier is Smart Communications, a member of the PLDT group, with a market share of 53.7%. Following Smart Communications is Globe Telecom with 31.9% (NTC 2010). In the Philippines, although the GSM phone which uses the 2G (2nd Generation) wireless telephone technology is still in the mainstream, the 3G (3rd Generation) license is issued to the four telecommunications carriers, namely: Smart Communications, Globe Telecom, Sun Cellular and Red Mobile in 2005, so now the 3G service is available for all carriers.

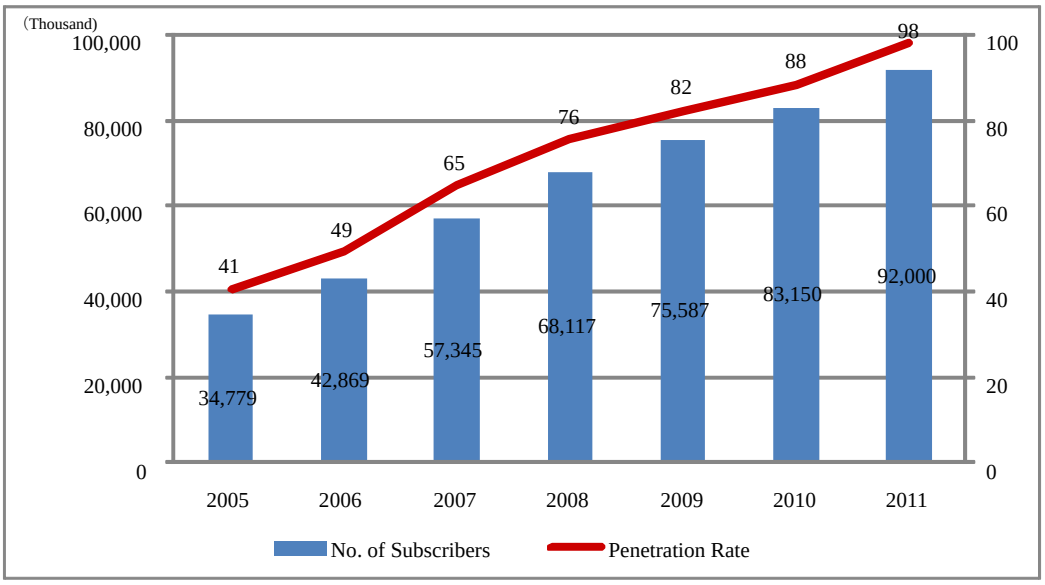


Figure 3.1.2 Transition of Mobile Phone

Source: ITU Statistics for 2005-2009, NTC Report for 2010, BuddeComm Estimation for 20111

3) TV / Radio

In the Philippines, there are 352 TV stations, 988 CATV networks, 393 AM stations, and 781 FM stations (NTC 2010).

Television is the most popular medium nationwide. The percentage of households with television in the Philippines is 94% (Nielsen 2010). Television is the preferred mass media channel,

since it has overtaken radio as the media channel in providing knowledge and information. A study conducted in 2010 also revealed that TV was regarded as the primary source of news and information compared to radio and newspaper.

Radio is the most widespread and cost-effective media in the Philippines and reaches 98.5% of the population. About 86% of households nationwide own radio sets.

4) Internet and Broadband

The number of internet subscribers nationwide is 4.3 million in 2010 and its rate among 100 inhabitants is 4.6, while the number of broadband subscribers is 3.6 million and its rate is 3.8. The rate of internet subscribers remains at low levels because of the lack of the fixed-line network facilities, high charge rates and the low ownership rate of computers. However, wireless broadband networks like 3G data communications and WiMAX are becoming widespread, and the cutting-edge LTE (Long Term Evolution) is on beta testing in Metro Manilla. In addtion to that, high speed internet services provided by cable TV companies like SkyCable is already available.

The number of ISP (Internet Service Providers) is increasing year by year, and it reached 304 in 2010 (NTC 2010).

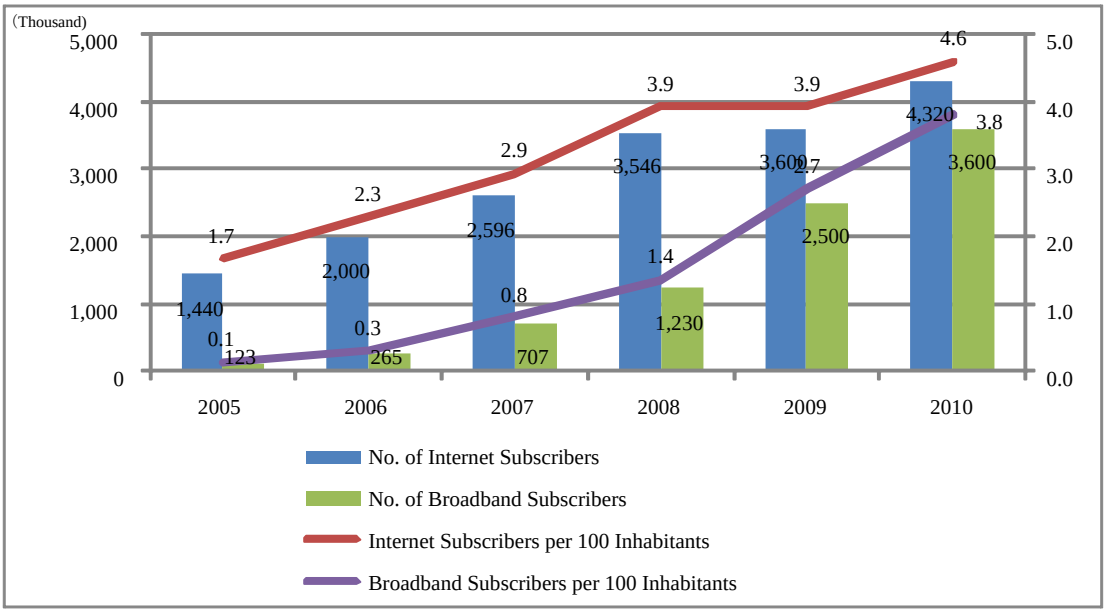


Figure 3.1.3 Transition of Internet and Broadband

Source (Internet): ITU Statistics for 2005-2009, NTC Report for 2010

Source (Broadband): LIRNEasia for 2005-2006, JICA Survey Team for 2007-2008, Globe Report for 2009- 2010

On broadband services, the number of wireless subscribers exceeded the fixed subscribers in 2008 and still shows rapid increase in the recent year. Wireless broadband services contribute to the widespread of broadband users; currently at 71% of total broadband users.

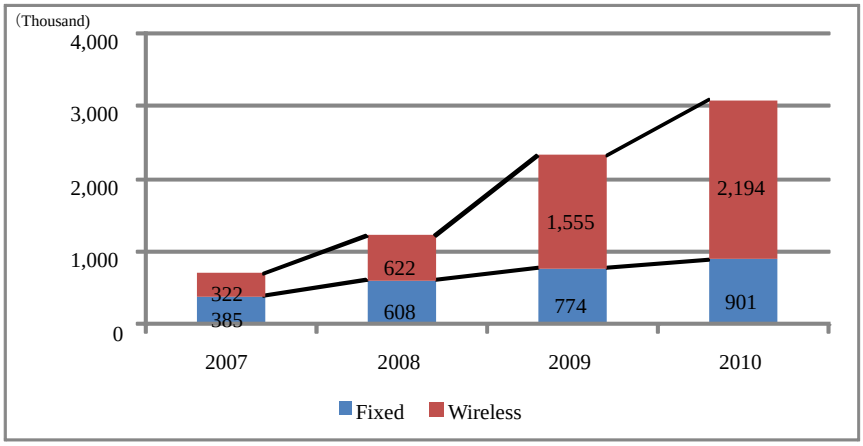


Figure 3.1.4 Growth of Broadband

Source: PLDT & Globe Report (2007-2010)

The internet user includes not only internet subscribers but also persons who can access the internet using family-owned computers and persons who does not have internet-accessible computer but can use internet at an internet café, office, school, etc.

The number of internet users is 29.7 million and its penetration rate per 100 people is at 29.7%. The growth rate of internet users is more rapid than that of internet subscribers. From the survey report, 74% of school children have experience in using the internet. In addition to the gaining popularity of wireless broadband services, the young generation also plays a key role to boost internet usage.

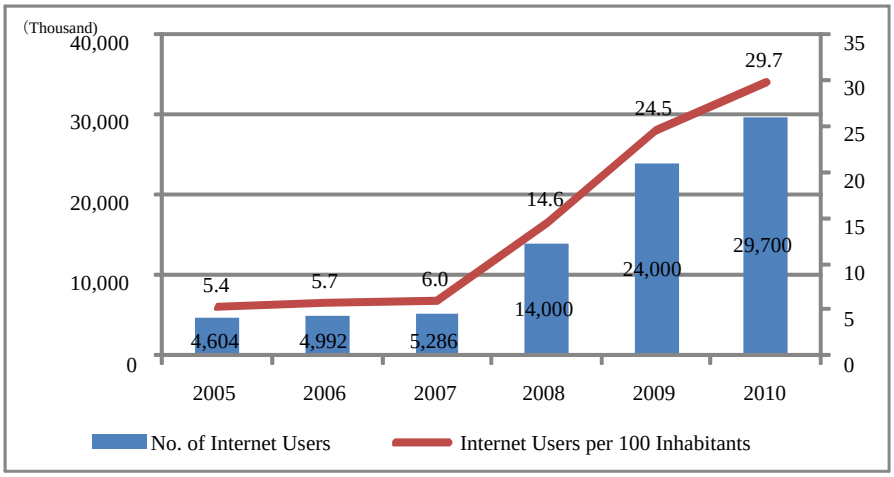


Figure 3.1.5 Transition of Internet Users

Source: ITU Statistics for 2005-2007, Internet World Stats for 2008-2010

5) ICT Services

5.1) SMS (Short Message Service)

About 1.8 billion SMS were sent daily in the Philippines (2009), making it the largest SMS volume in the world. This definitely characterizes the ICT services in the Philippines. However, the

internet SNS (Social Networking Service) is becoming popular in the recent years and SMS is gradually losing that volume.

5.2) SNS (Social Networking Service)

SNS is becoming bigger and bigger in Philippine society. The number of Filipino Facebook users is about 27.0 million as of December 2011, which makes it No. 8 in the ranking of Facebook users by country (in reference, Japan has 5.2 million number of users). The number of Filipino Twitter users is about 4.0 million and it's ranked at No. 8 worldwide.

The number of Facebook users is remarkably increasing and was recorded at 18.9 million in 2010 compared to 8.4 million in 2009, while the SMS volume declined from 1.8 billion/day in 2009 to 1.3 billion/day in 2010.

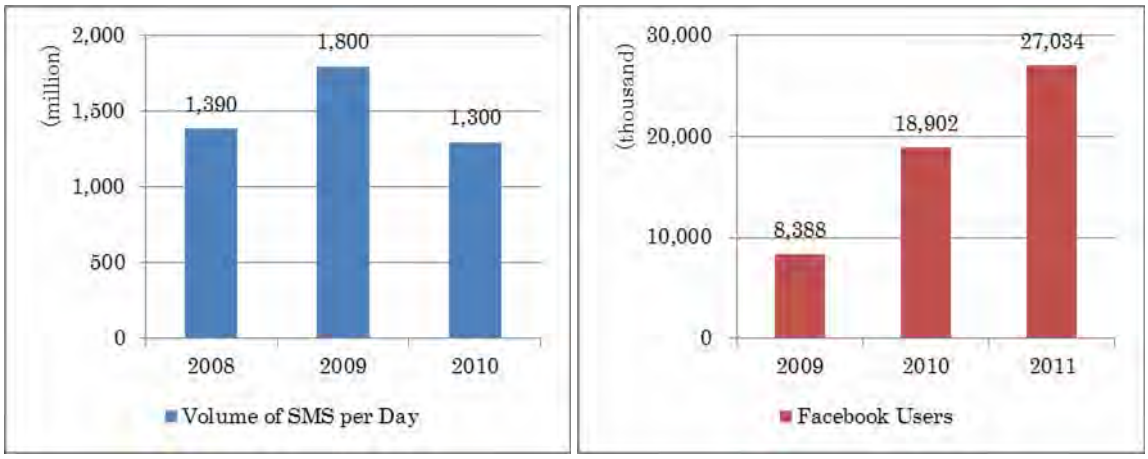


Figure 3.1.6 SMS vs. SNS

Source (SMS): Research and Markets for 2008- 2009, ABS-CBN news for 2010
Source (SNS): Facebook

5.3) Mobile Money Service

In the Philippines, the mobile money service enables money transfer and micropayment via SMS by crediting electronic money into the mobile phone account. This service provides very simple and easy access to money transfers and payments for the low-income person who doesn't have a bank account, OFWs (Overseas Filipino Workers) and people in the rural area who don't have banks and ATM in their community. The mobile money service offers the following major services.

- ✓ Money transfer locally or from abroad
- ✓ Cash-in and Cash-out over the partner's counter (Electronic Money Issuer or EMI)
- ✓ Phone-to-Phone money transfer
- ✓ Purchase prepaid load for self or for others
- ✓ Shopping using mobile phone
- ✓ Payment for public utility fees, tuition fees, and others
- ✓ Loan payment and insurance payments
- ✓ Donation to charities

5.4) Online Shopping

The rate of online shopping users among the internet users in the Philippines is only 3%. Only a few Filipinos access and use online shopping or C2C (Consumer-to-Consumer) sites like eBay and international B2C sites like Amazon, while local B2C (Business-to-Consumer) e-Commerce sites target OFWs/Filipinos abroad. In general, online shopping is a relatively new concept among Filipinos. Additionally, many online shopping users don't have credit card or they prefer to pay cash on delivery, bank deposits or mobile money payment.

5.5) Trend of Internet Services

Figure 3.1.7 shows how internet users act on the internet - the percentage of internet activities such as SNS, Twitter, news, general health info, sensitive health info, file sharing, blog, online games and online shopping.

The most remarkable volume is from SNS users which is represented by Facebook. Most internet users use Facebook to communicate with their friends.

Another interesting point is with regards to online shopping. The rate of online shopping in rural areas is three times higher than in urban areas. This fact indicates the potential demand of the rural people to overcome the distance disadvantage by using ICT.

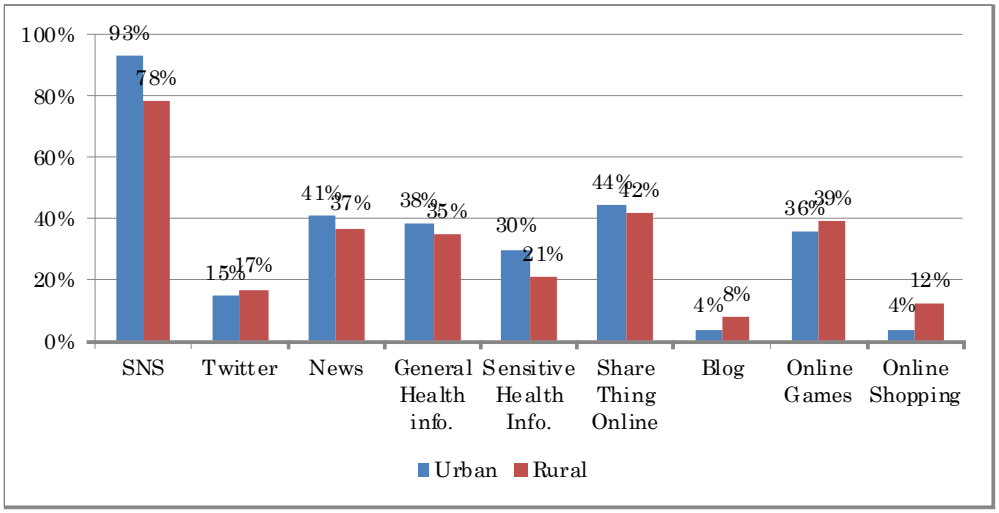


Figure 3.1.7 Trend of Internet Services

Source: SWS Survey (2006-2011)

6) ICT Literacy

ICT literacy strongly depends on an individual's circumstance and backgroud like education level, socio-economic status, role in society, residential location, and others. Therefore, the survey to obtain the ICT background in the Philippines in terms of area-specific and socio-economic aspects was conducted (SWS 1997-2011).

The following are the ICT background survey results regarding the penetration of computers

and internet connection considering area-specific and socio-economic aspects.

Figure 3.1.8 and Figure 3.1.9 show the percentage of households with computers and internet connection. The percentage of households with computer ranged from 6% in 2005 to 12% in 2010 and the percentage of households with internet connection ranged from only 2% in 2005 to 6% in 2010. In terms of locality, , computer ownership is three times more in urban area than in rural area and the ratio of having internet connection is five times more in urban area than in rural area.

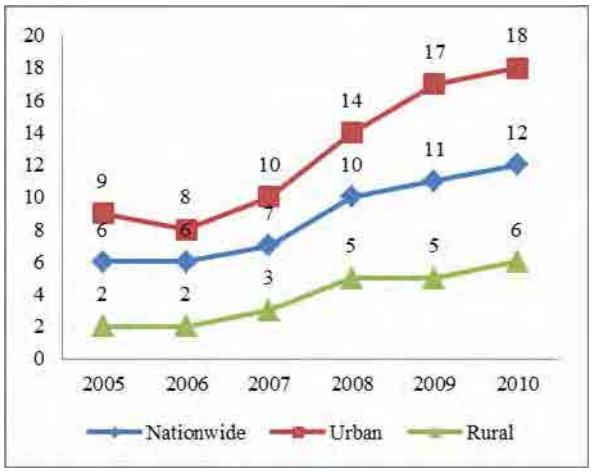


Figure 3.1.8 Rate of Households with Computers

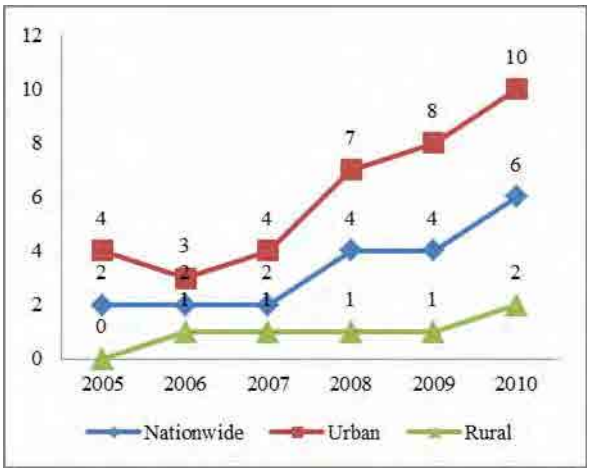


Figure 3.1.9 Rate of Households with Internet Connection

Figure 3.1.10 and Figure 3.1.11 show the percentage of households with computers and internet connection in terms of social-economic status. This survey divided the population into four socio-economic classes: the rich class AB, the middle class C, the poor D, and the very poor E. Per standard practice of the research agency, the rich AB and the middle class C are combined as middle-to-upper class ABC.

By socio-economic class, the disparity of computer ownership is more remarkable. Forty-three percent (43%) of households in class ABC own a computer, almost three times than the combined percentage of households in classes D and E. With regards to internet connection, 29% of class ABC is subscribed to the service, while 6% of class D and only 1% of class E have it. Especially for class E, the penetration of internet connection was zero until 2009.

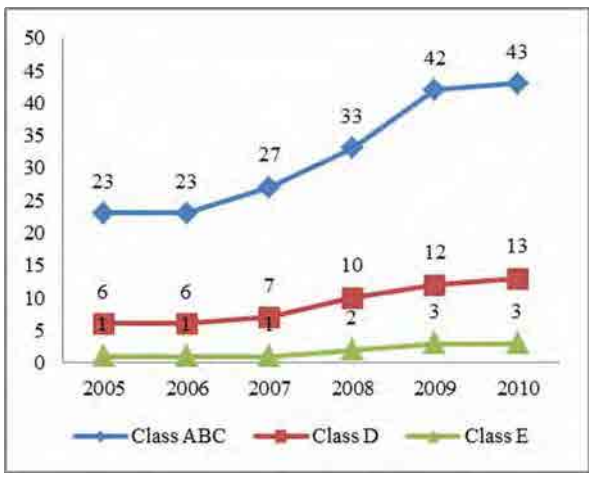


Figure 3.1.10 Rate of Households with Computers

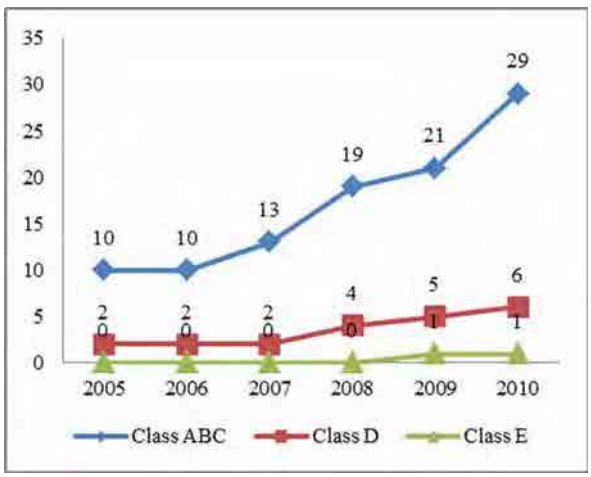


Figure 3.1.11 Rate of Households with Internet Connection

3.1.2 ICT in the National Development Strategy and Agricultural Development Strategy

1) ICT in the National Development Strategy

1.1) Philippine Development Plan (PDP) 2011-2016

In the Philippine Development Plan (PDP) 2011-2016, a number of perennial issues and problems affect the Philippine ICT sector.

a) Challenges in communications and information access and services, i.e. coverage, penetration, and diffusion of Internet and broadband
b) The legal and regulatory environment may not be consistent, transparent and conducive for investments in ICT infrastructure
c) Insufficient infrastructure support for e-Government system

To address the abovementioned issues, the government aims to implement the following plans and strategies.

a) Provide fast, reliable and affordable access to communication

1. Collected SUFs from telecommunication operators can be used to build an ICT infrastructure that will create a Universal Access and Service Fund. Part of this fund may used to grant subsidies for prospective private operators to invest in the remote areas of the country. The fund may also be allocated for developing different broadband needs of the public and for ICT awareness and capacity-building activities.
2. Establishment of a Community e-Center (CeC) in every barangay. Although CeCs are already present across the country, the government will assist in sustaining these existing CeCs and will further expand to cater to rural and un-served areas.
3. Implement policies for a secure and confidential information within a network and the transmission infrastructure by improving the country's cyber-security capabilities against threats and damages. There should also be a pool of experts in government agencies to provide technical assistance and prevent possible recurrence of cyber-security issues and threats.

b) Create an enabling environment through legal, regulatory and policy reforms to attract and sustain private sector investments in ICT infrastructure development

1. Establish the Department of Information and Communications Technology (DICT) (via the "DICT Bill")
2. Strengthening of the National Telecommunications Commission (NTC) through the "NTC Reorganization Bill".
3. Competition Policy for the ICT Sector.
4. Reassessment of Republic Act No. 7925 or the "Public Telecommunications Policy Act of the Philippines, 1995".
5. Convergence Bill / Information and Communications Policy Act.

6. Frequency Spectrum Management.
7. Intellectual Property Rights (IPR) Reform.
8. Digital Terrestrial Television (DTT) Broadcasting switchover
9. "Green ICT" Policies

c) Enhance e-Government systems to achieve increased government transparency, efficiency and trust.

1. There should be an adequate and effective ICT infrastructure support for a more reliable exchange and processing of data across different agencies through an e-government portal. This portal will also include an online payment facility for financial transactions. The government will be capable of a fast delivery of services, either electronically or directly to the public.

1.2) Philippine Digital Strategy (PDS) 2011-2016

The Philippine Digital Strategy (PDS) 2011-2016 is an ICT roadmap which is national in scope. Since there is hardly any social or economic sector that is not tapped either directly or indirectly by ICT, the PDS looks at how ICT can be used to transform the government and fight corruption, empower citizens and fight poverty through education. It can also be utilized to improve economy, employment, industries and small businesses for national development.

PDS has a vision of "A digitally empowered, innovative, globally competitive and prosperous society where everyone has reliable, affordable and secure information access in the Philippines. A government that practices accountability and excellence to provide responsive online citizen-centered services. A thriving knowledge economy through public-private partnership."

Current scenario of ICT in the Philippines ia summarized based on the SWOT analysis as shown in Table 3.1.1.

To address various issues and concerns based on the above scenario, PDS defines four strategic thrusts as follows:

1. *Transparent Government and Efficient Services:* An ICT-enabled transparent government will empower citizens and stakeholders and allows them to have secure electronic transactions and access to information and services anytime, anywhere. First key action for this thrust is the creation of Chief Information Officer (CIO) for both national and local government. Another is the establishment of a government ICT infrastructure system to upgrade and improve ICT-related government procedures and e-services. A reliable e-Government data center will also be utilized for information sharing among agencies and provide accessible data to the public. Development of Information Systems Strategic Planning for NGAs and LGUs can enhance organizational and personnel issues for better operations and public service delivery. Use of GIS technology and maps will also improve and address tax collection, land, use and climate change issues.

Table 3.1.1 SWOT Analysis of ICT Sector

	STRENGTHS	WEAKNESSES
INTERNAL	✓ New government poised for change ✓ Maintained digital economy ranking ✓ Very high mobile phone penetration ✓ Good fibre-optic backbone infrastructure ✓ Large English-speaking and tech-savvy population ✓ Strong competitive IT/BPO sector ✓ e-Government Fund to fund inter-agency ICT projects ✓ Gender Advocacy and Development Fund – for use by NGAs and LGUs for ICT and gender development projects	✓ Concentrated telecom market, limited competition ✓ Low broadband penetration & limited service provision throughout the country ✓ Low government spending on Education in the past ✓ Insufficient ICT training and skills ✓ Drop in e-Government ranking & lack of coordinated, cross department e-Government services ✓ Low ranking in ease of doing business ✓ Limited local content available ✓ Lack of high-level ICT leaders in government ✓ Lack of standards on interoperability and ICT resource sharing ✓ Lack of transparency in government
	OPPORTUNITIES	**THREATS**
EXTERNAL	✓ Technology advances that support cost-effective broadband coverage ✓ Web 2.0 and cloud computing ✓ Strong global growth of BPO/ICT sector ✓ Greater access to information, knowledge, services and applications through internet access ✓ Strong support from private sector, civil society and government at the local level ✓ Support from international and global partnerships	✓ Strong global competition ✓ Rapidly changing technology – risk to procure ✓ "Wrong" technology, quickly outdated, cost implications ✓ Slow economic development

2. *Internet Opportunity for All People:* Crafting and implementing a national broadband policy will improve digital literacy and competences and reduce geographical divides. Availability of an efficient and affordable broadband service and sustainable publicly shared internet access will enhance internet accessibility for people of all gender, social standing and abilities. Implementing online security measures and modernizing of ICT laws, policies and institutions will ensure users of a reliable and secure ICT infrastructure for a safe online experience.

3. *Investing in People: Digital Literacy for All:* Developing national standards and indicators on digital literacy will create a competent, confident and responsible culture. The government will initiate reforms in the educational system to enhance the quality and delivery of education using ICT. Improving the capacity of government workforce will enable them to effectively develop and manage ICT infrastructure and system. Enhancing ICT entrepreneurship can also be accomplished by developing the skills of

techno-preneurs to be globally competitive. The government will also address ICT literacy and competency needs of special sectors and strengthen its initiatives to develop and promote the culture, arts, history, public health, and other socio-economic concerns of the country. This will increase appreciation and responsive use of ICT by the citizenry.

4. *ICT Industry and Business Innovation for National Development:* The government will support micro, small and medium businesses to become more productive, innovative and globally competitive by providing them knowledge and tools to incorporate ICT in their sector, thereby improving business opportunities. Creating a viable environment for the ICT and ICT-enabled industry, especially in the regions, and promoting it to attract more businesses and investments for research, development and manufacturing will also increase employment opportunities and ICT innovations and commercialization.

2) ICT in the Agricultural Development Strategy

PDP 2011-2016 also described recommendations of ICT utilization in the agricultural sector.

Innovative mobile applications for market price and transaction platforms, agriculture value chain automation, micro-insurance for crops and other examples, have been shown to increase the productivity and income of rural farmers, fisheries and other agricultural activities.

One of the challenges in this sector is that there is a scarcity in long term investments in agriculture like RD&E (Research Development & Engineering), infrastructure and support services. Commodities with competitive advantage are also insufficient. Moreover, extension service is weak and there is a conflict in rice marketing policy.

Market development and regulation that is linked with RD&E and supported by an efficient physical and institutional environment will translate to increase in productivity. Enhancements in yields will make agriculture and fishery products more competitive, contributing to the growth of the economy. Raising the productivity and income is an important factor in modernizing the sector.

1. *Market Development and Regulation:* The implementation of an effective support and information system for product development, market intelligence and promotion activities is the plan’s endeavor. Regulatory competence through training and modernizing of laboratories and equipment should also be considered.

2. *RD&E:* To formulate a responsive national RD&E outline, reliable databases which will also include integrated mechanization projects of different NGAs and LGUs should be available. With an efficient database and information structure, increase in investments that will benefit RD&E programs in promoting enhancements in productivity and development of new technologies will be possible.

3) The Latest Example of the Agricultural Information Support System with the Use of ICT in Japan

The directly operated farms by Japanese company, which has large-scale retail stores, has just started the demonstration experiment of the ICT utilization on the agriculture sector from the aspect of "the visualization of management", "the visualization of production" and the "visualization of quality" on December 2011.

For "the visualization of the management", the employees of the farms record the yield amount of the commodities, shipping data and working data via computers or mobile phones. After that, the farms analyze records and make an appropriate farming plan for maximizing the profit.

For "the visualization of the production", the sensors on the field automatically record various factors such as temperature and precipitation to observe the circumstances. In addition to that, the employees take the photos of the farm field with GPS location data by using the camera-enabled mobile phone to share information and to solve the problems on the field quickly.

For "the visualization of the quality", the farms manage the adaptation to the global Good Agricultural Practice (GAP) as a global standard criteria for the agricultural production to secure food safety.

As the final goal of this experiment, they are targeting the combination of the agricultural information related to consumers, retails, distributions, weather, etc. and the implementation of the integrated data analysis and application.

Figure 3.1.12 Concept image of the project

3.1.3 Law and Institution

1) Public Telecommunications Policy Act (RA 7925)

This law was enacted in March 1995 and defines the criteria of issuing the operation license to the pubic telecommunication entities, their obligations and so on. This act promotes to join the new business entities into the telecommunication service market.

2) Service Area Scheme (SAS)

The Government of the Philippines implemented SAS in July 1993 by Executive Order (EO) 103 in the aim of developing the network of the fixed-line telephone in the country. Attached with Public Telecommunications Policy Act in 1995, SAS obligated both the new international carriers and the new mobile communication carries to set up the certain amount of the fixed-line in allocated areas.

3) Electronic Commerce Act (RA 8792)

This law was enacted in July 2000. The objectives of this act are to promote the electronic transactions and to protect it. In addition, it established the penalties against illegal access, distribution of computer viruses and illegal copy.

4) General Appropriations Act - Establishment of e-Government Fund (RA 9206)

The e-Government fund was established as an alternative funding source for mission-critical, high-impact, and cross-agency ICT projects.

5) Guidelines for the Protection of Personal Data in Information and Communications System in the Private Sector

In July 2006, the Department of Trade and Industry (DTI) issued the guidelines to protect the personal data, which was not included in RA8792. However, the DTI Administrative Order has limited enforceability and is therefore considered as a provisional action to protect personal data.

6) Reorganizing, renaming and transferring the CICT to DOST (EO 47)

In June 2011, the President of the Philippines issued the order regarding “Reorganizing, renaming and transferring the CICT to DOST”. The CICT (Commission on Information and Communications Technology) was renamed the Information Communications Technology Office (ICTO) and was placed under the policy, technical and administrative supervision of DOST (Department of Science and Technology). The NCC (National Computer Center) and the TELOF were also transferred to DOST and will form part of the internal structure of the ICTO.

This order aims to strengthen the alignment of ICT development with the thrust of the department to provide continuing innovation as the core of the sustained global competitiveness of ICT industry.

7) Cyber-crime Prevention Act (Bill)

The Cyber-crime Prevention Act is still under discussion in 2011. If passed, this act will define hacking, impersonation, phishing, Denial of Service (DoS) attack and so on, which is not included in the Electronic Commerce Act. It will also regulate the penalties against such kinds of cyber-crimes as well as the establishment of National Cyber Security Office.

8) Data Privacy Act (Bill)

The Data Privacy Act is also still under discussion in 2011. If passed, this act will regulate the procedure regarding the collection of personal information to be stored in ICT system of the government and private entities as well as the usage of this information.

9) Freedom of Information Act (Bill)

This act will implement the right of the people to information on matters of public concern. It will adopt and implement a policy of full public disclosure of all its transactions involving the public interest, subject to procedures and limitations provided by this Act. This right is indispensable to the exercise of the right of the people and their organizations to effective and reasonable participation at all levels of social, political and economic decision-making.

10) Creation of Department of Information and Communication Technology (DICT) (Bill)

The House of Representatives of the Philippines passed on final reading of the bill of creating the DICT on December 2011. The purpose of the DICT creation is to develop and implement policies and government programs that would boost and improve the country's competitiveness in the IT field.

The DICT is expected to provide strategic, reliable and cost-efficient citizen-centric ICT infrastructure, systems and resources, and will seek to accelerate the convergence of ICT facilities, such as the development of networks, ensuring access and high-speed connectivity at fair and reasonable costs, including areas not adequately served by the private sector.

3.2 ICT Current Utilization in Agriculture

3.2.1 General

This chapter discusses current situation of ICT utilization in agriculture sector in Philippines including programs/projects in planning stage. The information and data concerning ICT program/project in the Sector are provided mainly by the Department of Agriculture (DA), and its attached agencies and bureaus such as the National Irrigation Administration (NIA), Agricultural training Institute (ATI), Philippine Rice Research Institute (PhilRice), and so on.

According to the information, it is observed that various agencies listed above provide several kinds of agricultural information services for farmers. Most of these services are being made in the purpose of delivering information from these government agencies to farmers. On such services, flow of technical information is limited on a one-way basis only, and not many services are designed for interactive communication, such as obtaining feedback from users to reflect in the improvement of services.

Table 3.2.1 Program/Project of Agri Info Support and Administrative Service by the Use of ICT

(as of December 2011)

Sub-sector	Agencies concerned	ICT Program/Project	Contents, Other info
Irrigation	NIA-MID (Management Information Division)	Information Systems Strategic Plan 2011-2013 (ISSP 2011-2013)	・ NIA has a strategic plan to unify existing computerized system on eight major mandates. ・ Proposal formulated by NIA-MID has been in process to be approved by NCC (National Computer Center).
Irrigation	NIA-MID	Irrigation Service Fee Computerized Billing and Collection System	・ This is computerized system in terms of billing and collecting ISF for NIS, which was established by MID. ・ A series of trainings to billing clerk has started since 2009, and then 11 regions have finished so far. ・ The regional office with trained staff has started to encode paper-based data into computer. ・ The system is in operation as stand-alone (NIS/IMO basis). NIA plans to establish a Web based network as a part of ISSP 2011-2013.
Agriculture Extension	DA-ATI	NMRice (Nutrient Manager for Rice)	・ This is an agricultural information service system providing fertilizer application guides. ・ IRRI and PhilRice developed a database and ATI takes charge of extension. ・ There are types to access: CD, Internet and Mobile phone. ・ Access through internet is limited because farmers are still not yet familiar with management of internet. ・ Mobile phone access is complicated for some farmers due to a number of questions and limited time for answering. ・ Completed calls (Q&A) is at below 20%, but ratio has improved due to decrease of the question and face-to-face orientations done by ATI and LGU ・ Agricultural extension workers apply the system by using CD for their PC. ・ There are positive reactions of users of the system due to reduction of amount of fertilizer and constant yield even if weather is not so well.
Agriculture Extension	DA-ATI	e-Extension	・ e-Extension is generic name of project to utilize ICT on agricultural extension field. ・ This consists of e-Learning, e-Farming and e-Trading. ・ http://www.e-extension.gov.ph/
Agriculture Extension	DA-ATI	e-Learning	・ e-Learning is one of the components of e-Extension. ・ This provides training contents by using rich media contents like photos and video. ・ Composition of students is agricultural extension workers (AEWs) (80%) and others (20%) composed of retirees, Overseas Filipino Workers (OFWs), progressive/educated farmers, and university students. ・ The program utilizes SMS, Facebook SNS, Twitter SNS and YouTube. ・ http://e-extension.gov.ph/elearning/

Sub-sector	Agencies concerned	ICT Program/Project	Contents, Other info
Agriculture extension	DA-ATI	FCC (Farmers' Contact Center)	・ FCC is one of the components of e-Extension. ・ The service is for Q&A in terms of agricultural farming with users texting or calling from anywhere in the country. There are 3 out of 10 seats occupied in ATI call center. ・ There are three ways to access the service: toll-free fixed-line, SMS (Short Message Service) and e-mail. ・ The users are mainly farmers. ・ For simple questions, the operators give their answer directly to texter/caller. For FAQs (Frequently Asked Questions), the operators can refer to the answers previously provided by the FCC. ・ FCC has an average of 100 experts per region in whole country, responding to specific and/or advanced questions. ・ http://www.e-extension.gov.ph/efarming/
Agriculture Extension	DA-Regional Field Unit (RFU) VI	School on the Air	・ This is a distance learning program by using radio broadcast for farmers. ・ Topics usually vary yearly and completion test (post-test) is required among students. ・ There are 700 graduates in 2011.
Marketing	AMAS (Agribusiness and Marketing Assistance Service) and ITCAF (Information Technology Center for Agriculture and Fisheries)	AFMIS (Agriculture and Fisheries Market Information System)	・ This system posts public marketing price on Web for select major markets. The data is collected regularly by AMAS staff by using mobile phone. ・ The system has started its services since July 2010 and covers more than 40 major markets in the country. ・ ITCAF has provided Nokia E71 (smart phone) for the DA staff engaged in the system. The fee is P100/month with 24-month contract. The line can be from Smart or Globe. ・ The service is positioned as e-Trading program conducted by ATI. ・ http://afmis.da.gov.ph/index.php/home.html
Others	ITCAF	UEGIS (Unified and Enterprise Geospatial Information Systems)	・ The program aims to strengthen capacity of policy decision-making and its implementation on agricultural sector by introducing GIS (Geographical Information System). ・ The program includes GIS database, National Farmers' Registry System (NFRS), Inventory System of Agriculture & Fishery Investments (ISAFI) and so on. ・ This has been launched since 2011. Purchasing stages of satellite imagery is in process at present.

3.2.2 Irrigation

1) Current situation of ICT utilization of NIA

As for ICT utilization of NIA, the NIA Website was launched in August 2002, hosted by DA. The Website was developed in-house and is on Stage 3 of the UN-ASPA (United Nation-American Society of Public Administration) Stage of e- Government defined as "Public Act 8792 e-Commerce Law". The Website contains the basic website content prescribed under NCC-Memorandum Circular

No.2001-01 among others. The remaining stages are still for development. Current ICT staff of NIA would need additional training and experience to do the job in-house. Hiring of consultant/developer to do the remaining three stages is contemplated, if fund would be available.

At present, NIA operates 16 Regional Irrigation Offices (RIO), 48 Irrigation Management Offices (IMO), 90 Irrigation System Offices (ISO) and 11 Project Management Offices (PMO). These offices are located in almost all provinces nationwide. Such highly scattered and diverse location presents constraint in data/information collection, dissemination and sharing among the various units including the Central Office.

With the advent of ICT, it offers strategic solution to support the needs of the different operating units in order to improve the agency's operation and delivery of services.

NIA understands effectiveness for possibility/opportunity of ICT as follows:

- The use of ICT in the execution of NIA's mandate from project inception to construction would accelerate completion of projects and benefit the food production program of the government. Through ICT, critical information can reach top management on time for decision making. ICT solutions could be used in project scheduling, program of work, resource allocation and monitoring of status of projects.
- The use of GIS in spatially referenced geographic data is deemed necessary to improve performance of the NISs (National Irrigation System). Improved NIS performance results to the increase in irrigated area, more efficient use of water and higher productivity per unit volume of water used.
- Build-up of database on the history of NIS repair and rehabilitation in digital format would be undertaken to provide reliable information in the preparation of repair and rehabilitation program of irrigation system.
- In view of the thrust of the NIA towards IMT (Irrigation Management Transfer) to IA (Irrigation Associations), the use of GIS would facilitate the determination of accurate boundaries of area to be turned over to the IAs.
- Computerization of ISF billing and collection system is a strategy to improve ISF collection.
- The strategic solutions offered by ICT could also be utilized in Equipment Management, Financial Management and Administrative Services for efficient use of resources and timely delivery of services.
- EO No. 893 promoting the deployment and use of Internet Protocol Version 6 (IPV6) requires that NIA shall comply with the use of internet adopting the IPV6.

2) Information Systems Strategic Plan (ISSP) 2011-2013

2.1) The Plan

In 1994, NIA came up with its first ISSP. This plan outlined the strategies to update, improve and establish information systems for all the aspects of NIA'S Corporate Operations. The latest ISSP approved by the NCC is for the period 2005-2009. NIA has procured the E-1 Broadband Domestic Leased Line to connect NIA to the ASTI-DOST "PREGINET" in Diliman, Quezon City for easy

access to information and data from other agencies and easy submission of electronic documents to and from NIA Central Office.

NIA has also established its website and is now working on creating websites for each regional office. However, much remains to be done. Several more databases need to be established and data sharing linkages need to be studied and reviewed. The ISSP, however, needs to be updated and upgraded in view of the organizational changes in NIA, changes in the business critical strategies and policies and emergence of new ICT technology.

Under circumstances mentioned above, NIA has formulated a strategic plan to accelerate its ICT solution, which is titled as "ISSP 2011-2013". The plan aims at more systematic introduction of ICT to cope with present issues/problems on execution of NIA's mandates, especially on selected eight major functions, and its improvement.

The use of ICT through ISSP 2011-2013 in the execution of its mandate is expected to:

- Accelerate completion of the construction of irrigation projects
- Improve the overall performance of the irrigation systems operation
- Provide reliable information in the preparation and monitoring in the repair and rehabilitation program of the NIA
- Facilitate in the determination of accurate boundaries of areas to be turned over to IAs under IMT.
- Improve ISF collection performance
- Provide strategic solutions in Equipment Management, Financial Management and Administrative Services for efficient use of resources and timely delivery of services.

The proposal of this plan was first submitted in January 2011 to NCC for approval. Since that time, NIA has revised the proposal with minor changes and has been waiting for NCC's acceptance. The summary of NIA's strategic plan of ICT solution is shown below.

Table 3.2.2 Issues/Problems on Major Function of NIA and ISSP 2011-2013 (as of February 2012)

Major Functions	Critical Management/ Operating/ Business Systems	Issues/Problems	Intended Use of ICT
Development of new irrigation projects	Creation of irrigation project proposal	Inconsistent number of pipe-line projects that are ready for implementation	Project Preparation IS; Build-up of basic planning database
Project implementation	Monitoring of status of projects and evaluation of project	Late submission of reports. Delayed completion of project	Project implementation IS: Online submission of reports
Irrigation system operation	Monitoring of ISF and water management activities	No established record of spatially referenced geographic data	Irrigation systems operation IS: Use of GIS database
Repair and management of irrigation systems	Repair of damaged structure and maintenance of facilities	No organized record of repair and rehabilitation of NIS and CIS	Irrigation systems repair and management IS: Build-up of history of NIS and CIS repair and rehabilitation database

Major Functions	Critical Management/ Operating/ Business Systems	Issues/Problems	Intended Use of ICT
Irrigation service fee collection	ISF billing and collection	Delayed preparation and issuances of bills. Low ISF collection efficiency.	Financial management IS: Computerization of billing process
Institutional development	Organization and development of farmer-beneficiaries	Un-updated verification records of IAs boundaries, farm land	Institutional development IS: Use of GIS database
Light and heavy equipment service	Optimum utilization of resources	Delays in relocation of equipment/motor vehicle when needed	Light and heavy equipment management IS: Build-up of construction equipment databases and motor vehicle databases
Finance and administrative service	Account/budget management	Discrepancy in reported figures	Financial management IS: Computerization of accounting system
	Personnel management	Un-updated leave and personnel profile	Human resources management IS: Use of biometric-finger scan to be linked to personnel and accounting system
	Procurement, properties and supplies inventory and monitoring	Difficulty in locating property/slow processing and issuance of property accountability	Property and supply procurement, and inventory management IS: Computerization of MRs and office equipment supplies inventory

Table 3.2.3 ICT Solution of the Information Systems

Information System	Contents	ICT Solutions	
		Existing	Proposed
Project preparation IS	Project identification, Investigation and survey, Project design	Spreadsheets	Computerized application systems
Project implementation IS	Construction schedule, Monitoring and evaluation, Project accomplishment on physical/Financial	Spreadsheets	Development of the system in the NIA intranet
Irrigation systems operation IS	Water resource, Water distribution, Farm operation	Spreadsheets	Computerized application systems processing to run in stand PCs for the use of the field offices and networked application for central office GIS
Irrigation systems repair and management IS	Monitoring of facilities and structures, Repair of damages facilities and structures, Maintenance of facilities and structures	Spreadsheets	Computerized application systems processing to run in stand PCs for the use of the field offices and networked application for central office GIS
Financial management IS	Accounting, Budget/funds management, Billing and collection of ISF	Stand alone partial implementation: irrigation service fee billing and collection	Full implementation for operationalization of the program for computerization of the billing and collection by 2013 on stand alone PCs

Information System	Contents	ICT Solutions	
		Existing	Proposed
		Spreadsheets	Conversion to database and development of computerized application systems
Institutional development IS	NIA-IA contract, Institutional development program	Spreadsheets	Conversion to databases for network development
Light and heavy equipment management IS	Equipment inventory and management, Spare parts inventory, Operating cost monitoring	System runs on stand alone PCs	Enhancement of the IS to run on the NIA network
Human resources management IS	Personnel information system, Manpower development, Personnel attendance monitoring	Manual/use of biometric finger scan for data capture	Biometric
Property and supply procurement, and inventory management IS	Procurement, Property inventory and distribution, Supply inventory and distribution, Planning	Spreadsheets	Conversion to database and development of computerized application systems

In December 20, 2011, the ISSP was approved by the National Computer Center (NCC). The NCC is under the Department of Science and Technology (DOST), its establishment was mandated under the Executive Order No. 322 S1971. Among the function and responsibility of the NCC is,

"It shall act as the primary agency in planning the integrated development of EDP capability in the National Government.

It shall monitor the operation of existing Electronic Data Processing (EDP) installations and recommend the consolidation or deactivation of installations as the situations warrants, to achieve economy and efficiency.

In addition, it shall monitor requests of agencies for the acquisition (purchase/lease) of computers and other EDP equipment, endorsing only those whose job requirements cannot be absorbed by the NCC and other existing government EDP installations and which such agencies can justify the efficient utilization thereof."

Based on the above function of the NCC, all government institutions intention to procure or lease of computer system shall pass through this agency for endorsement.

The ISSF is facing delay in the implementation. According to its time table, it will to start on Y2011 and to be completed on Y2013. But, in this early month of Y2012, the project is not yet in its full implementation because the endorsement from NCC was just released on December 2011.

In the approved conceptual framework for the information system of the ISSP Y2011-Y2013, the UEGIS of the DA-ITCAF is not specifically indicated or elaborated. This would denote that the ICT improvement of the DA-ITCAF and the NIA-ISSP is virtually not complementary to each other, thus would affect the provision of the support for resources. However, in the meeting with NIA-IEC and NIA-MID, initial equipment/instrument and software packaged intended for UEGIS Program was already delivered to these two (2) divisions.

2.2) Training to Resource Persons

NIA-MID is the main department to accelerate the program of ISSP 2011-2013. The division has 16 regular and 7 daily personnel totaling 23. However, the number of persons who are actually familiar with ICT and its related knowledge/experience is only one.

MID has already introduced the GIS system under cooperation with JICA about 10 years ago and has produced some useful data/map. Unfortunately, NIA has not fully disseminated its system to its local organization like regional office due to shortage of human resources and budget as well. NIA, therefore, plans to include a series of training for the staff for the program of ISSP 2011-2013.

It should be noted that NIA has been nominated as one of RS (remote sensing)/GIS laboratory of UEGIS program being implemented by DA. Under the said program, NIA-IEC (Irrigation Engineering Center) received some equipment such as desktop computer, laptop computer, scanner, and plotter in October 2011.

The training plan attached to the ICT program of NIA is summarized below.

Table 3.2.4 Training Plan on Information System Strategic Plan (ISSP) 2011-2013

ICT Training Course		Number of Trainees targeted			
Classification	Tittle/Description	Y1	Y2	Y3	Total
ICT for users	Image Editing, MA access		35		35
ICT specialist course	Network specialist course, data communication, system analysis and design, etc.	36	33	15	84
GIS course	GIS introduction, Arc View GIS Training		32		32
ICT for executives/managers	Managing with internet, managing ICT services		47		47
Total		36	147	15	198

2.3) Project Cost

Project cost is estimated at PhP 103 Million for the 3-year program. Budget disbursement from first year to completion year is planned as PhP 76 Million, PhP 13 Million, and PhP 14 Million, respectively. Breakdown of the cost is in the table below.

Table 3.2.5 Project Cost estimated of Information System Strategic Plan (ISSP) 2011-2013

Activity	Financial Requirement By Year			Total (Peso)
	Year 1	Year 2	Year 3	
Application systems development	1,260,000	1,710,000	900,000	3,870,000
Database development/build-up	1,025,000	1,400,000	-	2,425,000

Activity	Financial Requirement By Year			Total (Peso)
	Year 1	Year 2	Year 3	
Hardware acquisition	67,079,100	6,373,400	3,179,000	76,631,500
Software acquisition	5,331,645	693,000	632,500	6,657,145
Network/communication	1,045,000	1,207,800	8,730,700	10,983,500
Trainings	255,200	1,252,200	226,640	1,734,040
ICT services, O&M of system	95,000	114,000	636,800	845,800
Total	76,090,945	12,750,400	14,305,640	103,146,985

3) Irrigation Service Fee – Computerized Billing and Collection System (ISF-CBCS)

3.1) Present status of ISF-CBCS

This is a system to facilitate billing and collecting ISF. The system is a part of ISSP 2011-2013 earlier mentioned.

As mandated by law, NIA collects ISF from farmer-beneficiaries to cover the cost of operation and maintenance of irrigation systems. As per ISF Collection Efficiency Report (ISFCER), average CE for the past three (3) years on Current Account is 58.73% and on Back account is 2.25%. This computerized billing and collection system established by NIA-MID now operates to improve billing and ISF-CE. The system targets only NISs and not CISs.

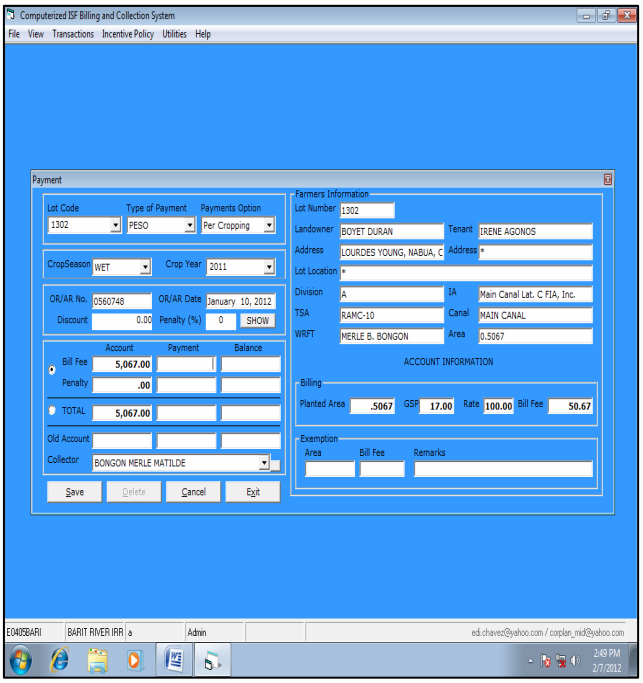


Figure 3.2.1 ISF-CBCS Screen Terminal

The ISF-CBCS originally started its system development in 2005. However, it could not appropriately operate due to presence of "bugs" in the program. Since then, it took about 5 years to fix the bugs. In September of 2010, NIA started a series of training targeting billing clerks of IMOs. Along with that, NIA-MID issued a memorandum directing all persons concerned encouraging the use of the system. The training was completed in 11 regions (CAR, 2, MARIS, 3, 4a, 4b, 5, 6, 8, 10, 11) so far and two regions are set for another training for start.

Some of the regions that received the training have commenced its actual operation while the others are still transferring data from paper records into the computerized system. However, it is unclear to the NIA-MID when all the encoding work would be completed. This is due to the lack of manpower and budget in the offices. Additionally, more claims requesting to improve their system have increased through regional offices.

As mentioned, the system has just started its operation since 2010, which means only two to three cropping seasons have passed. The system, therefore, needs more time to assess its effectiveness through seeing the trend of ISF-CE.

Currently, the system limits the number of beneficiaries (users) to NIA staff only (such as billing clerk) because IA or farmers would have difficulty accessing the system. However, from the view point of IMT promotion conducted by NIA itself, it is fairly considered to include IA/farmers training course as a part of institutional development process of IMT.

The system presently is operated as a stand-alone platform, which is not connected with NIA central office, even between region to region. NIA-MID intends to finally link up all regional offices by establishing connection with NIA Website, which is a part of the ISSP 2011-2013 earlier mentioned.

3.2) Issues on the Use of ISF-CBCS in Actual Field

In the survey, some issues and concern of the Billing Clerk/Data Encoder, Irrigation System Superintendent (ISS) IMO and Managers are as follows;

a) Lack of manpower in the Data Entry/Encoding of ISF-LIPA for Statement of Billing and preparation of Irrigation Fee Register,
b) Encoder is the same person that will check and review encoded data or false entry, in this way would delay his encoding works,
c) Current Back Accounts and Aging/Previous Years Back Account is not reflected in the Billing Statement to serve as reminder of the Landowner/Land Operators on their ISF obligations and responsibilities (compared to Electric Bill, Telephone Bill, and Water District Bill),
d) Lack of spare computer system unit for ISF Billing use only to supplement the Billing Process in case of peak days work in order to meet deadlines, while the NIA is still assisting the IA's under the preliminary stage of implementing IMT. This spare unit of computer system can be used also by IA's while on the job training (OJT) at NIA-IS.

4) ICT Literacy in Field Level (Survey on Irrigator's Association)

As stated in Chapter-1, the Survey Team conducted a series of field surveys at selected National Irrigation Systems (NIS) in Region-3, Region-5 and Region-6. A more intensive survey was also done in four (4) NIS in Region-3 and Region-5 where the team interviewed IA members (farmers) on their knowledge and experience in ICT utilization (mobile phone, internet, etc.). The survey also included questions on household financial management, ISF payment procedures and agricultural insurance which provided information for the Survey not only for the irrigation sub-sector but also for other sub-sectors.

4.1) Mobile Phone Literacy & Usage

This survey indicates that the common Filipino perception – Every household have at least one

mobile phone – is almost right.

According to the result of the survey, every farmer has a mobile phone in their household, and many of them can use SMS or text messaging. Moreover, some of them can use MMS or picture sending as well as airtime load sharing.

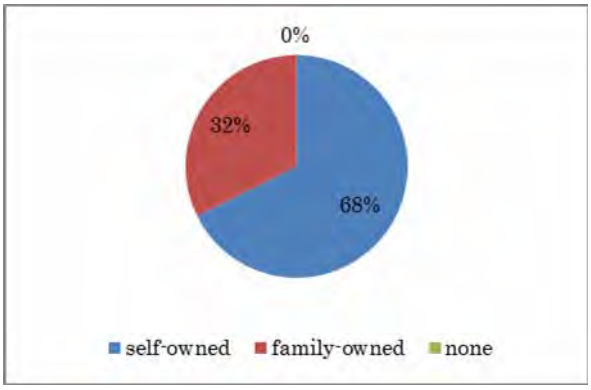


Figure 3.2.2 Mobile Phone Ownership

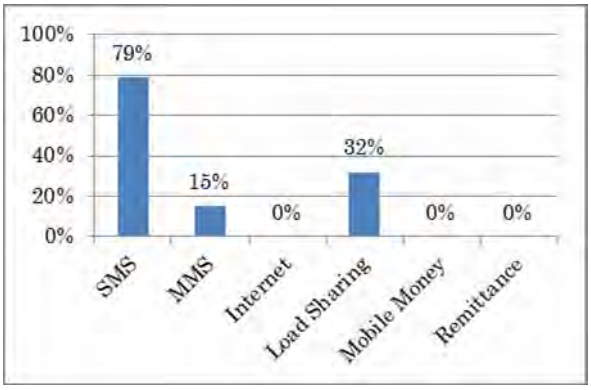


Figure 3.2.3 Experiences of using Mobile Phone Functions

In addition to that, most farmers prefer text messaging than to call when communicating and they buy airtime load at a Sari-Sari store within 500m from their house. Their children have mobile phones that are more sophisticated (equipped with a camera and other features), while farmers use a simple mobile phone (with call and SMS functions only).

Table 3.2.6 Result of the Survey regarding Mobile Phone Literacy & Usage

	QUESTIONS	ANSWERS	
Q01	Do you or your family have a cellphone?	Yes - Self-owned - Family-owned	100% (68%) (32%)
Q02	Who has a cellphone in your family?	Spouse Children Grandchildren	55% 70% 5%
Q03	Do you or your family have a camera enabled cellphone?	Yes - I have. - My family has.	65% (10%) (55%)
Q04	Which functions have you experienced doing through your cellphone? (multiple answer)	SMS / Texting MMS / Picture Sending Internet Access Load Sharing Mobile Money Remittance	79% 15% 0% 32% 0% 0%
Q05	Is your SIM prepaid or postpaid?	Prepaid	100%
Q06	Where do you buy airtime load? (multiple answer)	Sari-Sari Store Prepaid Loading Center	75% 25%
Q07	How far is it from your place?	0 m – 100 m 101 m – 200 m 201 m – 500 m 501 m – 1.0 km 1.1 km – 3.0 km	20% 25% 25% 5% 5%

	QUESTIONS	ANSWERS	
Q08	How many times do you call every day?	0	15%
		1 – 2	45%
		3 – 5	15%
		6 – 10	0%
		11+	5%
Q09	How many texts do you send every day?	0	5%
		1 – 2	5%
		3 – 5	25%
		6 – 10	10%
		11+	35%

4.2) Financial Services Access

The bank account ownership rate among farmers' household is approximately three-fourths. This rate is relatively very high compared to the one-thirds that BSP (Bangko Sentral ng Pilipinas) stated regarding bank account ownership rate among Filipino households in 2010.

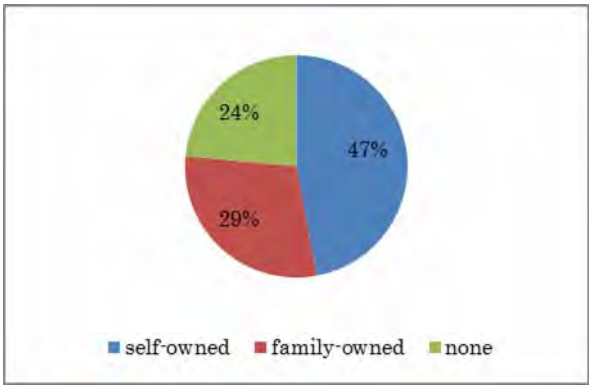


Figure 3.2.4 Bank Account Ownership of households

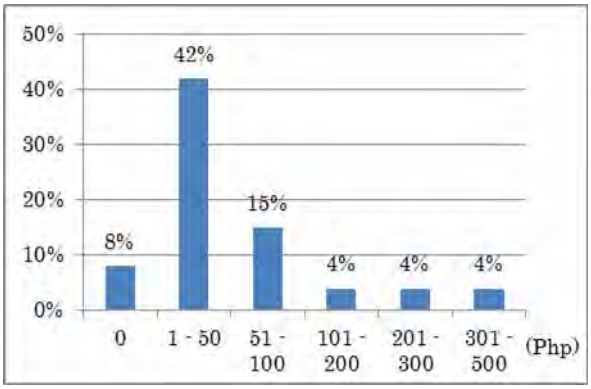


Figure 3.2.5 Cost to reach Bank Access Point

However, many farmers don't have immediate access to bank services in their community. They still have to travel and it will cost them up to Php100 to get to the nearest banking institution which is more than 1 km away from their house.

Table 3.2.7 Result of the Survey regarding Financial Services Access

	QUESTIONS	ANSWERS	
Q10	Do you or your family have bank accounts?	Yes	76%
		- I have.	(47%)
		- My family has.	(29%)
Q11	Which is the most commonly used bank transaction? (multiple answer)	ATM	38%
		Over the Counter	50%
Q12	What is the means of mobility to reach the Bank?	Motorcycle	35%
		Jeepney	19%
		Car	12%
		Walk	8%
		Tricycle	4%

Q13	How far is this from your place?	0 km – 1 km	12%
		1.1 km – 5.0 km	27%
		5.1 km –10.0 km	19%
		10.1 km – 20.0 km	15%
		20.1 km – 30.0 km	4%
Q14	How much is the cost to get there?	Php 0	8%
		Php 1 – 50	42%
		Php 51 – 100	15%
		Php 101 – 200	4%
		Php 201 – 300	4%
		Php 301 – 500	4%

4.3) ISF Collection

According to IAs in the survey areas, ISF is commonly paid through collectors. In more than half of the cases, the collector visits farmers' houses to collect ISF. But sometimes, it is the farmer who goes to the collector's house to pay ISF. In this situation, even though the farmers have to leave their house, the place of ISF payment is still within their community so half of them don't have to pay the extra transportation cost.

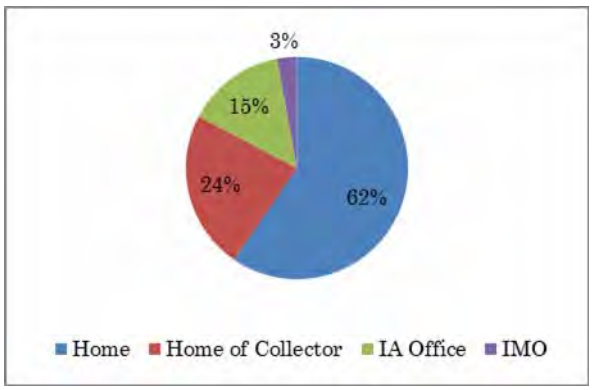


Figure 3.2.6 Place of ISF payment

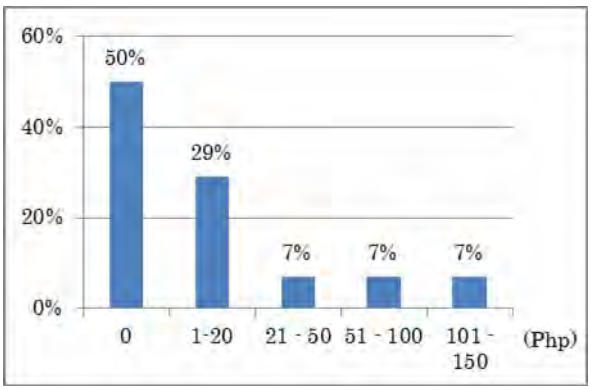


Figure 3.2.7 Cost to Place of ISF payment

Table 3.2.8 Result of the Survey regarding ISF Collection

	QUESTIONS	ANSWERS	
Q15	How do you pay your ISF?	Collector	94%
		Office	6%
Q16	To whom?	Water Master	29%
		NIA Collector	29%
		IA Treasurer	24%
		IA Collector	18%
Q17	Where?	Home	62%
		Home of Collector	24%
		IA Office	15%
		IMO	3%
Q18	How far is this from your place? (among the person who pays out of home)	0 km – 0.5 km	21%
		0.6 km – 1.0 km	57%

		1.1 km – 2.0 km	7%
		2.1 km – 3.0 km	7%
Q19	How much is the cost to get there? (among the person who pays out of home)	Php 0	50%
		Php 1 – 20	29%
		Php 21 – 50	7%
		Php 51 – 100	7%
		Php 101 – 150	7%

4.4) Agricultural Extension Services

Both FCC and FTC are not very popular among farmers on the survey areas. Only 6% of the farmers have experience in contacting FTC, and none for FCC.

Table 3.2.9 Result of the Agricultural Extension Services

	QUESTIONS	ANSWERS	
Q20	Do you know ATI's Farmer Contact Center (FCC)?	Yes	6%
Q21	Have you ever used FCC?	Yes	0%
Q22	Do you know PhilRice's Farmer Text Center (FTC)?	Yes	15%
Q23	Have you ever used FTC?	Yes	6%
Q24	What was the subject?	Info on New Technology	
Q25	How did you get it?	Call & Text News Letter	

4.5) Agricultural Insurance & Loan

The ratio of crop insurance awareness among the farmers is 8 out of 10, but only half of them have actual experience in using it. As for agricultural loan, only 4 out of 10 farmers have availed of such loans.

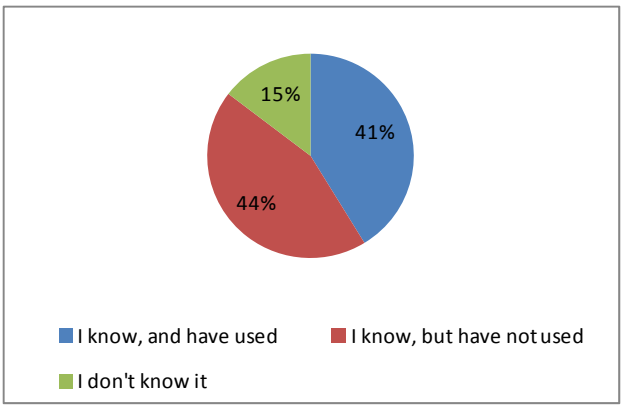


Figure 3.2.8 Usage of Crop Insurance

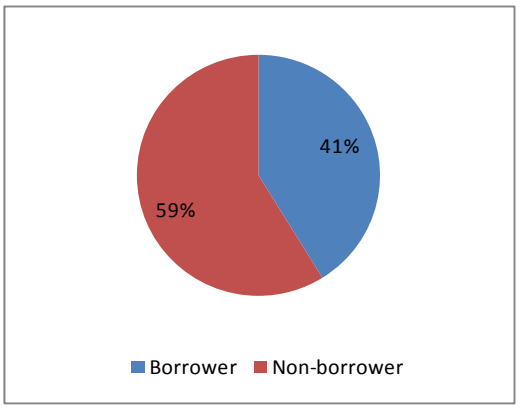


Figure 3.2.9 Usage of Agricultural Loan

The farmers' primary reason for not using crop insurance is that they are not interested in it, while some are not entirely familiar with its details. Moreover, although 6 out of 10 crop insurance users have received payout, more than half of them are not satisfied with the service because of low payout.

On agricultural loans, the farmers usually borrow money from Land Bank, Rural Banks and cooperatives. Sometimes, they are also required to purchase insurance when applying for the loan.

Table 3.2.10 Result of the Agricultural Insurance & Loan

	QUESTIONS	ANSWERS	
Q26	Do you know Crop Insurance?	Yes	85%
Q27	Have you ever used Crop Insurance?	Yes	41%
Q28	If not, why?	Not Interested	33%
		Not Familiar with Details	33%
		Hearsay of Low Payout	7%
		Benefit - Too Small	7%
		Not Approved	7%
Q29	Where did you purchase it?	PCIC	79%
		Land Bank	21%
Q30	Are you satisfied with it?	Yes	36%
		No	57%
Q31	Why?	Low Payout	38%
		Difficulty with Payment Terms	13%
		Slow Process	13%
Q32	Have you ever gotten any payout?	Yes	64%
Q33	Do you usually get Agricultural Loan/Credit?	Yes	41%
Q34	What types of organization do you borrow money from?	Land Bank	36%
		Rural Bank	21%
		Cooperative	21%
		Local Money Lender	14%
		IA	7%
		Micro Credit Institution	0%
Q35	How much is the interest rate?	18.5% / annum	7%
		18% / annum	14%
		15% / annum	14%
		12% / annum	7%
		9% / annum	7%
		3% / month	7%
		1% / month	29%
Q36	Is Crop Insurance required to borrow money?	Yes	56%
		No	24%
		I don’t know	21%

3.2.3 Agricultural Extension

As briefly discussed in Chapter 2, agricultural extension activities are being carried out by multiple agencies concerned: ATI, PhilRice, and others. In the past years, those agencies have started using ICT in their extension modalities. Typical example is a use of text message by mobile phone, which is followed by web-based training modules. This section, thus, provides an overview of those extension modalities and programs provided by various agencies.

1) Agricultural Training Institute (ATI)

Among the banner programs being implemented by the Institute is the e-Extension website, composed of the following: e-Learning, e-Farming and e-Trading. The agency is also working on partnership projects with other agencies such as IRRI for the NMRice program and DOST-PCARRD for the FITS program.

1.1) E-Extension

The e-Extension program (www.e-extension.gov.ph) was originally a partnership project between ATI, BAR and PCARRD, driven from the OPAPA system/project. In 2002, based from AFMA, the Agriculture and Fisheries Extension Network (AFEN) was formed as an offshoot of the Major Final Output on Extension Support, Education and Training Services (MFO ESETS). ATI serves as the lead agency for the administration and coordination of extension service delivery.

The e-Extension program is being funded through the ATI's regular budget as well as shares from the budget of the different banner programs (commodity-based) of the DA. ITCAF has also provided funding in 2009 and 2010, both at about P 7.0 million. Currently, there are more than 9,000 registered and active users of the e-Extension system. E-Extension system is composed of three main components of 1) e-learning, 2) e-farming, and 3) e-trading, although e-trading is yet well developed as an independent site, instead having a linkage to outside resource. The following explains the outline of three components.

1.2) e-Learning

The program was launched in 2007 via www.e-extension.gov.ph/elearning (instead of the ATI website to acknowledge the partners in this project) with e-Learning at its forefront. The Institute was able to offer its first set (7) of e-Learning courses in 2008. As its main role in the program remains to be the management and administration of the website, ATI tapped the partner agencies and institutions (including public and private universities) and developed their capability for content development.

In 2008, trainings on courseware development were provided to PCARRD, the 16 ATI regional training centers and BAR. In 2009, training was given to AFEN members, Bureau of Plant Industry (BPI) and Philippine Carabao Center (PCC). Additional trainings were conducted in 2010 and in 2011; ATI is conducting trainings for Xavier University, a private university in Mindanao, for courseware development.

The training is conducted in two phases: I for content development and II for rich media applications. Phase I is on the development of the actual course which includes structure, content and tests. Phase II is more on the use of photos, videos, and course lab (open source software). Each training/phase is conducted once a year for the target partner and would normally include 20-25 participants.

The ATI-RTCs have e-Learning coordinators partnering with universities for content development as well as in promoting the use of the e-Extension website among agricultural students. They are also the ones coordinating with the pool of SMEs in the region.

As for the actual e-learners/clients, the main target for e-Learning courses are AEWs (approximately 25,000 with 17,000 coming from LGUs and the rest from SCUs and other agencies), especially those who cannot afford (due to time and/or cost) to attend trainings being conducted by the RFU, PAO and other agencies. At present, about 80% of registered e-Learning users are AEWs, 10-12% are retirees and returning OFWs, and 8% are advanced farmers and agriculture students.

One of the main challenges at the beginning of the e-Learning project was the availability of infrastructure and equipment for target AEWs. There are times during the promotion of the project that AEWs are requesting for computers, internet access or even allowances to pay for such services. However, ATI prioritized the development of content based on the premise that if the AEWs would really need the information, they will find a way to access it.

Another challenge is the level of computer literacy among the target users. In 2009 and 2010, the RTCs were directed to have, at least, one training per province on basic ICT literacy and internet essentials. With this, the number of users, enrollees and graduates were said to have increased.

The e-Learning website now operates under the "Any Place, Any Pace" slogan wherein the courses can be enrolled in and finished at any time, depending on the capacity and availability of the enrollee. The set-up was not always like this. At the beginning, courses should be completed at a set timeframe based on the length of the course. However, after some analysis, it was known that many enrollees drop out and do not get to finish due to inability to access the course in the prescribed time. As such, ATI adopted the "rolling mode" wherein users can enroll at any time and graduate at any time. The record for the longest time needed to complete a course is at six months.

To access the e-Learning courses, a user must first complete a one-time registration process (registration form→receive username and password via email/SMS). After choosing from the Menu of e-Learning courses, a user can ask for the "enrollment key" also via SMS or even through the shout box incorporated in the website.

Each e-Learning course contains 3-4 modules, each containing a set of lessons, tests and activities. An end of module test should be taken by the enrollee and accomplished with a 70% achievement rate. Top e-Learning courses are banana pest management, organic agriculture and goat production. Table 3.2.11 shows the number of enrollees and graduates for each course.

Table 3.2.11 Number of Enrollees and Graduates for e-Learning Courses

(As of January 11, 2012)

No.	Course Code	Enrollees	Graduates
1	Abaca1	82	56
2	Abaca2	49	32
3	Agrimark1	275	183

4	Bamboo1	156	104
5	Banana1	876	670
6	Banana2	575	430
7	Citrus1	254	144
8	Coffee1	267	177
9	CO1	259	116
10	Corn1	417	201
11	Durian1	203	89
12	EDS1	167	53
13	Goat1	495	314
14	Goat2	200	150
15	Greenhouse1	449	243
16	Jackfruit1	161	117
17	Mango1	163	80
18	Mushroom1	41	26
19	Orchid1	162	89
20	Organic1	725	546
21	Pig1	282	224
22	Pig2	19	8
23	Seaweed1	121	94
24	Vermi1	412	280
25	Yam1	312	206
Total		**7122**	**4632**

The number of enrollees for January 2011 until January 11, 2012 totals to 4096. A big bulk of enrollment happened during the 3rd and 4th quarter of 2011 (until January 11, 2012). From this number, 2804 enrollees (68.46%) have already graduated. A big portion of the enrollees have graduated during the 3rd (34.37%) and 4th (37.80%) quarters as well. Figure 3.2.10 shows the number of enrollees and graduates per quarter, including the first half of January 2012.

As of now, courses are only offered for Filipinos, residing in the Philippines or about to return to the country, due to location specific technology. There is a plan/talks for an ASEAN cooperation (like Indonesia) but it is yet to be finalized. In any case, what is clear is that these countries will be the one to develop the content based on the standards set by ATI. The institute will also be the one to manage the courses and the users.

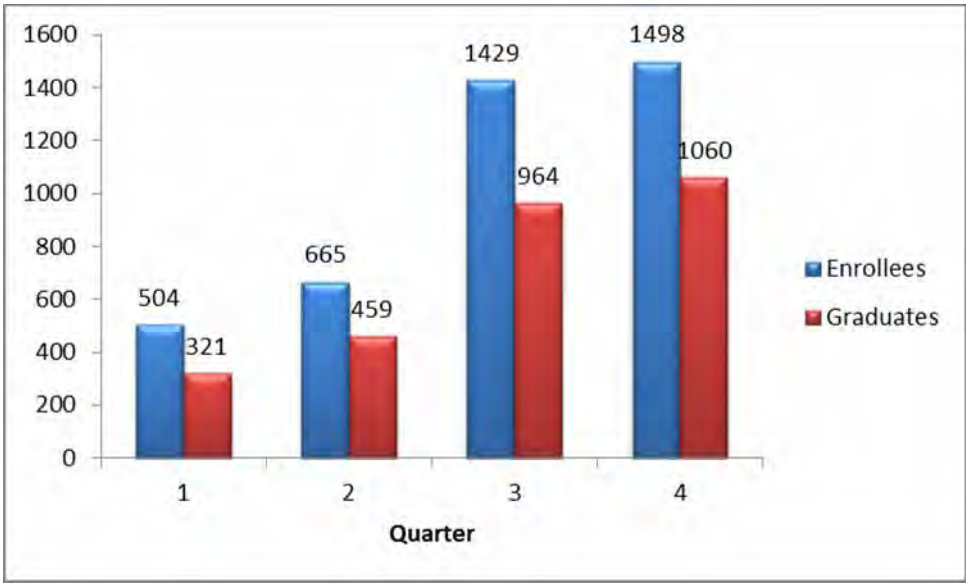


Figure 3.2.10 Enrollees and Graduates from January 2011-January 12, 2012

Source: ATI Knowledge Products Management Division

Another form of e-Learning is through the so-called Digital Extension with the use of Digital Learning Resources. The Institute has developed "info kits" for certain commodities. Since the budget for printed production is limited, ATI is now digitizing this info kits to be uploaded in the e-Learning website for easier access and dissemination. In 2011, the techno-kit for Lowland Vegetable Production was the most downloaded, followed by Total Quality and Productivity for Rice. Cashew Production had the least downloads (with the exception of Organic Fertilizer Production since it was made available only in the 4th quarter). Table 3.2.12 shows the e-Learners' number of downloads for Digital Techno-Kits.

Table 3.2.12 Number of Digital Techno-Kits Downloaded by e-Learners by Quarter

(2011)

	TITLE	1Q	2Q	3Q	4Q	GRAND TOTAL
1	Organic Fertilizer Production Kit	-	-	-	6	**6**
2	Durian Production Kit	11	8	10	10	**39**
3	Lowland Vegetable Production Kit	25	28	34	31	**118**
4	Cashew Production Kit	5	7	8	7	**27**
5	The Philippine Cattle Industry	13	23	14	15	**65**
6	Broiler Production	19	20	31	31	**101**
7	Bangus Techno-Kit	7	10	14	10	**41**
8	Hog Finishing Production Information Kit	20	25	25	25	**95**
9	Meat Processing Techno Kit	19	24	28	24	**95**
10	Citrus Production Techno Kit	14	15	17	17	**63**
11	Coffee Production Techno Kit	11	18	25	19	**73**

TITLE		1Q	2Q	3Q	4Q	GRAND TOTAL
12	Corn Techno Kit	22	18	22	15	**77**
13	Mango 1: Mango Processing Information Guide	11	9	10	13	**43**
14	Mango 2:A Guide to Mango Production	17	19	15	22	**73**
15	Total Quality and Productivity for Rice	17	22	29	36	**104**
16	Banana Production Guide	9	17	23	33	**82**
Total Downloads		**220**	**263**	**305**	**314**	**1102**

Source: ATI Knowledge Products Management Division

Additionally, web links for info kits already uploaded by other agencies in their respective web pages can also be included/ posted in the e-Learning website. An assessment of the e-Learning website as well as its impacts is set to be conducted next year.

1.3) e-Farming

The main target for e-Farming is the farmers. The e-Farming concept is focusing on providing extension services to farmers through the Farmers Contact Center (FCC), serving as the DA Help Desk.

The FCC provides services to farmers through text, calls, shout box, and e-mail communications. Clients, most of them are farmers, can use land lines (fixed line phone) and call a provincial toll free number 1-800-10-982-AGRI (2474) for their agriculture queries and concerns. Smart mobile subscribers can also call 0920946AGRI (2474) and be charged P7 for every call made (not the regular per minute basis). Mobile subscribers from Smart, Globe and Sun can also text the same number and/or 391DA (32) and be charged with P 1.00 for every message sent (160 characters). Emails can be sent at info@e-extension.gov.ph.

Table 3.2.13 Farmers' Contact Center Communication Means and Costs

FCC Number/Hotline	Means of Communication	Cost for Clients (Farmers/AEWs/Students)	Cost for DA (ATI)
Toll Free Number	Land Line/Fixed Phone Line	Free	Fixed monthly rate of P80,000 (unlimited inbound and outbound calls)
Mobile Call (for Smart subscribers)	Mobile phone	P7.00 for every call	Partnership with Smart
SMS (Smart, Globe, Sun)	Mobile phone	PhP.80 for every 160-character message sent	About PhP 10,000 per month (PhP 1 (or PhP.80) for every 160-character message sent (reply or info blasting)
Shout Box/Email	PC/Laptop/Internet Connectivity	Internet subscription/ Computer rental at internet café/ Load/Credit for Plug-it	Internet subscription/ Server maintenance cost

Source: Interview with ATI (2011)

Though other means of communications were made available, the FCC maximized the use of mobile phones and SMS for information dissemination. The text support center was launched in

February 2009 while the call support feature was launched in November of the same year. The service has now expanded to respond to queries on market prices, pests and diseases as well as complaints and suggestions on DA programs and services.

Queries are coming in to the FCC through three platforms: Call and Text Support, Mailbox and Shoutbox, and Forums. In 2011, the Mailbox and Shoutbox platform received the most number of queries (5280) among the three. A total of 2637 "queries" came from the e-Learning and e-Extension portal shoutboxes while 2643 were from the e-Learning, e-Extension and ATI mailboxes. Table 3.2.14 shows the breakdown of queries coming in through Mailboxes and Shoutboxes.

Table 3.2.14 Queries breakdown from January to December 2011

Shoutboxes		Mailboxes			
Enrollment key	1212	Enrollment key	11	3	372
Username and Password	14	Username and Password			8
Certificate of Completion	89	Certificate of Completion	2	2	63
Technical Assistance	264	Technical Assistance	2	1	94
New Course	74	New Course			17
A&F Concerns	17	Outbound e-Learning Messages	22	4	1668
DA Programs	2	A&F Concerns			41
ATI Programs and Services	19	DA Programs		5	99
Miscellaneous/others	946	ATI Programs and Services			49
		Outbound Messages to Clients			55
		Miscellaneous/others	1		177
TOTAL	**2637**		***38***	***15***	***2643***

Note: Shouts for "Miscellaneous/others" are greetings and appreciation.
Source: ATI Knowledge Products Management Division

As for the Call and Text Support platform, 4,362 queries were received from January to December 2011. A total of 3,637 texts and 725 calls were received and entertained by the FCC agents. Top query through text was e-Learning while Outbound Calls (correspondence regarding updates/feedbacks on their queries) ranked highest for the call support. DA Programs (questions about programs and services of DA, including its Bureaus and Attached Agencies) ranked 2nd for text (202) and call (151) support. Agriculture and Fisheries (A&F Technologies) ranked 3rd with 163 text queries on cultural management, dryer equipment, new technology, process application, soil deficiency, varieties/breeds/species, and vermicomposting. Table 3.2.15 shows the categories and number of queries received by the FCC.

Table 3.2.15 Category and Number of Queries Received by the FCC

Category	Number of Queries	
	Text	**Call**
A&F Technologies	163	46
Marketing	34	20
Pest and Disease Management	63	9
e-Learning	2847	131

Category	Number of Queries	
	Text	Call
DA Programs	202	151
ATI Programs and Services	71	45
Outbound Calls/Messages to Client	151	181
Miscellaneous	106	142
Total Queries Responded	**3637**	**725**

Source: ATI Knowledge Products Management Division

In addition to the queries being received, the FCC is also able to send out messages and information to registered clients through SMS. Called techno tip broadcasts, the FCC is able to send updates on A&F Technologies as well as latest activities of the Department of Agriculture. In total for 2011, the FCC broadcasted techno tips 106 times to a total of 38,449 recipients. While the 2nd quarter had the most number of recipients at 19,742, the 4th quarter had the most number of broadcasts at 45.

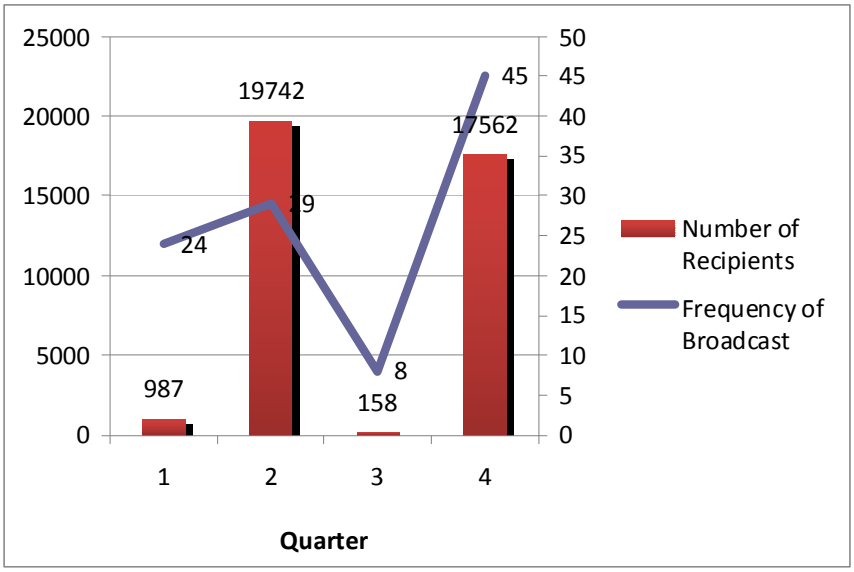


Figure 3.2.11 FCC Techno Tips Broadcast in 2011

Source: ATI Knowledge Products Management Division

The third and least used platform are the Forums. Classified into three—e-Learning Forums, ATI Interactive Forums, and Instant Messaging—the Forums platform received only 231 queries in 2011. E-learning forums had the most queries at 117 followed by ATI interactive forums at 93. Instant messaging received only 21 queries last year. In the Forums platform, informal topics or discussions such as “Agricultural Extension Wish List” and “Introduce Yourself” had a significantly higher number (77 and 46, respectively) or participation than the “Main Forum for Crops” and the “Main forum for Livestock and Poultry” (8 and 4, respectively). Details of Forum queries are shown in Table 3.2.16.

Table 3.2.16 Queries Breakdown for Forums from January-December 2011

e-Learning Forums		ATI Interactive Forums		Instant Messaging	
Site News and Announcements	26	Roll call of the working class	2	Enrollment key	2
Introduce Yourself	46	Agricultural extension wish list	77	Username and Password	0
Agri & Fisheries News	11	Story time	5	Certificate of Completion	1
Request a Course	9	Tips and snippets of wisdom	3	Technical Assistance	2
Site Q & A	10	Extension in the Philippines	4	New Course	0
Main Forum for Livestock and Poultry	4	Of ATI and its services	1	A&F Concerns	13
Main Forum for Crops	8	Special announcements, your events & happenings	1	DA Programs	1
Main Forum for Marine and Fisheries	2			ATI Programs and Services	2
Main Forum for Digital Resources	0			Miscellaneous	0
Main Forum for the e-Extension Offices	1				
TOTAL	***117***		***93***		***21***

Source: ATI Knowledge Products Management Division

The FCC uses "Netcast," provided by Smart, for its SMS-based communications. For phone communications, ATI sought the services of Avaya, a business communications provider. The FCC set-up has 10 "seats", three of which are currently being manned by the three FCC agents employed by ATI. Three are extra seats for Knowledge Product Management Division (KPMD) staff to help out if there is a higher volume of calls, two seats for monitoring of calls and another two for directors and visitors.

Currently, the three (3) agents manning the FCC answers queries through text messages, calls, shout box posts, and email messages. The FCC agents are graduate of agriculture courses and know how to speak and understand the English and Filipino languages and at least one of the major Philippine dialects (Iluko, Hiligaynon, Cebuano). This way, answering the text messages in the local dialect is also possible, as well as calling the farmers for further information or clarification of questions.

Leaflet of Farmer Contact Center distributed by ATI, having inbound queries scenarios.

Combining their know-how on agriculture topics and the compiled FAQ/Knowledge Base received through the FCC and those submitted by the DA-RFUs and ATI-RTCs, the agents are usually able to answer the questions that are coming in. For situations that cannot be answered/handled/responded through this, the agents would contact the subject matter experts (SME) and at the same time send a message/advisory to the client that their concerns are still being processed.

There are about 100 SMEs per region. The pool of experts is further classified according to commodity or field of specialty. The SMEs are usually emailed or called by the FCC agent for certain queries. The answers would then be sent to the client in the form of SMS or a call. However, for situations concerning pests and diseases, the protocol is different. These concerns are directed to the RFUs and LGUs as personal validation is necessary. The RFUs are being mobilized, as the DA Secretary has issued a Memo directing all RFUs to extend assistance to these concerns, and are being connected with the LGUs' AEWs for the field inspection of the affected area.

Recently, DA-RFU VI has collaborated with ATI to establish an FCC in the region. Since all of the incoming messages, calls and emails are still to be managed by the ATI-FCC, the main goal of the RFU is to send messages to the farmers for information dissemination, especially to send warning messages on pest infestation and disease outbreak (as part of the region's *Bantay Peste* (pest watch) program/campaign) and for up-to-date information on market prices.

As the FCC system is already in place, the RFU is only granted access to certain features and services of the Netcast system being used. The RFU also allocated counterpart funding for the training of the agent that will use the FCC in the region. Additionally, the regional FCC would also be paying for the messages they have sent using the system.

1.4) e-Trading

Of the three services offered by e-Extension, e-Trading is the least developed in the website. Currently, the e-Extension site has posted a link to AFMIS (Agriculture and Fisheries Market Information System), a website containing information such as price bulletin, directory of buyers/sellers, and other market information.

The e-Trading development saw challenges along the way, including the lack of available data and information on prevailing prices and demand for products and agricultural services. Consequently, to avoid redundancy of efforts and costs, the ATI has decided to coordinate with AMAS and ITCAF, the two DA-attached agencies in charge of developing ICT-based tools for agricultural marketing and trading. The ATI's main focus now for e-Trading is to harmonize the efforts of various DA agencies engaged in the sector's development.

1.5) Possible Plans and Projects concerning ICT

There's a necessity for assessing the functionality of the e-Extension services that were already in place. Importance is also placed in increasing manpower and responding to the needs for capacity building of staff and clients.

In terms of e-Trading, developing a system or replicating the method employed by Cornell University with the use of "market maker" (matching system for agricultural products, providers, demands and supplies) is also possible. Another area to be looked at is the formation of Communities of Practice for pooling of experts and Communities of Interests for advanced/progressive farmers to share their experiences.

2) Philippine Rice Research Institute (PhilRice)

The Philippine Rice Research Institute (PhilRice) is among the leading research institutions when it comes to Philippine rice culture. In addition to the research, several extension programs, most of which meant to disseminate the results of studies and experiments, are being implemented by the institute. Currently, PhilRice maintains e-extension activities under the banner program of Open Academy for Philippine Agriculture (OPAPA) and some other set of modules administered by the Information Systems Division (ISD) of the institute.

2.1) Open Academy for Philippine Agriculture (OPAPA)

The OPAPA was organized in 2003 as a virtual network of national and international institutions with PhilRice being designated as the lead agency. The list of organization in the network is shown below (source: PhilRice as of Dec. 2011).

1) PhilRice - Philippine Rice Research Institute
2) DA - Department of Agriculture
3) DA-Bureau of Agricultural Research
4) DOST - Department of Science and Technology
5) DOST-PCARRD - Philippine Council for Agriculture, Forestry and Natural Resources Research and Development
6) IRRI - International Rice Research Institute
7) ICRISAT - International Crops Research Institute for the Semi-Arid Tropics
8) USM - University of Southern Mindanao
9) PAC - Pampanga Agricultural College
10) CLSU - Central Luzon State University
11) ISU - Isabela State University
12) UPOU - University of the Philippines Open University
13) ATI - Agricultural Training Institute
14) DA-ITCAF - Information Technology Center for Agriculture and Fisheries
15) PhilScat - Philippine-Sino Center for Agricultural Technology
16) PhilMech (former BPRE) Philippine Center for Postharvest Development and Mechanization
17) DA-Philippine Carabao Center

The OPAPA was organized due to the limited sources of effective agricultural contents and the inaccessibility of formats for everyone from many different agencies. The objective of the OPAPA is to educate, train and mobilize extension workers and farmers using ICT for agriculture modernization. The Open Academy also aims to provide e-extension services in the form

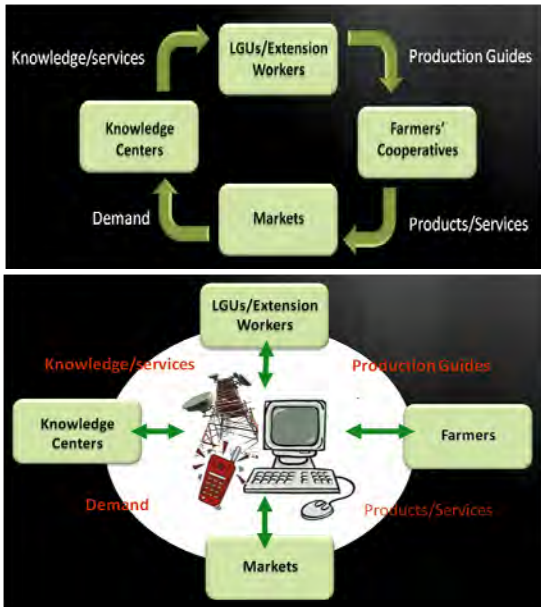


Figure 3.2.12 Illustration of Conventional (above) and Media-centric Information Flow

Source：PhilRice OPAPA briefing material

of advisory, general knowledge/information and e-learning modules.

To date, most extension services from research agencies and central government institutions still rely on face-to-face communication (*conventional information flow-above in the figure*). While this physical method has been proven effective, the time needed to deliver services and the manpower required to do such activities remains a constraint.

Through the OPAPA and the use of ICT (*media-centric knowledge flow-below in the figure*), more clients can be reached within a shorter time with the use of mobile phones and computers.

The OPAPA is an action research program which aims to generate knowledge or models on how to effectively use ICT for farmers and AEWs. Based on testing of ICTs, PhilRice currently provides the following services:

2.1.1) Farmers' Text Center

The Farmers' Text Center (FTC) was launched in 2004. The target clientele are mostly rice farmers and extension workers. It is primarily focused on rice but also caters for rice-based crops/systems. Clients can send SMS and MMS messages as well as call the FTC hotline, 09209111398 (SMART number).

The SMS messages take up the majority of the queries received, amounting to 98%. It is also the cheapest way to reach the FTC, with each 160-character (or less) message costing P 0.80 (beginning December 1, 2011). Calls only make up 2%, probably due to the charge (average of P 7.0 per minute for any subscriber/telecom). MMS messages (picture messages), are not yet gaining that much popularity among the clients especially since it requires mobile phones with camera functions and relatively higher rates for sending messages.

The FTC SMS platform being used by PhilRice is also user-friendly. Unlike the usual services offered by telecoms which require syntax and registration, clients can simply send their queries in any format they want. It is also not service provider-specific, which means that messages can be sent and received regardless of the telecom subscription. The FTC is running through a program from InfoTXT.com (http://infotxt.com), a USA company operating in the Philippines as GiveMe Unlimited, Inc. (www.myinfotxt.com).

Figure 3.2.13 Illustration on how the InfoTXT.com platform works for messaging

Source : Infortxt.com

Figure 3.2.14 Illustration on the use of the InfoTXT.com platform for sending/receiving queries/push tips and receiving between Clients and FTC/Agent

Source：PhilRice OPAPA briefing material

Bought for P 130,000, the PhilRice runs the FTC platform from the OPAPA office but it is actually hosted outside in a Manila server.

While, a 160-character (or less) SMS query costs the client P 0.80 (previously PhP 1), each reply/push tip SMS sent costs the FTC/PhilRice P 0.50 per SMS (regular messaging was previously at P 1.00). Calls, which are made by FTC agent to the client if the query is unclear, cost P 7.00 per minute (using a fixed line phone).

There are also instances wherein an automatic reply (in Tagalog) is sent for queries that refer to varieties (message should contain only the name of variety i.e. “IR64” or “IR 64” and without any other words). The auto-reply message (usually in two parts as it would not fit 160 characters) would send out the distinct characteristics of the variety being asked. The FTC services are not just on the rice varieties. There are also queries on availability of seeds wherein they can just send an SMS (i.e. IR64 Isabela or IR 64 Nueva Ecija) and the FTC operator/agent will provide the real-time information on the seed availability in the area.

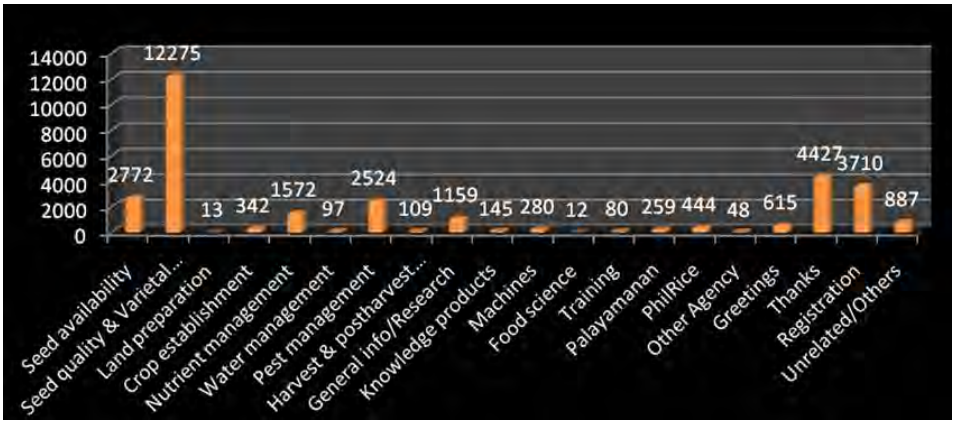


Figure 3.2.15 SMS/texts received by FTC per classification from Jan-Nov 2011

Source：PhilRice OPAPA FTC Status of Implementation

The FTC also sends out “push tips” or rice technology tips periodically for certain areas at a time. Diagnosis of rice pests through MMS/email, while few have availed, is also done or facilitated (coursed through local MAO or PhilRice specialist in the area). There is also

information on weather forecasts broadcasted in certain areas to be affected.

As shown in the figure above, the top three topics during this year (Jan-Nov 2011) are (1) Seed Quality and Variety at 12,275 texts (39%); (2) Seed Availability at 2,772 texts (9%); and (3) Pest Management at 2,524 texts (8%). "Thank you" messages (4427) and registration texts (3710) are also ranking high at 14% and 12%, respectively.

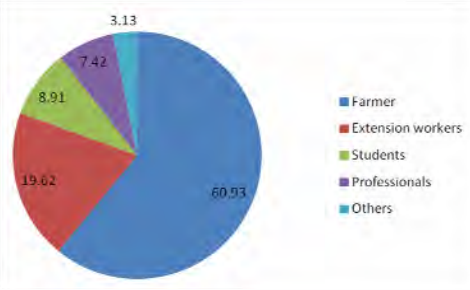


Figure 3.2.16 FTC customer database (Nov. 2011)
Source：PhilRice OPAPA FTC Status of Implementation

Currently, the FTC serves 26,500 registered clients. For this year (Jan-Nov), a total of 3,670 newly-registered users were added to the FTC's client list. Top five provinces, in order, are: Agusan del Norte (327); Compostela Valley (257); Nueva Ecija (219), Isabela (208); and Ilocos Norte (152). Of the total registered clients, 20,867 (78.7%) are active texters (number of actual person sending SMS).

The customer database as of November 17, 2011 (with 22,844 clients) recorded the following number of users of FTC:

1. Farmers – 13,918 (60.93%)
2. Extension workers – 4,481 (19.2%)
3. Students – 2,035 (8.91%)
4. Professionals – 1,694 (8.91%) and
5. Others (housewives, unemployed and blue-collar job workers) – 716 (3.13%)

As of November 2011, the FTC has received 39,295 messages with an average of 3,572 SMS per month (Jan-Nov 2011). In one day, 80-120 queries through text are received, most of which are from farmers, students and extension workers. Compared with the 2010 data, there's a 22.88% decrease in terms of messages received for the same period this year. This is attributed to the failure/issues of the InfoTXT platform connected with the FTC push tips messaging/info blasting.

Figure 3.2.17 Comparison of SMS received by FTC per month (2010 and 2011)
Source：PhilRice OPAPA FTC Status of Implementation

There are 2-4 operators at Munoz, from the OPAPA staff. Since all PhilRice stations were also given access to all the applications in the InfoTXT platform, one staff from each station teams up with the staff at Munoz to manage the FTC operations (i.e. Monday = 1 or 2 PhilRice

Munoz plus 1 PhilRice Batac, Tuesday = 1 or 2 PhilRice Munoz plus 1 PhilRice Agusan, and so on). Making the rounds among the PhilRice stations is not only helpful in terms of manpower distribution but also in actually answering the clients' queries since the FTC is a multi-dialect service, which is available in English, Tagalog, Iluko, Hiligaynon and Cebuano.

2.1.2) Pinoy Rice Knowledge Bank (Interactive Knowledge Resources)

The Pinoy Rice Knowledge Bank (PRKB) website (www.pinoyrkb.com) was established to support the Philippine Rice Sufficiency Program and its stakeholders. As a PhilRice-IRRI collaboration, its main purpose is to become a one-stop source of updated knowledge resources on Philippine rice production, especially for extension workers, development specialists, farmer organizations, NGOs, LGUs, and media practitioners, among other. Results of the location specific technology development (LSTD) program are also provided in this website.

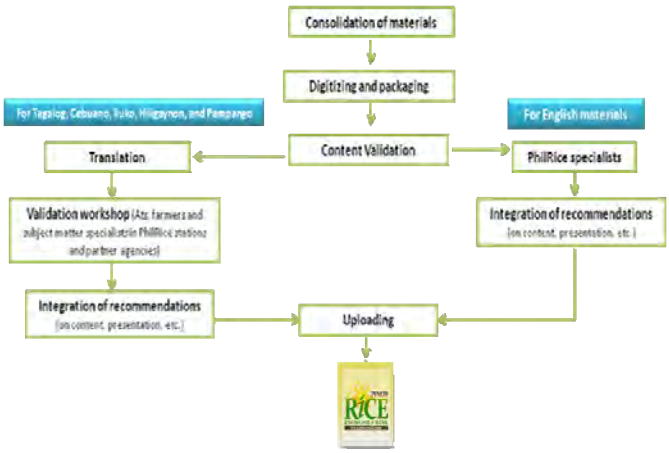


Figure 3.2.18 Process of content development

Source：PhilRice OPAPA FTC Status of Implementation

Development of the knowledge bank was further intensified since May 2010 through several consultation meetings and validation and evaluation workshops, the latest of which are focused on content development and translation of resources into several local dialects (Tagalog, Hiligaynon, Cebuano, Iluko and Pampango).

The site contains downloadable resources such as PowerPoint presentations, handouts, one-page fact sheets that extension workers can use and can be readily printed and distributed. These interactive knowledge resources can also be in the forms of audio recordings, video clips, educational/informative games, etc. The information included in these resources are coming directly from PhilRice experts.

Table 3.2.17 Contents of Pinoy Rice Knowledge Bank as of November 2011

Uploaded resources	Quantity
Handouts	
English	*62*
Cebuano	*34*
Iluko	*40*
Hiligaynon	*49*
Pampango	*29*
Tagalog	*52*
Broadcast Releases	
Tagalog	*52*
Cebuano	*11*
Modules (PowerPoint presentations)	*33*

Technology Videos	*18*
Audio clips	*55*

Source：PhilRice OPAPA FTC Status of Implementation

As of November 2011, a total of 425 resources have been uploaded to the Pinoy Rice Knowledge Bank website. In mid-November, OPAPA was able to produce a limited number of CD-based PinoyRice English and Tagalog versions, packed with the contents of the website.

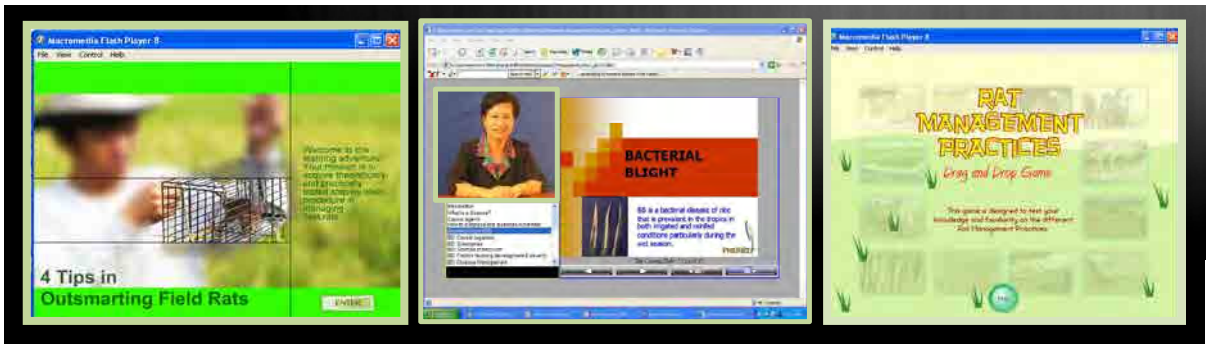


Figure 3.2.19 Screenshots of some Interactive Knowledge Resources being produced by OPAPA

Source：PhilRice OPAPA FTC Status of Implementation

OPAPA has also started and/or intensified their monitoring of the website's activities (through a Search Engine Optimization report) and their download logs. In the period of July to November 2011, the PRKB recorded a total of 3429 download occurrences for PowerPoint presentations and video clips.

Table 3.2.18 Number of Downloads for PPT and Video Clips

Resource	Occurrence	Downloader	Classification		Top Downloads (Topic)
			Farmers	EWs	
PowerPoint presentation	2,908	921	331	169	Transplanting, Seed and Variety Selection, Fertilizer Materials, PalayCheck Concepts, Nutrient Management
Video clips	521	123	36	22	Seed and Variety Selection, Harvest Management, Controlled Irrigation, Sabog Tanim (broadcasting), Lipat Tanim (transplanting)

Source: PKRB Progress Report (2011)

For the handouts, the website module (DOCman) was able to populate a list of the top 50 downloaded handouts. From this list (see Annex 1 for the complete list), a total of 51,488 downloads have been recorded for those published between March 2010 to June 2011. These topics/handouts do not pertain to specific rice technologies alone but also information on PhilRice products for sale, statistics (provinces' yield, area, and production), technology bulletins, Q&A Series, directories, machines and cost, and farmers' success stories.

Table 3.2.19 Top 5 downloaded handouts from PKRB

No.	Title	Downloads	Date Published
1	10 Steps in Compost Production	5842	21-Jul-10
2	Hakbang sa Paggawa ng Kompost (Steps in making a compost)	2214	21-Jul-10
3	Rice straw-based nutrient management	1639	21-Jul-10
4	Carbonized Rice Hull	1469	21-Jul-10
5	Management of zinc-deficient soils	1305	21-Jul-10

Source: PKRB Progress Report (2011)

The hits or number of visitors registered in the website is increasing. Extension workers in Visayas can access the information available from Nueva Ecija. There are also LGUs who invest in ICT so that AEWs can access the website. There are still only few but many are convinced that they really need internet connection and are trying to invest in infrastructure.

The downloadable and CD-based offline interactive knowledge resources are very beneficial and useful especially for users who do not always have stable internet connection. Once downloaded and saved/stored in the computer or memory drive, these can already be accessed even while offline. These can also be shared from one AEW to another or even to progressive/computer literate farmers. In this way, the limitations for accessing the information caused by the difficulty in internet connection, especially in rural areas, can be lessened.

2.1.3) E-Learning Courses on Rice

The e-Learning component of OPAPA has been launched in 2007, the PalayAralan. The website (www.palayaralan.com) is targeting AEWs and progressive farmers and workers who wish to learn more about rice production and related technologies. The website established a new look just in July 2011 and the courses are now made through "Articulate," an e-Learning platform/software package. Apart from the interface, the server was also changed (outside PhilRice) and manual tracking of enrollees' stages in the modules was also done.

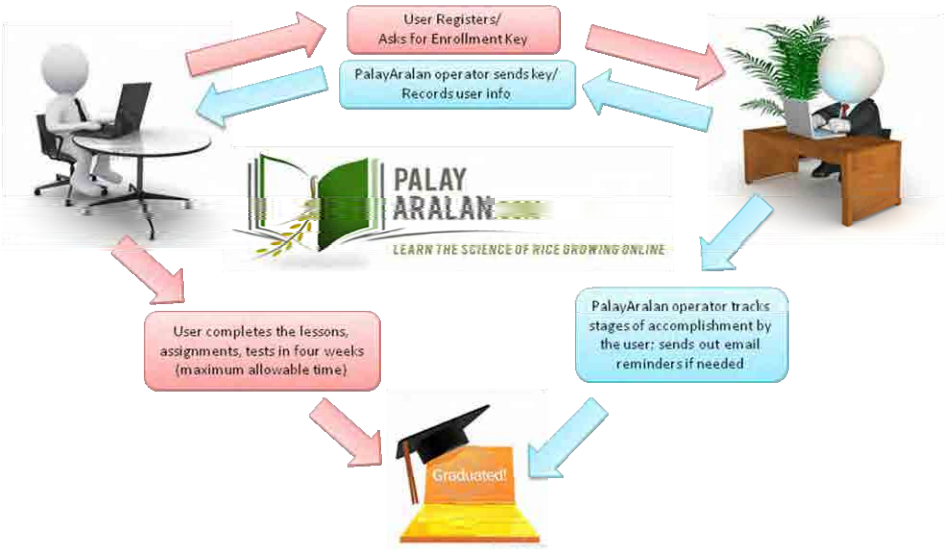


Figure 3.2.20 Illustration of the e-Learning process through PalayAralan.com

Source：JICA Survey team based on PhilRice OPAPA FTC Status of Implementation

Each course can be accessed by anyone after creating an online account. PhilRice would email the new user asking about the course they would like to take. An enrollment key corresponding to the course will be emailed after the user identifies which ones he/she would like to take.

After beginning the course, the user has four weeks (maximum) to complete it. Each user should take the pre-test, go through all the lessons, submit all the assignments, and take the post-test before graduating or finishing the course. The user can also email the PalayAralan operator for any concerns at any stage of the course. He/She can likewise ask for a chat session with an expert for additional clarifications about the lesson being discussed.

The course itself is made up of 2-4 lessons/modules. The user must first finish the first lesson before moving on to the next one. According to the website operator, each course can be completed in one sitting, sometimes as fast as 30 minutes to an hour. However, there are still enrollees who, perhaps due to lack of time or quality of internet connection, would take time completing one course. In these cases, the operator send out and email informing them of their current stage and reminding them to complete the course within the 4-week period.

Unfortunately, even with these measures, the enrollment rate of PalayAralan.com remains low and the graduation rate even lower. Additionally, each user can only be enrolled at one e-Learning course at a time. He/She must first finish the course currently enrolled in before moving to the next one. Annually, there are only about 40-50 enrollees with just have of them able to graduate.

Table 3.2.20 Available e-Learning courses at PalayAralan.com

Course Category	Course Title	Enrollees	Graduates	Development/ Remarks
Rice Production (General)	Rice Postproduction Technologies	1	1	2009
	Modified Dapog Technology	3	1	2010/Updated with Articulate
	Controlled Irrigation	5	2	2010/Updated with Articulate
Fertilization	Minus-one Element Technique	2	1	2010
	Nitrogen Fertilizer Management Using LCC	1	1	2010/Updated with Articulate
	Production and Use of Rice Straw-based Organic Fertilizer	---	---	---
Pest, Disease and Weed Management	Management of Armyworms and Cutworms	8	7	2010/Updated with Articulate
	Management Options for Golden Kuhol	1	1	2009
	Management of Rice Blast Disease	1	1	2009
	Management of Rice Black Bugs	---	---	---
	Management Options for Ricefield Weeds	---	---	---

Source: PalayAralan status of implementation (2011)

Some of the enrollees and graduates are Africans, those who were in PhilRice for a separate training. Unlike the e-Learning platform of ATI, PalayAralan can be used/access even by foreign nationals. Still, most enrollees are OFWs who have farms in the Philippines. They are the ones learning and instructing their tenants/caretakers on how these technologies can be applied.

The PalayAralan platform of PhilRice is limited only to rice production or rice-based technologies. For other concerns, such as swine raising and fruit production, the operator re-directs them to the e-Learning site of ATI.

2.1.4) ICT Road Shows and Cyber Communities

A hindrance/challenge for delivering agricultural information through the media-centric knowledge flow is the absence or lack of infrastructure and equipment to access ICT products. Additionally, the level of computer literacy also varies among the areas.

To respond to the situation, PhilRice has conducted several ICT road shows or information caravans with the aim of bringing online agricultural information to rural areas. By showing that there is content readily available for AEWs and farmers, PhilRice hopes to convince local chief executives (LCEs) to invest on ICT infrastructure and capacity building.

In 2006, PhilRice converted a JICA-donated vehicle (coaster) for TCP1 (1991) into a Mobile Internet Bus (MIB) in 2006. The MIB is equipped with: 12 laptops; 1 television; 1 DVD player; speakers; 1 LCD projector; LCD white screen; and 1 microphone. The MIB is complemented by a smaller Mobile Internet Cab for the same purposes but with limited functionality.

Broadband internet connection is also made available but is not very stable especially when in far-flung areas without cell sites. In instances wherein there are more than 11 participants (seating capacity of the MIB), the training is moved to the village gym/covered court to accommodate everyone. Otherwise, the training is still conducted in the MIB but participants are divided into two groups/batches.

Rice technology training using the MIB
Source: PhilRice OPAPA briefing material

Through the MIB, several rice technology and basic ICT trainings and activities has already been conducted in the provinces of Aurora, Bulacan and Tarlac for 2010 and 2011. The bulk of these trainings were conducted in Aurora as several e-villages (to be confirmed) are being

supported by PhilRice. Target participants for the trainings included AEWs, farmers, and even primary school students.

The rice technology trainings were mostly on pest and nutrient management, wherein lectures and discussions were conducted by a PhilRice specialist/expert. Meanwhile, the basic ICT trainings included an introduction of the basic computer parts and terms, basic skills (on and off, typing, clicking, opening and closing applications). Hands-on activities like using the internet were also conducted. PhilRice e-services such as the OPAPA and the FTC were also promoted for both rice technology and ICT trainings.

Table 3.2.21 Rice Technology and ICT trainings conducted from July 2010 to June 2011

Province	Training Type	Participants				
		Brgy	Coop	AEWs	Farmers	Total
Aurora	Rice Technology	449	74	N/C	N/C	523
	Basic ICT	907	113	N/C	N/C	1020
Bulacan	Basic ICT, Internet OPAPA e-services	N/C	N/C	---	24	24
	Basic ICT, Internet OPAPA e-services	N/C	N/C	N/C	N/C	22
Tarlac	Basic ICT	---	---	15	---	15
Total		1356	187	15	24	1604

Source: PhilRice MIB report (2011) N/C: Not Classified

Apart from the ICT road shows, PhilRice also established “Cyber Communities” throughout the Philippines. The 12 (Luzon, 5; Visayas, 1; Mindanao, 6) Cybercom serves as Rice ICT Research and Applications Satellites wherein ICT programs of PhilRice are being tested. The Cybercom is being run through a partnership with either the barangay, cooperative or LGU.

Each partner was provided with a desktop computer and internet connection for one year wherein farmers are being taught how to use the computer and how it can be utilized to access agriculture information. Currently, a barangay-led partnership proves to be the easiest to access and also the most popular way because farmers don’t have to change into good clothes or be bothered with appearances. Each Cybercom also has a computer operator or intermediary to assist users. Farmers’ children can also be trained to help their parents.

2.1.5) Other ICT services

- ***Virtual consultation with experts through Skype or Yahoo! messenger*** – PhilRice can set-up a real-time consultation meeting/session between a PhilRice expert and a group of farmers, regardless of the geographical distance. However, good internet connection and bandwidth is required to facilitate good teleconferencing.

- ***Radio + SMS + Internet*** – Radio is still one of the powerful tools that can be used to reach rural areas, especially in Visayas and Mindanao. Interaction happens when listeners

(mostly *farmers*) to the radio program on rice and corn send in text messages or queries. The broadcaster will either search for answers from the internet or direct the question to be answered by PhilRice. There has been good response from the radio programs in Pampanga and Mindanao for the lunch time program (10:30-11AM). P 3000 is being paid for per week for a once a week program with hundreds of listeners. University facilities/broadcasts, while most of the time is provided for free, have less than 100 listeners. In North Cotabato, payment is one sack of rice/1600 per month for the on-going once a week program (5-5:30AM). For lesser costs, OPAPA opts to produce interviews of rice experts on certain topics and then provide CDs to radio stations if they would want to include it in their program.

2.2) Information Systems Division

The Information System Division (ISD) is a new division that integrates and rationalizes the ICT activities. It aims to tap the potential uses of ICT to help achieve PhilRice's contribution for the rice self-sufficiency program. The ISD resulted from the merger of the following divisions:

- Information and Communications Technology (hardware: computer and telecommunications)
- Library systems (e-library system and general library services)
- Rice Information Systems and Agricultural Database (Information Systems Development; data capture, transmission, storage and sharing)
- GIS Laboratory (GIS processing, remote sensing)

Currently, the ISD is continuously developing, implementing and improving several information systems model for users and stakeholders.

2.2.1) Rice Data Information Portal

- *Seed stocks for sale information system* – list of available seeds in PhilRice being updated in real-time (available online).
- *Philippine seedboard (PSB)/NSIC rice variety characteristics database* – tabulated and searchable using codes/keywords such as irrigated, transplanted, etc.
- *Real-time, interactive rice variety preference survey* – farmers can post online what variety they'd like to plant so PhilRice can prepare what to produce in advance.
- *Nationwide rice seed growers inventory* – list of rice seed growers (name, address, mobile phone number) in the entire country presented using some GIS-aided techniques.
- *Rice production technical question and answer database* – can work hand in hand with the FTC, also multi-lingual.

- *Rice R&D highlights* – a database of the studies conducted by the institute from the beginning of PhilRice to the present (sorted/searchable according to author and subject).
- *Ricewiki* – a website similar to Wikipedia but all the information to be accessed is about rice. The website already had initial inputs and is also open to inputs from public users (last modification of the Main Page was on February 11, 2010).
- *Soil series-based soil management system* – a collaboration project between BSWM (using the old maps) and the Agronomy and Soils Division of PhilRice, this system contains information that is already accessible in the internet (survey of other areas is still on-going) and covers even the non-rice areas at barangay level.

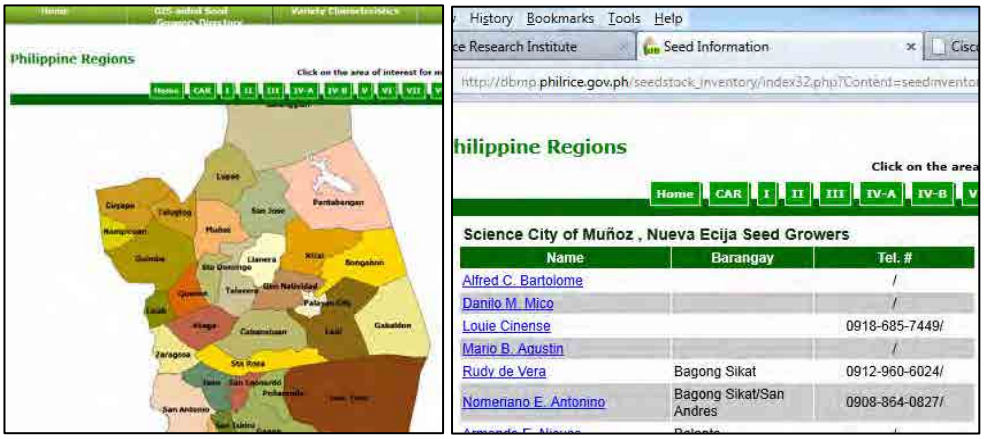
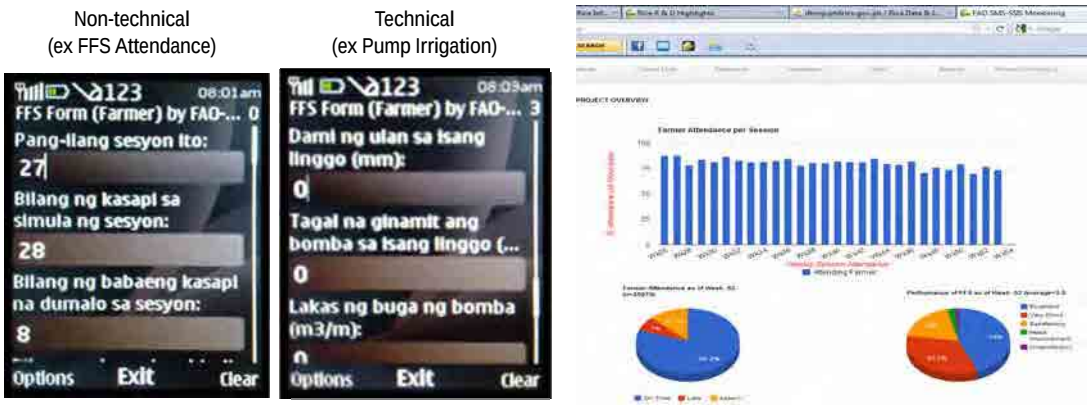


Figure 3.2.21 Screenshot of National Rice Seed Growers

Source: PhilRice ISD briefing material)

2.2.2) Cell phone based survey form and online dashboard model

It is a Java program installed in mobile phones that uses forms (sent via SMS once completed) for filling out technical and non-technical information initially used for project management. The data sent through the SMS server were shown in a real-time dashboard (tables and graphs). This has potential application for real-time gathering of field data and information using cell phones.



Cell-phone based survey form **On-line Dashboard Model**

Figure 3.2.22 Cell phone based survey form and online dashboard model

Source : PhilRice ISD briefing material

This program, fully developed in 2010, was a component of the Rain-fed Agriculture Development Program by the FAO (specifically the Small Scale Irrigation System project). The program was targeted for the extension worker and farmer leaders in the project sites.

The content was more on irrigation systems management and the project management system. The developer of the program indicated that it can be modified for other uses such as quick response system in times of calamity, yield prediction (data collection at flowering/panicle initiation, counting the spikelets per square meter), price monitoring, cropping calendar data collection, and infestation mapping, among others.

The Model or Program is running and functional, and the informant (data sender) can either be identifiable through a serial number (more secure but possibly lesser number of users) or not identifiable (mass use). The Model uses two servers and two terminals and cost less than PhP 1 million for piloting at Central Luzon (Region III). Most of the budget went to the software server, database server, and SMS terminal.

The technical capacity of human resource is considered good enough but hardware must be magnified depending on the area coverage. For the informant side, there's a need to install the program in their cell phone or even provide Java-enabled phones. Bigger bandwidth is also required as well as the need for back-up servers (preferably outside of PhilRice) and higher level of cyber security.

2.2.3) Rice area mapping

Rice area mapping is a project that developing a model to delineate rice areas by using remote sensing technologies. It was started two years ago through collaboration among DA-PhilRice-IRRI satellite images (three satellites: IR and radar, biomass signature, water signature). PhilRice is involved in basic image processing, developing the rice map based on ground-based and remotely sensed data. The groundworking has been started last year, and Ricescape© (a dedicated processing chain that enables mapping of rice areas, detection of emergence, and monitoring of growth for the whole cropping season) is still under development (by sarmap in Switzerland in collaboration with PhilRice and IRRI). Software development is targeted for completion by the first quarter of 2012. To date, a 80-90% accuracy has already been recorded but this still needs more validation.

2.2.4) Others

- ***Other rice production management information systems*** – online searchable and clickable content.
- ***Online GIS-aided directories*** – areas where PhilRice interventions are (Google API: Application Programmable Interface) for location specific technology development sites and

services.

2.2.5) Challenges and Proposals

One of the biggest problems in the country in terms of ICT application is that internet connection is not yet that good in rural areas and farming communities. It is also a problem for PhilRice (in Munoz and in other branch stations) even if it is considered near the city or center. With the availability of internet connection, more information put up in the web and other e-services can be more easily accessed.

PhilRice also has issues when it comes to bandwidth and connectivity, even for the local servers in the headquarters. As such, certain services of OPAPA and ISD are being hosted outside, for reliability and security purposes. Additionally, the need for capacity building in terms of ICT use and application is also much needed at the users' end. Infrastructures and equipment responding to ICT needs is also necessary to access the available information.

Apart from these, PhilRice has identified the following needs that can possibly be addressed through ICT use and applications:

- Real time information when calamities strike is essential for planning and operations (physical area/configuration, boundary of flood in each day or drought)
- Online drought and flood forecasting using remotely sensed images is being conceptualized
    - To have a near real time updated online information on calamity areas
    - Provide user with up-to date geo-spatial, agro-climatic data and information
    - Develop a tool in forecasting flood and drought in the Philippines
- Watershed management is also very important in relation to real-time data collection, storage and further analysis of long-term data

3) International Rice Research Institute (IRRI)

3.1) Nutrient Manager Rice (NMRice) Program

The NMRice or Nutrient Manager for Rice of the International Rice Research Institute is a computer- and mobile phone-based decision-making application to help farmers in determining the appropriate amount, type of fertilizer, and timing of applying fertilizer for their rice crops to maximize production, increase profit and reduce wastage.

NMRice is a collaboration program between IRRI, PhilRice and SUCs at the beginning of its development and piloting activities. Currently, ATI handles the information dissemination activities to further promote

NMRiceWeb 2.0, available in English and five Philippine dialects
Source: screenshot from IRRI website

the use of its platforms, web-based and CD-based, especially its text messaging service.

The first of its kind in Asia and the world, NMRice program is a location-specific nutrient manager decision-making tool aimed at aiding farmers in terms of crop fertilization. The program was developed in four platforms: original one page guide; CD-based application; web-based application; and mobile phone application. The NMRice Mobile works by asking 13 questions to farmers through an IVR (interactive voice response) system that can be responded to through voice messages and keying numbers through the mobile phone's number pad.

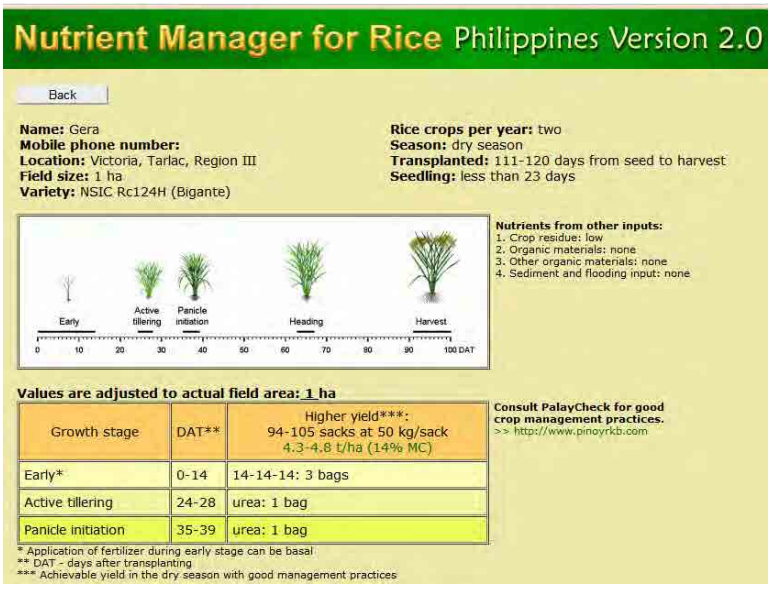
Pilot activities of developing NMRice module have been carried out in Region VI since 2004, with the involvement of the West Visayas State University (WVSU) through the Extension and Development Center Director, Dr. Greta Gabinete. The collaborative research between WVSU and IRRI (also serving as the funding institution) following the principles of the Site-Specific Nutrient Management (developed in mid-1990s by IRRI and Philirice), been expanded to contribute to the NMRice software. This was made possible through further collaborations with other research and extension agencies at varying stages of program development in the region.

Table 3.2.22 Collaborators and activities for the NMRice development in Region VI

Year	Collaborators	Activities
2004	IRRI, DOST-PCARRD, WVSU	Data gathering for field condition, soil type, crop management practices and residue management
2005	IRRI, DOST-PCARRD, WVSU	Drafting of recommendations for Iloilo
2006-2007	IRRI, DOST-PCARRD, WVSU	Conduct of field experiments and verification trials
2008	IRRI, DA-RFU, PhilRice, WVSU, ATI	Refinement of nutrient management recommendations; launch of CD-based NMRice (October)
2008-2010	IRRI, DA-RFU, PhilRice, WVSU, ATI	Data gathering and expansion for Aklan, Capiz, Antique, Negros; launch of NMRiceWeb (Version 1.1, 2009); launch of NMRiceWeb (Version 2, 2010); launch of NMRice Mobile (September 2010)
2011	IRRI, DA,-RFU PhilRice, WVSU, ATI	Data collection and analysis on use of PalayCheck and Nutrient Manager, continuous information dissemination;

Source: Interview with ATI (2011)

As of late, focus is given in the information dissemination on how to access this service and how its recommendations can be followed and applied by the farmers. The one-page guide, used as a questionnaire to gather data from farmers in the pilot sites, has been simple and easy enough to understand. However, as the data from these one-pagers become more and more, there was a need to develop an application that would make it easier to facilitate retrieving the needed



Result of mock data entry for NMRice Web. The result also includes NPK rate conversion and fertilizer cost estimation Source: screenshot from IRRI website.

information from the farmers and the feedback from the database.

The one page guide used at the beginning is already replaced with the CD- and web-based application (NMRiceWeb 2.0), allowing for a faster access to information and results. Seminars and information caravan on how to use both computer- and mobile phone-based platforms have been conducted in pilot sites within the region.

AEWs and farmers alike, though already trained, were still having difficulties in the use of the computer-based application. The lack of infrastructure and equipment, such as internet access, computers and printers, remains a constraint in the use of this system.

For instance, in actual field implementation (as experienced in the municipality of Dingle, Iloilo), AEWs would need to bring a laptop or desktop PC in a meeting/orientation area. From there, the CD-based application can be accessed and each farmer can take turns in working together with the MAO to get their fertilizer recommendation. However, as there may be no electricity in the area or when printers are not always available or since inks have already run out, the information would most likely be written in a piece of paper and handed over to the farmer.

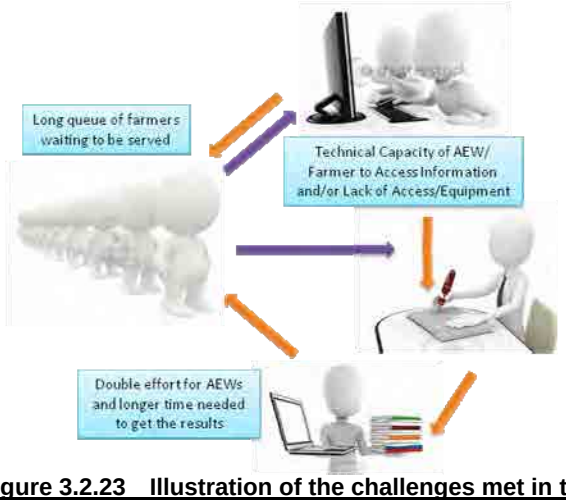
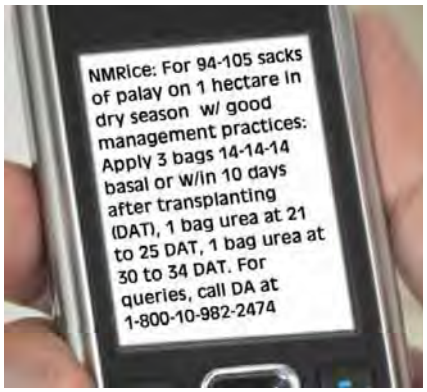


Figure 3.2.23 Illustration of the challenges met in the field for the use of computer-based NMRice

Source：JICA Survey Team (2011)

In areas where computer is not available, the AEW must reproduce a two-page questionnaire to be filled out by the farmers. This is mostly done by the farmers while being guided by the AEW, explaining each question and then answering these one by one. After that, the questionnaires would be collected from the farmers. Upon returning to the office, the AEW would need to input the answers of individual farmers in the computer-based system in order to get the nutrient management information and results.

While these processes still meet the needs of farmers for nutrient management information, it's still not done in the expected turnaround time. As such, the number of clients being served remains at a minimum. And instead of lessening the task of AEWs, these processes are actually taking more time from their other tasks. These bottlenecks defeat the purpose of serving more clients through the computer-based platform. This really needed to be addressed as both developers and users of NMRice have acknowledged its effectiveness and benefits—right timing and right amount of



An edited image of SMS response (IRRI annual report 2010)

fertilizer resulting in reduced waste of money and resources, reduced input costs and higher yield/production.

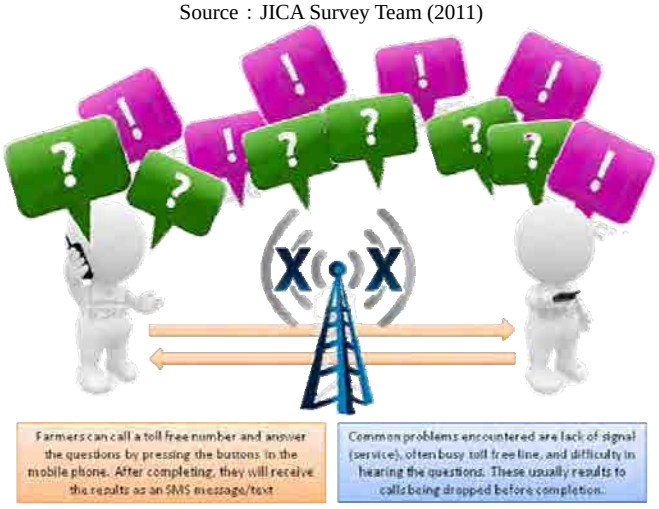
In response, the NMRice Mobile, commonly known as NMRice Text, was conceptualized and launched. NMRice Text is supposed to bridge the gap between the lack of equipment, access to internet, and gaps in technological capabilities by providing a simple and easily accessible service through SMS and toll-free calls made from mobile phones.

The farmer only needs to call a toll-free number wherein an automated voice service would ask questions pertaining to his/her farm. The farmers will then answer by inputting the information through typing in the mobile phone's keys/buttons.

As per experience of Dingle farmers who have tried the service, the entire exchange of questions and answers would normally last for about 10 minutes. Afterwards, a system-generated result (from IRRI database) from the answers provided would be sent to the caller's mobile phone as a text (SMS) message.

Figure 3.2.24 Illustration of the NMRice Mobile Question and Answer exchange

Source：JICA Survey Team (2011)



However, the process does not always go very smoothly. In a trial and error 'experiment' done by the farmers during one orientation session, only two callers at a time were able to get through to the toll free number. The third caller ends up with a busy tone. According to ATI, Initial results showed that only 17% of callers actually finished the calls. The call dropping (83%) was said to be due to misunderstanding of the questions or instructions, keying wrong syntaxes, etc.

There were also issues in terms of connection and clarity of conversation due to the coverage of Globe, the telecom currently providing the toll-free service in the area. Not to mention the fact that farmers wanting to avail of the service should use and/or purchase a Globe SIM card. An earlier meeting with ATI revealed that though Smart has been a partner in the earlier stages, the telcom is yet to provide the toll-free service.

Another issue for unsuccessful or dropped calls is the lack of or misunderstanding on the part of the farmers about the questions being asked and the expected questions. Each question is repeated a maximum of three times, giving the caller two chances to repeat the question before giving an answer. However, there are still instances that the farmers would not completely understand the question, even if it is already in their local dialect. In this regard, ATI, together with the MAO in the pilot areas, are conducting a series of orientations explaining each of the questions being asked during the call. The farmers were also being taught of identifying the possible answers and how it can be provided by inputting through the buttons of the mobile phone.

As convenient and accessible as it is, however, the NMRice Text platform is still limited. Unlike the computer-based NMRice platforms which allow multiple factors, the NMRice Text platform is only applicable for farmers who would be applying 10 bags or less of organic fertilizer for a one hectare plot and for farmers who cultivate rice crop twice a year. For applications beyond that, the farmers should turn to either the CD-based or web-based platform.

Meanwhile, IRRI is pushing the use of mobile technology further through the development of android-based software/program. Beta versions of this program have already been uploaded in the "android market" (though advised not to use yet as some changes are still being made) for the use of Philippines, Bangladesh and Indonesia. Additionally, the NMRice web-based platform is already made available at the IRRI website for Philippines, Indonesia, China, and soon coming are Bangladesh, Vietnam, and western Africa countries.

A part from the expansion of NMRice, IRRI is also developing a program of a total crop management of rice.

4) DA-Regional Field Unit (RFU)

The Department of Agriculture Regional Field Unit (DA-RFU) is currently conducting several activities under the Regional Agriculture and Fisheries Information Division (RAFID) geared towards improved information dissemination of the DA programs and activities in each region. Several forms of ICT such as radio, TV, mobile phones, fixed line phones and internet are being used to disseminate information through a wider scale. This is complemented by agriculture information caravans and partnership with LGUs and other attached agencies. The RFU also conducts regular meetings and even trainings for the designated information officers from the DA-attached agencies in the region as well as those coming from the LGUs (PAO-level). This sub-section of the report introduces a case of DA-RFU VI, where an interview survey was conduced.

4.1) Radio and TV Broadcasting

RAFID of DA-RFU VI has a "recording studio" and has acquired equipment for audio and audio-video production (including digital cameras, video cameras, lights equipments, etc.) to aid them in their radio broadcasting and cable TV shows as well as for other AV requirements. The recording studio has the potential to be a radio station if and only if the RFU will be able to secure a transmitter and a permit from the National Telecommunications Commission (NTC) and franchise from the Department of Transportation and Communication (DOTC)—both of which are really hard to get these days.

For now, RAFID broadcasts the recorded materials through two local radio stations, one community cable TV channel and one University channel. Topics for the shows are on agricultural information and technologies for the different commodities. Programming includes interviews of agriculture experts for specific commodities, success stories from progressive farmers turned entrepreneurs, and reading of greetings/messages/comments/suggestions from listeners/viewers (farmers, AEWs, students). Jingles (catchy songs/melodies with agricultural information as lyrics) and

radio plugs (announcements) are also recorded in the studio and broadcasted through the different programs. Hiligaynon, the local dialect in most of the provinces in the region, is the primary medium of communication followed by Filipino and English.

Table 3.2.23 Programming Schedule and Costs of Radio/ TV Programs

Radio Station/ TV Channel	Topics	Schedule/Time Slot	Duration	Cost for Airtime
Bombo Radyo (commercial radio station)	Agricultural Information	Every Thursday 8-8:30pm (primetime)	30 minutes	PhP 45,000 per month
	Entrepreneurial and Success Stories	Every Saturday 9-10am	1 Hour	
DYRI RMN (commercial radio station)	Agricultural Information	Daily (Monday-Friday) 4-430am	30 minutes	PhP 30,000 per month
Community Cable Channel	Agricultural Information	Every Saturday 9-10am Tuesday and Thursday (replay)	1 Hour (3 hours per week)	PhP 20,000 per month
Central Philippine University Channel	Agricultural Information	Every Wednesday 7-8pm	1 hour	Free

Source: Interview with DA-RFU VI and RAFID (2011)

Starting next year 2012, another program will air every Thursday over Radyo ng Bayan, a government owned and operated radio network. In the nearby island province of Guimaras, a Community Audio Tower System is hooked with (basically tuned in to) DYR RMN radio station to broadcast (megaphones were installed) the 4:00am Agri Pinoy radio program throughout the barangay. The CATS is already being maintained by the Barangay Council. They were trained by RAFID on radio programming (content development) and are likewise provided with basic maintenance training.

Another radio component extensively used by the RAFID is the School-on-the-Air (SOA) program. A 4-month long broadcast over the DYRI RMN radio station, the SOA aims to provide complete information to students, usually farmers, on specific agricultural production technologies (one for each year).

A total of 12 SOAs have been conducted from 2000-2011. Over the years, the highest number of enrollees (725 farmers) was recorded for the SOA on “Swine Raising Technology/Biogas digester in 2003”. The “Banana Production Technology” in 2005 recorded the lowest enrolment with 145 farmers. This year’s topic on “Organic Farming and Sustainable Agriculture” is the second highest in enrolment with 567 farmers.

Table 3.2.24 List of SOA Conducted from 2000 to 2011 by RAFID, RFU VI

Year	Topic	Enrollees
2000	Rice Farming Technology	245
2001	Poultry Production	315
2002	Mango Production	187
2003	Swine Raising Technology/Biogas digester	725
2004	Coffee Production and Rejuvenation	542
2005	Banana Production Technology	145
2006	Hybrid Rice Production with Emphasis on Rice Black Bug Management, Prevention and Control	278
2007	Integrated Pest Management for Rice	377

Year	Topic	Enrollees
2008	PalayCheck System	415
2009	Rice Postharvest Technology (Flat Bed Dryer)	300
2010	Palayamanan System (Rice-based Agriculture)	455
2011	Organic Farming and Sustainable Agriculture	567

Source: RAFID, DA-RFU VI (2011)

Unfortunately, of the numbers listed, approximately 20-25% of enrollees drops out during the four-month period and are unable to graduate/complete the SOA. Reasons cited are reception issues, weather effects, busy schedule of farmers and lack of battery for the radio units (usually transistor radio). On the other hand, the number of enrollees does not reflect the actual listenership for the SOA program. According to RAFID staff, there are also a lot of farmers who listen to the SOA even if they are not enrolled.

Like a regular school, farmers have to enroll (for free), take the pre-test, listen consistently in the broadcasts, complete the assignments and pass the periodical test and post-tests before they can graduate. The RFU coordinates with the PAO and MAO to mobilize the AEWs as facilitators of the said activities. The AEWs themselves, even if they are not enrollees, also listen to the broadcasts.

A Farmers Information Bureau on the Air is also formed, composed of technical experts and farmers (farmer coordinators). The members of the Bureau are sometimes asked to guest in the show to share their experiences and knowledge on the topic at hand. The involvement of the Bureau's members were said to have helped in the increase in enrolment.

Additionally, an information caravan/clinic is also being held in the different provinces every now and then. This is not just to promote SOA and the radio/TV broadcasts but also to increase the awareness and participation of farmers and LGUs in the implementation of the RFU's programs.

4.2) Others

The RFU regularly conducts meetings with the designated information officers from the different attached agencies and LGU representatives within the Region. In this way, they would be able to coordinate programs and projects in a more effective manner. Below are some of the current programs and activities related to agriculture extension service delivery in the agencies and provinces, both through face-to-face communication/traditional media and use of ICT:

Table 3.2.25 Current Programs and their Means of Communication

Province/ Agency	Mode of Delivery	Extension Services	Challenges/Solutions
Guimaras	Face-to-face communication, FITS Center	Agricultural Information Dissemination	Internet connection is bad, not all farmers have computers, AEWs and farmers alike need skills training/capacity development in using ICT
Capiz	Face-to-face communication, School on the Air, Mobile phone	Agricultural Information Dissemination	Very few agricultural technicians, seeks out the help of other agencies like ATI
Negros Occidental	Face-to-face communication, IEC materials	Organic farming information	There are not so many times

Province/ Agency	Mode of Delivery	Extension Services	Challenges/Solutions
Iloilo	FITS	Agribusiness and other information	
Philippine Crop Insurance Corporation	Face-to-face communication	Marketing/Product promotion	Digital cameras or mobile phones with camera functionality is needed for faster recording of damaged area/field situation, there's a need to develop a system for easier identification of calamity areas which can receive insurance payments; PCIC can train AEWs as adjusters if and when necessary
Philippine Coconut Authority	Face-to-face communication, Manila paper or Blackboard, posters, leaflets	Coconut production technologies	Coconut farmers are old and technophobic, computers and laptops are not available to access information, field personnel still uses traditional materials since laptops and LCD screens for presentation are not readily available (some LGUs might have); it will be good to have a public computer in Brgy. Hall with a designated computer assistant to aid in accessing such information

Source: Interview with Region VI information officers (2011)

4.3) Challenges and Possible Solutions

Even with the number of programs being implemented by the RFU, the main challenge still lies on the support from the LGUs and LCEs (local chief executive). As much as the RFU would like to reach out to as many farmers in the field as possible, it would be very difficult without the LGU's support. Size of the coverage area, number of manpower, and the capability of the staff in the local agriculture offices (PAO and MAO) vary from municipality to municipality depending on the support being given by the LCE.

Additionally, in the onset of climate change and its effects, information dissemination plays a bigger role in ensuring the delivery of right services. Facilities on agromet stations are needed to help in planning for the cropping calendar and location specific programs. Some LGUs in the region has acquired rain gauges but still needs more (from PAGASA and BSWM) to cover a bigger area.

The RFU has also instituted the *Bantay Peste* brigade (Pest Watch) to involve farmers in the gathering and dissemination of information (volunteer farmer→uses mobile phones, preferably with camera function→sends an MMS (multimedia service) photo of the affected area→FCC receives the information, requests AEWs or experts to verify→info blast sent to farmers in the area through FCC to watch out for possible widespread of infestation).

5) DOST-PCAARRD

5.1) FITS Centers

The Department of Science and Technology-Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (now DOST-PCAARRD) is tasked as the Department's apex organization for national agricultural research system. Although not mandated to conduct extension services, PCARRD has established the Techno Gabay Program (TGP) as one of its banner programs related to agricultural research and extension.

The Techno Gabay Program aims to deliver science-based information and technology services to end-users from the sectors of agriculture, forestry and natural resources (AFNR). Specifically, the TGP aims to accomplish the following objectives:

1. Develop, validate, and promote modalities to facilitate technology promotion, utilization, and commercialization;
2. Strengthen links among technology generators, technology service providers, and technology users; and
3. Complement efforts of LGUs and rural-based organizations (RBOs) in extension services.

To do so, TGP has capitalized on three basic strategies:

a. Bottom-up delivery process – highlights a participatory approach wherein service providers (MAO, LGUs, NGOs, etc) are the primary implementers, with PCARRD and the NARRDN (National Agriculture and Resources Research and Development Network) providing support as facilitators
b. Networking – the TGP maintains a strong network and linkage with various sources (R&D institutions, SCUs) and users (farmers, LGUs, NGOs) of information and technologies
c. Partner Member Agency (PMA) Scheme – a mechanism by which consortium-member agencies (those actively involved in R&D and technology management activities) are tapped to provide research-based information and technical assistance to established Farmers Information Technology Service (FITS) Center or Techno Pinoy Center in their area/locality. As it is integrated in the extension programs of the PMA, it is expected that there will be an accelerated institutionalization of the TGP at regional, provincial and field levels.

The TGP is composed of four interrelated modalities: FITS Center; Magsasaka Siyentista (Farmer Scientist) and Science and Technology (S&T)-based Farms; Information, Education and Communications (IEC) Strategies; and Information and Communications Technology (ICT). These modalities ensure continuous flow of appropriate S&T information for TGP clientele and other stakeholders. All services provided through these modalities converge through the FITS Center.

As of December 2010, there are 743 FITS centers established in 14 regions. The most number of FITS centers can be found in Region III (Central Luzon) with 103, followed by Region VII (Central Visayas). The least can be found in

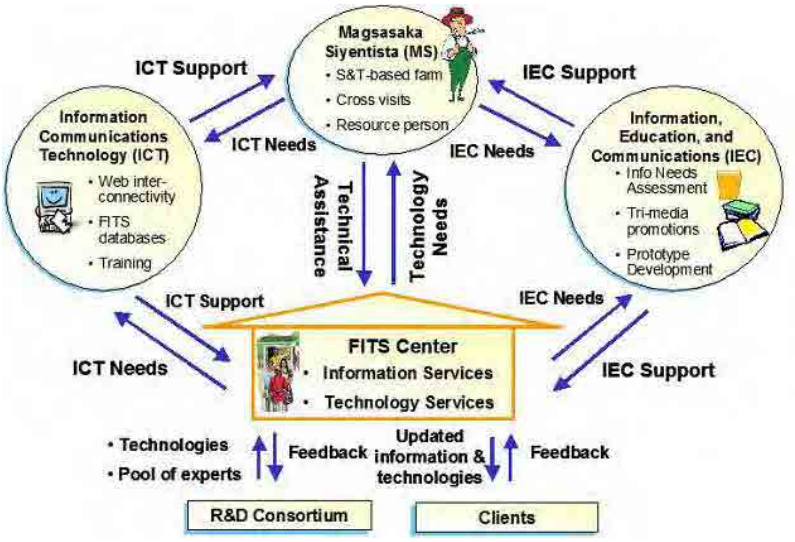


Figure 3.2.25 The Techno Gabay Program Framework

Source：TGP website (2011)

Region IX and CARAGA with 17 and 16 FITS centers, respectively.

Table 3.2.26 Number of FITS Centers per Region as of December 2010

Region	CAR	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	CARAGA
FITS Centers	43	75	72	103	33	48	55	86	73	17	31	38	53	16

As of the survey period, reports indicate that there are already 812 FITS Centers established nationally, an increase of 69 centers established for 2011. While majority of the FITS Centers have Farmer Scientists (some even have more than two in one center), a lesser number have their own S&T Project/Proposal corresponding to the focus commodity.

As FITS Centers are found in the locality (usually one per municipality), it is characterized by accessibility and availability of site-specific information. Focus is given to the commodity widely planted or produced in that certain area. Therefore, a FITS Center is expected to deliver several services to majority of farmers, entrepreneurs, and other clients through providing fast access of information and technologies that fits the users' needs.

The FITS centers can offer both information and technology services. Information services are composed of technology information available in different multimedia formats, exhibit of new technologies and products, internet services, SMS, and FITS database. Meanwhile, technology services include training, link-building with other agencies and financial institutions along with sources of planting materials, animal stocks and agricultural inputs, and technical assistance, among others.

In order to achieve a functional status, a FITS Center must meet the following requirements:

- *Physical* - Accessibility, floor area of at least 50 m^2 with at least two divisions/rooms, FITS billboard
- *Furniture and Fixtures* -Tables and chairs, display cabinets/shelves, infrastructure/communication support (electric power source, telephone lines)
- *Equipment* - Computer (PC Pentium or better) and peripherals, photocopier, TV and stand, DVD/VCD player, sound system (e.g., Karaoke)
- *Data/Information* - AFNR-related books, other publications, communication materials
- *Staff (part-time from host agency)* - Site Manager, Information Services Specialist, Technology Services Specialist
- *Funding Capability* - Ability to provide funds for establishment and maintenance of FITS Center
- *Magsasaka Siyentista (Farmer Scientist)* - who is an expert in the center's focus or priority commodities and products, should be officially connected with the FITS Center

Currently, as the transfer of management of FITS Centers is being done from PCARRD to ATI, the latter is planning to conduct an inventory of the FITS Centers to be transferred, focusing on the

centers' capacity to meet these minimum requirements previously set. The turn-over of 194 (those with commodity focus on rice, corn and small ruminants) out of 812 FITS Centers is expected for completion by the first quarter of 2012.

The National Computer Center has also put up so-called community e-centers. According to ATI, these e-centers can be turned into FITS centers as well. The incentive for doing so may be in terms of providing additional infrastructure to the e-center if it proves to be functional as a FITS center.

6) Challenges and Opportunities in the Agricultural Extension Sector

From the current programs and projects which employ ICT in agricultural extension sector described in this sub-chapter, some lessons have been drawn as a form of Strengths (S), Weaknesses (W), Opportunities (O), and Threats (T)—so-called "SWOT." As summarized in the table below, there are some strengths in common such as pool of expertise, ready information, and linkage with clients or other agencies. On the other hand, weaknesses are also found such as lack of staff due to the rationalization, lack of technical competitiveness, and limited mandate to extension.

Furthermore, looking at the outside of organizations, there are some opportunities including the fact that cost of internet is getting reasonable and more prevailing as well as popularity of social networking. Incompatibility of file formats, limited coverage of network, and limited know-how in ICT are found as threats.

Table 3.2.27 SWOT Analysis on Current ICT Application (Summary)

STRENGTHS	WEAKNESSES
・ Established pool of subject matter experts ・ Monitoring of each stage is done ・ Interactive learning/interface ・ Easy to use ・ Existence of knowledge base/FAQ database ・ Materials are available offline (after downloading) and can be shared ・ Locality-based ・ Accessible to clients ・ Linked with target agencies/groups ・ Various information available for different commodities in different formats	・ Rationalization of positions/ moratorium on staff hiring ・ Low number of graduates/High drop out rate ・ Agents (staff) are limited ・ Few staff monitoring the courses/stages ・ Knowledge base is not very organized yet ・ Not mandated to do extension (mostly for testing/research) ・ Very few enrollees and graduates
OPPORTUNITIES	THREATS
・ Costs of internet subscription, calling, and texting use is getting cheaper ・ Power of social networking for promoting services ・ Collaboration with private telecommunication companies ・ Increasing coverage through improvements/setting up of cell sites	・ Compatibility of downloaded resource formats with user programs/software ・ Cell service or coverage issues ・ Inaccessibility of information due to internet connection issues ・ ICT/Technological know-how of potential users

Source: JICA Survey Team (2011)

3.2.4 Agricultural Marketing

1) Agribusiness and Marketing Assistance Service (AMAS)

AMAS, as the main marketing arm of DA, has also engaged in the use of ICT for a faster delivery of market research results and pricing information for the agribusiness sector. The most notable of its initiatives is the Agriculture and Fisheries Market Information System (AFMIS).

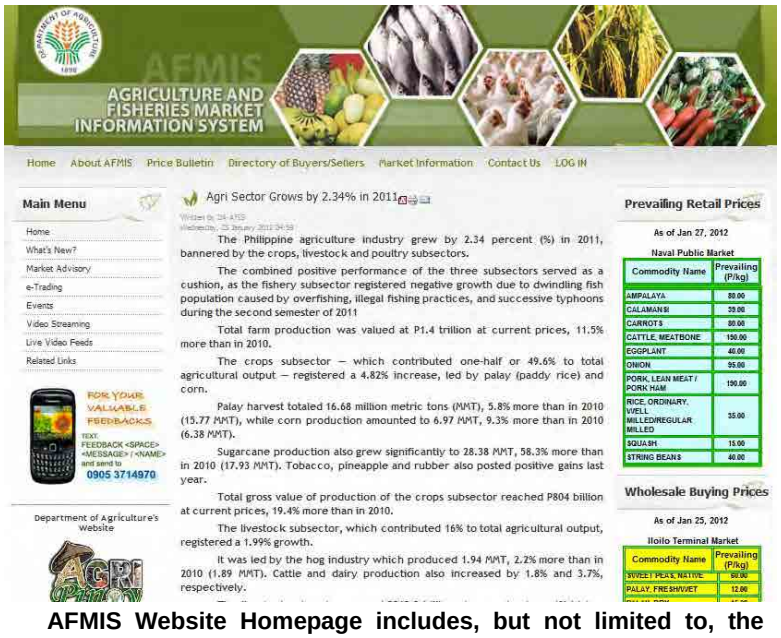
1.1)AFMIS and the Agribusiness Development Center

AFMIS began as part of the Market Development Support Services Component I of the Diversified Farm Income and Market Development Project (DFIMDP. The World Bank-funded loan is aimed at stimulating rural growth, employment, and increase in farmers' income. It supports initiatives of the DA in reorienting its service initiatives towards a market demand-driven approach and strengthening its core function based on globally-competitive systems and technologies in order to address the problem of declining competitiveness of Philippine Agriculture.

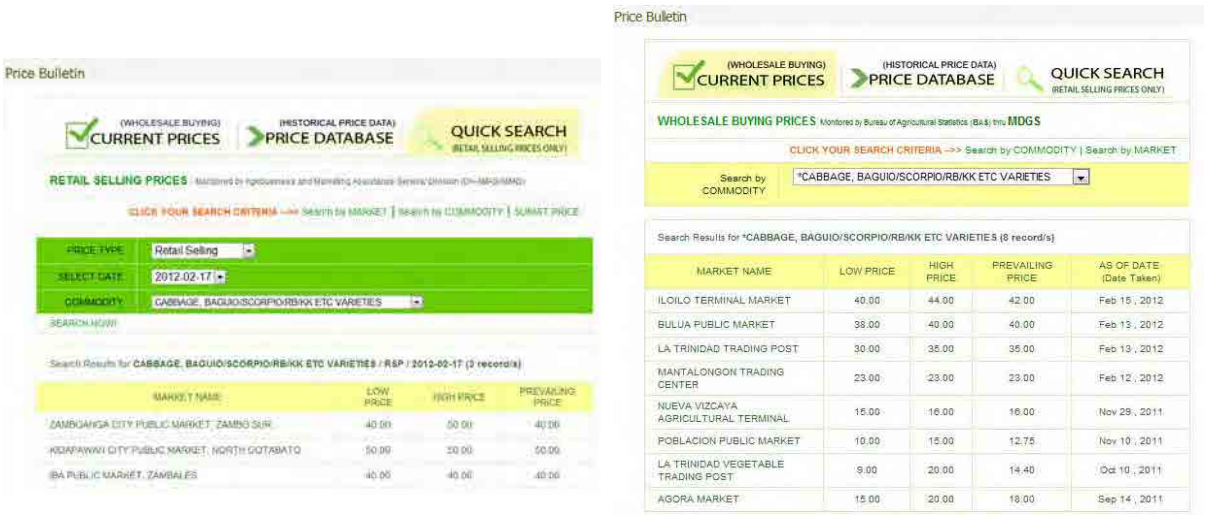
The system is a consolidation of the market information activities by the agencies under the DA doing marketing related information services. As envisioned, the AFMIS Project covers the National AFMIS and Local AFMIS. The National AFMIS is a consolidation of all market information to be inputted into the system through the Market Development Cluster (MDC) composing of the Agribusiness and Marketing Assistance Service (AMAS), Bureau of Agricultural Statistics (BAS), the Agriculture and Fisheries Information Service (AFIS), Information Technology Center for Agriculture and Fisheries (ITCAF) and the National Agriculture and Fishery Council (NAFC).

There were only four pilot project areas and it is expected that implementation would differ among pilot areas and other areas in the Philippines. Currently, AMAS is further building it up to put more information in the AFMIS website (http://www.afmis.da.gov.ph) to promote and disseminate the information.

Apart from the website, AFMIS is operated and complemented through the Agribusiness Development Center (ADC) which was started only in 2011. The ADC is also the venue for most of AMAS' activities: (a) market matching, (b) information center, and (c) showcase of commodities and products in the regions.

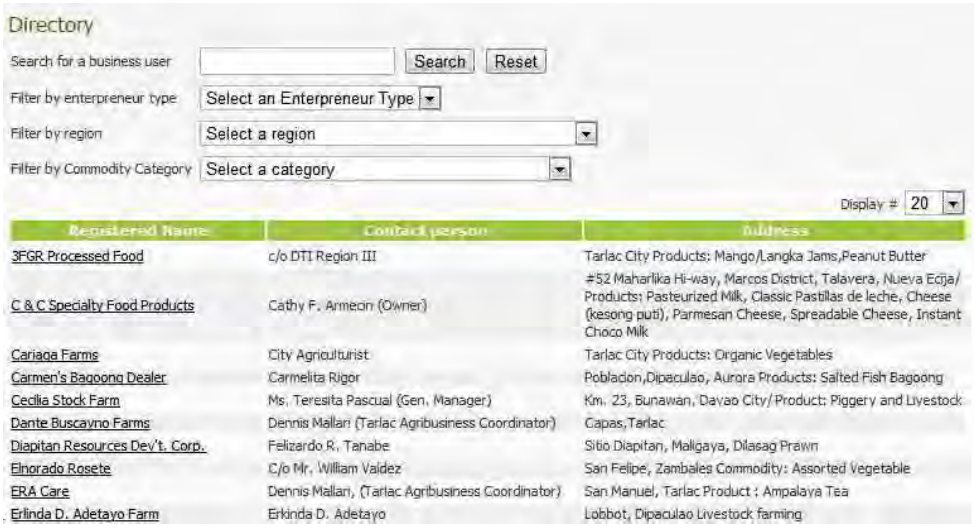


AFMIS Website Homepage includes, but not limited to, the Main Menu (About, Directory, Market Information, etc.), daily retail and wholesale commodity prices, and news for marketing sector



Price Bulletin functions for searching wholesale buying and retail selling prices in select markets

The ADC building is housed at the DA Central Office. There is a showroom wherein different products being supported for export (either already exporting or in the process of finding targets or achieving certifications and passing the standards) are displayed and sold. There is also the Information Center wherein anybody who wants to venture into agribusiness can get information about any program or any project. This is open as well for private companies.



Main screen for the Directory of Buyers/Sellers

AMAS is now trying to get as much materials from different agencies and link it with the Information Center. The Service Unit also developed a booklet from these materials which are likewise displayed. The ADC is also engaged in product development wherein they help farmers and producers to develop and market their products by giving support in packaging and showcasing.

1.2) Available Information and Services at the AFMIS Website

Set-up mainly to provide up-to-date market information for the agribusiness sector, the AFMIS website has three (3) main sections or pages: (1) Price Bulletin; (2) Directory of Buyers/Sellers; and

(3) Market Information.

The Price Bulletin contains commodity wholesale buying and retail selling price information in markets and trading centers being monitored by AMAS and AMAD (Agribusiness and Marketing Assistance Division in the RFU) as well as by the Bureau of Agricultural Statistics (BAS).

The Directory of Buyers/ Sellers is a listing of farmers, producers, processors, buyers, sellers, cooperatives and other organizations involved in agricultural production and agribusiness enterprises. As of February 17, 2012, there are a total of 4312 individuals or groups registered in the system. The directory allows an easy searching through the following: (a) by relevant keyword for the business user; (b) by entrepreneur type; (c) by region; and (d) by commodity.

Details for the business user: contact information and commodities list

As for the Market Information, this mostly contains files and documents based on researches and statistics for agriculture, livestock and fisheries. These files are downloadable, and thus can be accessed even when already offline. Currently, there are a total of 101 files classified into eight categories as shown in Table 3.2.28.

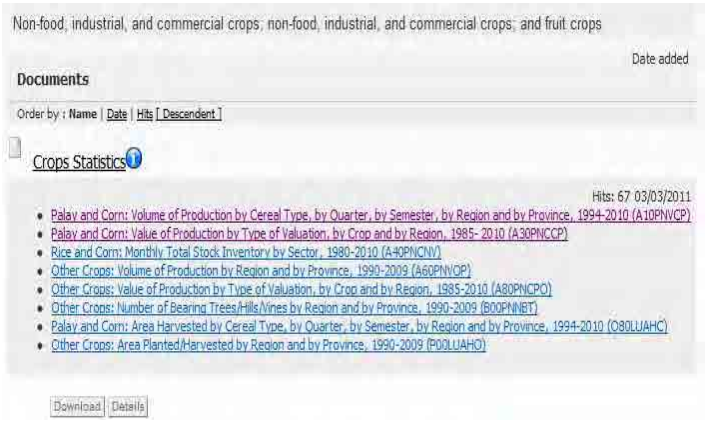
Table 3.2.28 List of downloadable market information at AFMIS

Categories	Description	Files
Production	Market-related statistics relating to production	16
Profile	Commodity profiles, market profiles, regional agribusiness profiles, etc.	14
Trade	Trade-related statistics of various agricultural and fishery commodities	50
Consumption	Supply and utilization data of various agricultural commodities	3
Prices	Data on prices of agricultural and fishery commodities, farm and processing equipment and postharvest/cold storage, etc.	4
Resources	Statistical data on various agricultural resources, such as machinery, fertilizer, and pesticides	1
Labor and Employment	Data on agricultural wages and other documents relating to agricultural labor and employment	1

Directories	Directories of individuals, groups, institution, or corporations involved in agribusiness	12

1.3) Digital Media Signages

In addition to the web-based platform, AMAS has also recently installed four electronic digital media signages (DMS, as in large LCD screens) in pilot major markets for displaying the current prices of products in that area, playing infomercials and disseminating information.



Sample list of downloadable documents for Crops

In theory, these DMSs should be interconnected so as to be able to display the prices of commodities from other areas as well (i.e. DMS in Balintawak Market will display prices from Pangasinan, Cebu and Davao; and vice versa). Currently, the DMSs can show prices of commodities in the trading center where it is located. However, it cannot display prices from the other markets due to interconnectivity problems.

2) Bureau of Agricultural Statistics (BAS)

The functions of the Bureau of Agricultural Statistics (BAS) were defined by Section 16 of Executive Order No. 116. These included the following: (a) collect, compile and release official agricultural statistics; (b) exercise technical; supervision over data collection centers; and (c) coordinate all agricultural statistics and economic research activities of all bureaus under the DA.

In addition, by virtue of AFMA (RA 8435), BAS is further mandated to: (a) serve as central information source and server of the National Information Network (NIN) of DA; and (b) provide technical assistance to end-users in accessing and analyzing product and market information technology.

As such, BAS has initiated efforts in publishing agriculture-related reports, researches and statistical data both for offline and online access. Offline accessing of information can be done after downloading the publications from the BAS website (http://www.bas.gov.ph). Download is free but would only be available for members of the BAS website

Homepage of Bureau of Agricultural Statistics

(membership is also free). Online access can be done through accessing the Statistical Database or CountrySTAT Philippines (http://countrystat.bas.gov.ph).

2.1) Downloadable Resources

The "Publications" link at BAS Homepage directs the user to the list of publications available for downloads from the website. These publications were the result of the different statistical surveys and studies conducted by the Bureau. These are grouped into tabs as follows:

MP – Major Publications

(a) CP – Crops
(b) LP – Livestock and Poultry
(c) FS – Fisheries
(d) PT – Prices and Trade
(e) FE – Farm Economics
(f) MS – Marketing Studies
(g) AI – Accounts and Indicators
(h) OP – Other BAS Publications

These information were published and provided free of charge in the hope that the reports would help BAS' clients and stakeholders in their search for information in agriculture.

2.2) CountrySTAT Philippines

The CountrySTAT is a web-based system that integrates national food and agricultural statistical information to ensure harmonization of national data and metadata collections for analysis and policy making.[3] CountrySTAT was established by the Phhilippine Statistical System (PSS) through the Philippine Statistical Association (PSA). Installation of the CountrySTAT was funder under the FAO "Strengthening the National Statistical Systems of Selected Countries in the Asian and Pacific Region" project. The development of a metadata system is necessary for the development of CountrySTAT. The preparation and publication necessary was also another major component of the Project.

CountrySTAT Philippines Database Page

The CountrySTAT database is basically divided into two: National Core and Details (Sub-national). Information

contained in the National Core Database are those collected on a nationwide scale. The Details (Sub-national) Database consists of information focusing on Regional and Provincial levels.

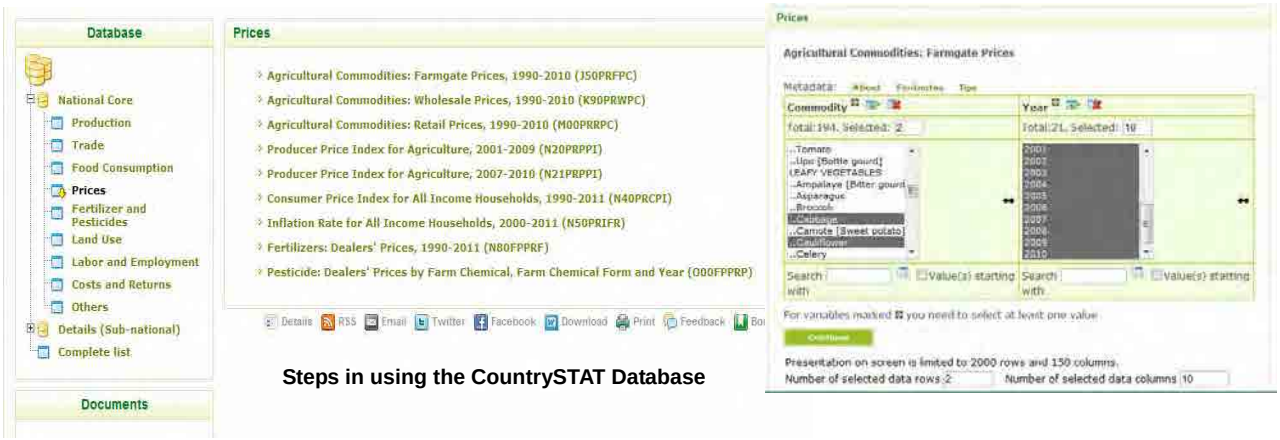
Categories for both National and Sub-National database are the same. The navigational structure of CountrySTAT allows users to search for information either by geographic location or by thematic paths. The categories are: (a) Production; (b) Trade; (c) Food Consumption; (d) Prices; (e) Fertilizer and Pesticides; (f) Land Use; (g) Labor and Employment; (h) Costs and Returns; (i) Others. The following table provides a basic description of each category and the number of resources for each.

Table 3.2.29 List of Information Categories at BAS

Categories	Description/Type of Resources Available	Res.
Production	Agriculture, Crops, Livestock, and Fisheries Volume and Value of Production; Crops and Livestock Inventory; GNP and GDP	26
Trade	Quantity and Value of Agricultural Exports and Imports	2
Food Consumption	Food Balance Sheet; Food and Non-food Supply and Utilization Accounts; Annual Per Capita Consumption, Self-Sufficiency Ratio, and Import Dependency Ratio of Agricultural Commodities; Shares of Food to Total Family Expenditures	16
Prices	Farmgate, Wholesale and Retail Prices of Agricultural Commodities; Producer Price Index for Agriculture; Consumer Price Index for Households	9
Fertilizer and Pesticides	Fertilizer Supply and Disposition; Fertilizer and Pesticide Dealers' Prices; Palay and Corn Estimated Inorganic Fertilizer Use	5
Land Use	Palay, Corn and Other Crops Harvested Area; Irrigated Area by Type of Irrigation System; Area of Farms by Land Use	4
Labor and Employment	Employment in Major Industry and in Agriculture; Total Employment; Agricultural Wage Rates	4
Costs and Returns	Costs and Returns of Palay, Corn, Root Crops, Legumes, Vegetables, Fruits, Commercial Crops, Nuts and Milkfish	8
Others	Number of Equipment; Agricultural Production loans; Average Annual Rural and Farm Households Income; Expenditures of Farm Households and of Government in Agriculture	6

To use the CountrySTAT and access the database, the user only needs to follow three steps:
(1) Choose an information category;
(2) Choose the report under that category that most likely contains the information needed; and
(3) Set the criteria or filters that will be the basis of the search for the specific data required.

After setting the filters, the system would then populate the searched information. The following screen shots will show how the database is used.



Steps in using the CountrySTAT Database

CountrySTAT Philippines

Agricultural Commodities: Farmgate Prices by Commodity and Year

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
..Cabbage	5.91	8.08	8.59	8.67	9.24	12.55	9.47	10.52	13.73	8.04
..Cauliflower	13.90	20.63	21.81	13.98	10.65	16.20	16.24	18.55	21.79	17.00

... Data not available
.... Data not yet available
2010 Final

Latest update:
2011-05-12 11:23

Source:
Bureau of Agricultural Statistics

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Unit:
pesos per kilogram (or as indicated) * - pesos per piece

Matrix:
J50PRFPC

CountrySTAT Database results page

3.2.5 Others

1) Information Technology Center for Agriculture and Fisheries (ITCAF)

ITCAF was established as a core office with responsibilities to manage, operate and maintain ICT systems of DA and attached bureaus/agencies. ITCAF also has the mandate under AFMA to manage the National Information Network (NIN) that links all offices and levels of DA with various research institutions and local end-users, providing easy access to information and marketing services related to agriculture and fisheries.

The activities of ITCAF are as follows:

- ✓ Formulate policies and guidelines of IT for all DA units/offices and stakeholders;
- ✓ Formulate plans and strategies to keep IT resources current and up-to-date;
- ✓ Establish and operate Local Area Network (LAN) of DA Offices and attached bureaus/agencies as well as Wide Area Network (WAN);
- ✓ Implement programs and projects towards the DA's vision and mission;
- ✓ Develop and manage DA's information infrastructure, resources and processes as well as those

of NIN;

- ✓ Ensure that users, especially the LGUs, are provided access to NIN;
- ✓ Provide DA units/offices with technical support and assistance;
- ✓ Provide information technology with hardware and software;
- ✓ Develop, manage and implement IT Training Programs;
- ✓ Provide the required system and maintenance;
- ✓ Oversee the integrity and security of all information; and
- ✓ Build and manage IT alliances and partnerships.

Currently, the main concern of ITCAF is to implement the UEGIS project described below.

2) Unified and Enterprise Geospatial Information Systems (UEGIS)

The DA, in its efforts to implement AFMA, is requested to improve the delivery of services to its stakeholders as well as to adapt to and/or mitigate the effects of climate change. As such, DA launched the UEGIS project in order to enhance the planning and implementing capability of DA and LGUs in Strategic Agriculture and Fisheries Development Zones (SAFDZs).

The objectives of the UEGIS project are: a) the utilization of high-resolution satellite imageries in order to establish a geospatial database of agricultural and fisheries resources; b) the improvement of the institutional capacity/capability of the various stakeholders; and c) the formulation of Integrated Development Plan (IDP) for the agriculture sector.

The expected achievements of the UEGIS project are:

a) Enhancement of efficiency and effectiveness in the allocation and/or use of DA's resources including that of its partner institutions, especially the LGUs;
b) Ensuring equitable and timely distribution of goods and services;
c) Response to the challenges of climate change;
d) Improvement of response time and effectiveness of emergency assistance to farmers and fisherfolk;
e) Providing more accurate Agriculture and Fisheries production forecasting and markets; and
f) Improvement of governance.

The UEGIS project consists of the following four components.

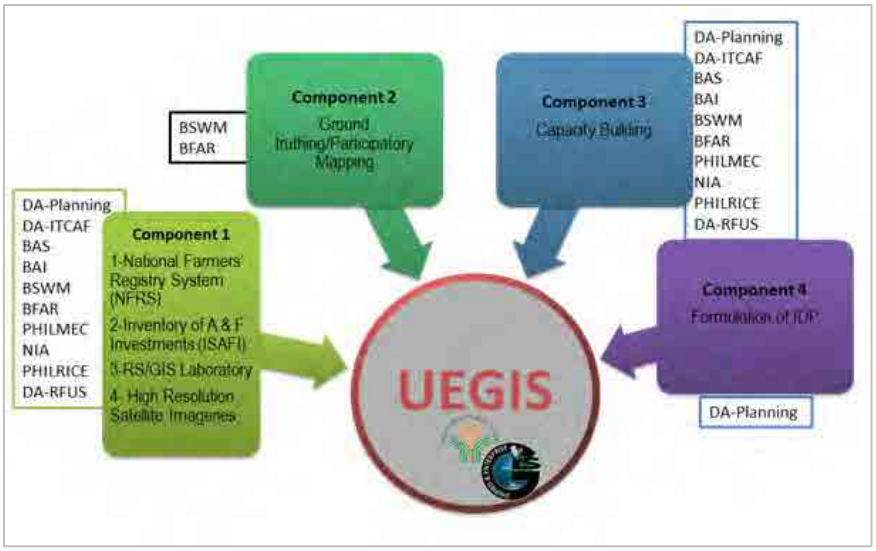


Figure 3.2.26 Components of UEGIS

The component 1 involves the refinement of SAFDZs and development of spatial database as well as the establishment of the National Farmers' Registry System (NFRS) and the Inventory System of Agriculture and Fishery Investments (ISAFI). The NFRS is a voluntary registration system to construct an electronic database of all farmers and farms nationwide. On the other hand, the ISAFI is a comprehensive database for agriculture and fisheries investments, both public and private. NFRS will represent the demand-side and this will be linked to the ISAFI, representing the supply-side, to help determine the investment gaps and needs of the sector.

The component 2 involves area validation and ground "truthing" in SAFDZs through participatory mapping techniques using high-resolution satellite imageries. The ground "truthing" is a term used in cartography and analysis of remote sensing techniques in which data are gathered at a distance. The ground "truthing" refers to collecting information on location in order to relate image data to real features and materials on the ground.

The component 3 includes institutional and capability building of DA staff in data generation, analysis and geospatial technology.

The component 4 entails the formulation of an Integrated Development Plan (IDP) for the agriculture sector.

DA is implementing the UEGIS project through the regular fund from the government of the Philippines. The implementation status of the project (as of December 2011) is the following:

Table 3.2.30 The status of the UEGIS project

Component	Status
Component 1: NFRS, ISAFI, RS/GIS Laboratory and Satellite Imageries	✓ Conducted the pilot testing in Tarlac, Aurora and Nueva Ecija ✓ On-going Roll-out of NFRS and ISAFI in Bukidnon, Quezon, Leyte, Bulacan and Tanauan, Batangas, and planning the additional roll out of NFRS for the eight provinces

	✓ On-going re-bidding for high-resolution satellite imageries ✓ Printers, Scanners, DLP Projectors, Plotters and Servers, UPS, Desktops and Laptops were delivered and started with the deployment to RFUs, selected bureaus and attached agencies ✓ RS/GIS Software and other accessories delivered ✓ Setting-up of RS/GIS laboratory
Component 2: Ground Truthing and Participatory Mapping	✓ Conducted pilot participatory mapping for the three municipalities in Bulacan
Component 3: Capacity Building	✓ Conducted the trainings for the various application software and still planning to conduct the further trainings as follows; GIS, Image interpretation and applications, Environmental remote sensing, Land use mapping, etc.
Component 4: Formulation of IDP	✓ Not ready for the implementation

3) Bureau of Soils and Water Management (BSWM)

In the early 1990's, BSWM introduced Soil Information System (SIS) with JICA project-type technical cooperation. About ten years later, the Agricultural Resources Information System (ARIS) integrated SIS, Land Resources Information System (LARIS) and Water Resources Information System (WRIS) into one, which was introduced to utilize soil data and so on for the purpose of farm management and making farmland utilization plan.

The other ICT utilization in BSWM is the digitizing. The digitizing of hand-drawn map, in which the result of ground survey was recorded, is also the primary task of BSWM. The data on the map are converted into database through digitizer and that database is applied to create the specific purpose map such as soil map.

Additionally, BSWM is appointed as the one of the RS/GIS Laboratory on the UEGIS project, and the equipment such as computers and plotters are already distributed.

4) BAR's Philippine Agricultural and Information Network (PhilAgriNet)

The Philippine Agricultural and Information Network (PhilAgriNet), is a result of the training workshop endorsed by Food and Agriculture Organization wherein through the cooperation of different agricultural institutions, an electronic database of local agriculture knowledge sources is created. Facilitated by the Bureau of Agricultural Research and UPLB, PhilAgriNet will cover a wider range of research outputs and this database will incorporate links to full documents for the organization members, private or public institutions and other researchers.

5) K-Agrinet

K-Agrinet is a collaborative endeavour of four institutional players in the Philippine agriculture: the Development Academy of the Philippines (DAP); Department of Agrarian Reform (DAR); Department of Science and Technology – Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (DOST-PCARRD); and the Department of Agriculture – Philippine Rice Research Institute (PhilRice).

The K-Agrinet (Knowledge Networking Towards Enterprising Agricultural Communities) is a program funded by the government and supported by the CICT. Its goal is to develop and modernize the agricultural sector as the demand for more innovative and practical methods that farmers, fisherfolks, extension workers and agricultural communities apply to their everyday activities. The four participating agencies synchronized their individual ICT-based projects by developing information systems and providing capability building activities then generating a more efficient method of information distribution and communication which can help agriculture and fisheries players and their communities to improve their operations and increase their quality of life.

e-AGRIKultura or Agricultural Growth thru Information and Knowledge Networking is one of the components of the K-AgriNet program. Its goal is to improve productivity in the agricultural sector and create practical area-based rural enterprise that would improve farmers' household incomes. It involves the establishment of e-community centers selected rural areas for farmers, fisherfolks and agri-business owners.

Through the use of ICT, these e-community centers are envisioned to provide access to latest agricultural technologies and current market information. It aims to generate community support and participation and capacitate farmers, fisherfolks and agribusiness entrepreneurs to access and utilize information on operation and management of farm enterprises. It should also help in strengthening informed and participatory decision making and promote development of agriculture enterprises by utilizing ICT-based information.

6) PCARRD's Commodity Information Network (CIN)

Developed by the PCARRD, Commodity Information Network (CIN) is a congregate information website that offers present information on different agriculture and forestry commodities to supplement and share relevant and up-to-date data to different players of the industry. Under the agriculture sector, the following networks are available:

- ✓ Mango Information Network (MIN)
- ✓ Poultry Information Network (PIN)
- ✓ Ruminants Information Network (RIN)
- ✓ Swine Information Network (SwIN)
- ✓ Agricultural Machinery Information Network (AgMachiIN)

- ✓ Horticulture Information Network (HortiNet)
- ✓ Corn and Other Feed Grains Information Network (COFGIN)

3.3 Supports of Donors for Introduction of ICT

There are no particular donors, except the International Rice Research Institute (IRRI), regarding the introduction of ICT in an agriculture sector under our survey. Most of current ICT systems in the Philippine agricultural agencies/bureaus are developed, operated and maintained by their own regular fund.

NMRice for Android

IRRI already provides three types of NMRice: CD, Web and Mobile. The Institute is currently developing NMRice for Smart Phone (exactly for Android OS) and is on the beta testing stage.

As supplemental information, the Bureau of Agricultural Statistics (BAS) submitted the proposal titled "Establishment of the Food Security Information System in the Philippines (PhilFSIS)" to obtain the technical cooperation program from FAO. PhilFSIS is the Philippine-oriented version of ASEAN Food Security Information System (AFSIS) with the objective to enhance food security planning, implementation, monitoring and evaluation through improved organization, analysis and dissemination of relevant data and information in the Philippines.

3.4 Activities of Other Organizations for ICT Introduction

3.4.1 ICT introduction by academic sector and private sector

1) The Partnership between ATI and Institutions

In terms of ATI's e-Learning, state and private universities and colleges, and other institutions forge partnerships with ATI and work closely to develop more e-learning courses. To move forward with the above-mentioned partnership, ATI has provided several courseware development trainings at each site to enhance their abilities and skills of contents development as well as to increase the line-up of their e-learning courses.

2) The Support from the Private Sector

From the private sector, Globe Telecom Inc., a telecommunications company in the Philippines, provides a toll-free line to help farmers to access the NMRice Mobile as one of the program partners. Nokia also provided the software, "Nokia Data Gathering (NDG)", as

Nokia Data Gathering (NDG)

well as the technical assistance during the development of the Agriculture and Fisheries Market Information System (AFMIS) without any charges. However, this contribution is considered as a kind of market strategy as well.

3) SMART Communications' Island Activations Program

Smart Communications introduced its Island Activations Program to rural communities located in remote areas where basic financial services are not easily accessible or sometimes nonexistent. They brought mobile money transfer services to these communities, mostly in remote islands which are under-served or un-served by the formal banking system. Smart partners with existing microfinance institutions and orient and train them on mobile based money transactions using their mobile phones. People living in these isolated barangays encounter different challenges to perform financial transactions. They incur high transportation cost to banks or established financial institutions because they still need to travel far distances just to deposit, withdraw or transfer cash. Aside from this, they shoulder costly service charges, manage remittance delays and endure risk to dangers with travelling with cash.

The introduction of mobile banking in island communities is not only beneficial to its residents but also improves the community's financial and social development. Smart MIMO (Money In, Money Out) Centers have been set up in remote rural communities where island residents can conveniently buy airtime, transfer money, pay their bills and make other purchases just by using their mobile phones.

3.4.2 Mobile Banking

1) Background

The Philippines is an archipelagic country with an estimated 7,100 islands, ICT has find a way to connect the Filipinos through mobile phones. Mobile phone becomes part of every household in the country and dubbed as "Text Capital" of the world (Senate Bill 2512, Cellular Phone Message Spamming Protection Act of 2010) due to the large volume of short messaging system (SMS) traffic exchange in the country with 79.9 million of phone subscribers and more 600 text messages sent per month.

BSP has supported the improvement of the two (2) different understanding for the big mobile operators in the Philippines, Smart Communication (Smart) and Globe Telecom (Globe). The two companies presented non-bank based model, Smart offers system of pre-paid accounts and launched the *Smart Money*, while Globe push on virtual stored-value accounts on *GCash.*

In 2008, Overseas Filipino Workers (OFW) sends their earnings home approximately 18Billion which constitute about 11% of Gross Domestic Product (GDP). This creates a window of opportunity for Globe and Smart in enhancement of the mobile banking. Originally, mobile banking refers to availment of bank transaction using mobile communication devices. The non-bank based model evolved so fast that virtual bank replaces the original banks like retail stores, merchant, and

designated center. The cost for transfer fee in sending money elsewhere is cheaper compared to banks and any courier. This mobile banking seems favorably to low income worker as it grows gradually in rural areas.

2) Safeguard

Mobile Banking is governed by the Policy of the Banko Sentral ng Pilipinas (BSP) or Central Bank of the Philippines (CBP) defined in the 2010 Manual of Regulations for Banks (MORB), Section X701.13, Part VII-Page4.

3) Features and Use

Mobile banking maintains its original purpose, using the mobile phone device to transfer bank deposit to another account, provided that bank is accredited by service provide/telecommunication. Other sources of funds may come from many sources like international remittance from OFW, local transfer of funds, and electronic money issuers (EMI) such as retail store/sari-sari, cooperatives, merchant partners.

The mobile banking has variety of usage, such as;

a) Transfer of Airtime Load from Mobile Phone to another Mobile Phone,
b) Convert mobile money to airtime load,
c) Pay electric bills, water bills, phone bills, etc,
d) Convert to cash as Retail Store/Sari-sari Store, EMI, merchant partners, or accredited banks,
e) Purchase groceries foods using swipe machine (point of sale equipment),
f) Purchase goods and services using e-money card,
g) Encashment at automatic teller machine (ATM),
h) Pay insurances,
i) Contribution to charity works
j) Conveyance for loan transfer from micro-finance

4) Advantages and Disadvantages

The advantages and disadvantages of using the mobile banking system are illustrated in the Table 3.4.1.

Table 3.4.1 Feature of Mobile Banking

Advantages	Disadvantages
a)Cheap or low cost of fund transfer services	a)Do not earn interest, hence cannot claim insurance since it is not a bank deposit
b)Fast	
c)Convenience	
d) Transparency of records of transaction, upon request from telecommunications	

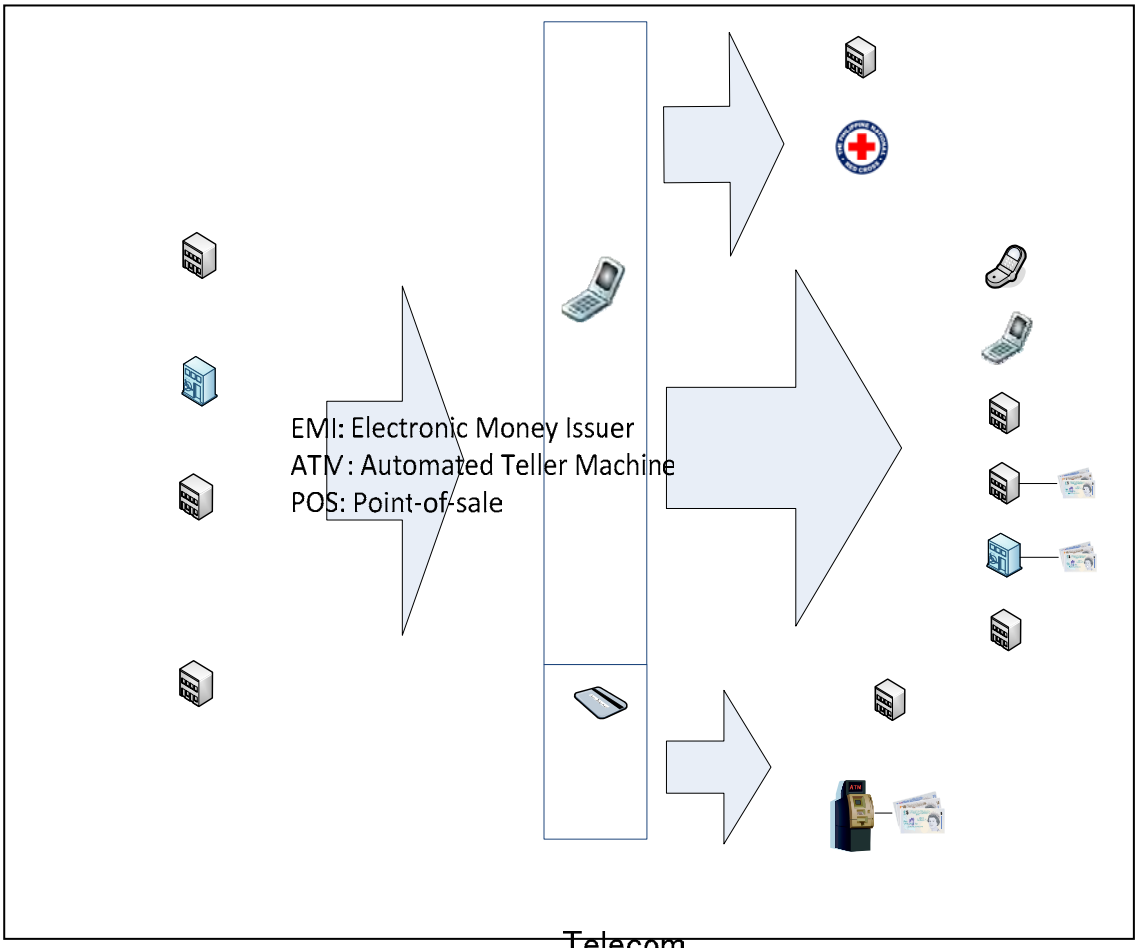


Figure 3.4.1 Mobile Banking System

Telecom
Business
Center

Accredited
Bank

Mobile Money

EMI
(Sari-sari Store,
Cooperative,
Merchant
Partners)

Local and International
Remittances

CHAPTER 4 CURRENT SITUATION OF CROP INSURANCE

Agriculture is one of the most highly vulnerable sectors to the unpredictability of nature. With agricultural production representing the major livelihood of many resource-constrained farmers, the impact of natural disasters and other agricultural risks cannot be taken lightly. Other agribusinesses and commercial farms that operate with higher capital and advanced technology on better lands are not spared from the same risks as well. The need to safeguard the interests and investments of local farmers and industry players is therefore of paramount importance.

In line with this, the Philippine government has come up with a range of risk management programs for farmers and other agricultural stakeholders. In terms of crop insurance, the Philippine Crop Insurance Corporation (PCIC), a government-owned and -controlled corporation, has been mandated to provide crop insurance and other agri-related insurance products.

Recently, PCIC has also introduced index-based insurance products. Index Based Insurance presents a big potential for business expansion as well as in climate change risk mitigation. Moreover, the private sector has also shown interest in index-based insurance. For instance, some private companies have already developed and introduced index-based insurance products such as typhoon-based and area yield-based insurance.

This chapter, therefore, focuses on index-based insurance. The current situation of PCIC shall be described and explained. PCIC's existing index-based insurance schemes, Weather Index-Based Insurance (WIBI) and Area Yield-Based Insurance (ARBY), will be reviewed. Further, other initiatives by the private sector such as Weather Protect insurance and Typhoon/Drought Index-based Insurance shall also be reviewed. Other major considerations such as weather infrastructure of the Philippine Atmospheric, Geophysical and Astronomical Services Association (PAGASA) and some regulatory issues were also analyzed in this survey as these are imperative conditions for the product development of Index-based insurance.

Based on the assessment of the current situations and review of different index-based insurance products being piloted or promoted, all major issues, concerns and findings shall be analyzed and summarized for setting up a future direction for the development and promotion of index-based Insurance in the Philippines.

4.1 Philippine Crop Insurance Corporation (PCIC)

4.1.1 Current Situation of the PCIC

The PCIC was created under Presidential Decree (PD) 1467 on June 1978 and its charter was amended by PD 1733 on October 1980 and subsequently, by Republic Act (RA) 8175 on December 1995. Its principal mandate is to provide insurance protection to the country's agricultural producers, particularly the subsistence farmers, against crop losses arising from natural calamities and plant diseases and pest infestations, and non-crop agricultural asset losses due to perils for which the asset has been insured against.

The PCIC provides protection to agricultural producers along six insurance lines: 1) Rice Crop Insurance, 2) Corn Crop Insurance, 3) High Value Commercial Crops (HVCC) Insurance, 4) Livestock Insurance, 5) Non-crop Agricultural Assets Insurance, and 6) Term Insurance Packages. Apart from these lines, PCIC has recently expanded its insurance lines to the Fishery sector. This new insurance line covers fish farmers, fisherfolks or growers, against losses in fish and fishery/aquatic products due to natural calamities and fortuitous events. The object of insurance is the un-harvested crop/stock in fisheries farms. The PCIC issued the first fisheries insurance policy to Southern Negros Agri-Fisheries Multi-Purpose Cooperative on April 13, 2011.

One of the major products of PCIC is Rice Crop Insurance. According to PCIC's Annual Report in 2010, a total of about 150,976 agricultural producers availed PCIC's insurance services (Table 4.1.1). From which, 88,843 producers were rice farmers and accounted for 60% of the total. With this, a total amount of premium worth 316 million came from rice farmers, providing almost 80% share of the contribution to the overall premium collected by PCIC in 2010.

Table 4.1.1 Number of Farmers and Accomplishment of PCIC in 2010

	No. of Farmers	Share of total No	Premium Amount (Php M)	Share of total amount	No. of Hectares
Rice	88,843	59%	316.53	81.8%	142,403.42
Corn	8,959	6%	42.87	11.1%	12,265.21
HVCC	1,131	1%	2	0.5%	2,776.43
Livestock	5,672	4%	4.4	1.1%	-
Non-crop Insurance	1,375	1%	9.76	2.5%	-
Term Insurance	45,360	30%	11.19	2.9%	-
Total	150,976	100%	386.75	100%	157,445

Source: Philippine Crop Insurance Corporation ANNUAL REPORT 2010

There are two types of insurance cover for rice crops—one is the Multi Risk Cover and the other is Natural Disaster Cover. Multi Risk Cover is a comprehensive coverage against crop loss caused by natural disasters such as typhoon, flood, drought, earthquake and volcanic eruptions as well as pest infestation and plant diseases. The Natural Disaster Cover, on the other hand, is a limited type coverage against crop loss caused by natural disasters only. The period of cover is from direct seeding or upon transplanting up to harvesting. All rice varieties accredited for production by the National Seed Industry Council (NSIC) are insurable.

PCIC's premium rate is highly variable per region, per season, and risk classification. Payment of premium is shared among the farmers, the lending institution and the government. A major consideration is that the Philippine government provides subsidies to PCIC.

Table 4.1.2 National Composite Rates and Premium Sharing

	Multi Risk Cover		Natural Disaster Cover	
Sharing of Premium Payment	*Premium (%)*	*% share in Total Premium*	*Premium (%)*	*% share in Total Premium*
Farmer Share	2.91	26.92	2.23	28.05
Lending Institution Share	2.00	18.50	1.50	18.87
Government Share	5.90	54.58	4.22	53.08
Total	10.81	100	7.95	100

Source: Philippine Crop Insurance Corporation
Notice: Premium rates vary per risk classification. Table shows only medium risk as an example.

PCIC receives a large amount of subsidies from the government to reduce the farmers' burden of paying high premium rate. As shown in Table 4.1.2, government subsidy accounts for more than 50% in total premium share. Lending institutions share 19% of the total premium while farmers pay around 26%to 28% of total premium share. The government's premium subsidy stood at PhP183.711 million. With the subsidy and the premium payments generated, about PhP 246 million was paid out to 28,420 farmers who sustained damages and losses during the year 2010. Although subsidies are only available for rice and corn farmers, PCIC heavily relied on these government subsidies.

In addition, the distribution channel of the PCIC is also characterized. Especially for lending institutions, farmers' crop insurance is usually provided as a bundle with production loans. Moreover, crop insurance is usually one of the requirements for the farmers or farmer groups to avail production loans. According to PCIC, there are about 1,234 accredited lending institutions acting as underwriter-solicitors. About 90% of rice crop insurance is distributed through these lending institutions and the remaining 10% are availed by self-financed farmers. These lending institutions include Land Bank of the Philippines (LandBank or LBP), Local Government Units, Cooperatives, NGOs, and Rural Banks.

For LandBank, crop insurance is used as a substitute to the collateral. They assess the financial situation of each cooperative and then rank them from A to E based on their criteria and ratings. In general, they provide loans to cooperatives ranked A to D, but not to those ranked E. However, if a cooperative that was ranked E gets insurance cover, LandBank may still extend them a loan.

4.1.2 Major Challenges for PCIC

PCIC plays an important role for crop insurance in the Philippines. However, the Corporation still has many challenges that must be addressed. These challenges are summarized into three things, namely: 1) low penetration rate of insurance; 2) slow response time for claim settlement; 3) and low insurance literacy.

1) Low Penetration Rate of Crop Insurance

One of the major issues of PCIC that continue to persist is the low penetration rate of crop insurance among the farmers. In 2010, Rice Crop Insurance covered 142,403 hectares while Corn Crop Insurance covered 9,697 hectares (Table 4.1.3). Although penetration rate of Rice Crop Insurance has been increasing since 2007 with 2.1%, their coverage for rice field is only 4.7% of the total rice field hectarage in the country. Combined with Corn Crop Insurance, their penetration rate is less than 0.5% since 2007.

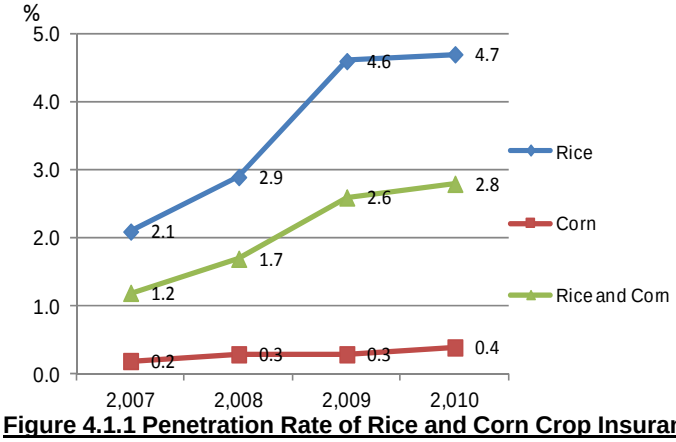


Figure 4.1.1 Penetration Rate of Rice and Corn Crop Insurance

Source: Philippine Crop Insurance Corporation ANNUAL REPORT 2010

Table 4.1.3 Insured Area of Rice and Corn Crop Insurance from 2007 to 2010 (in Ha)

	2007		2008		2009		2010	
	Insured Area	Total Area	Insured Area	Total Area	Insured Area	Total Area	Insured Area	Total Area
Rice	61,727	2,917,012	88,209	3,032,638	141,325	3,055,763	142,403	3,008,325
Corn	5,349	2,648,317	8,595	2,661,021	7,416	2,683,890	9,697	2,499,040
Rice and Corn	67,076	5,565,329	96,804	5,693,659	148,741	5,739,653	152,100	5,507,365

Source: Philippine Crop Insurance Corporation ANNUAL REPORT 2010

For the Rice Crop Insurance, the penetration rate jumped from 2.8% in 2008 to 4.6% in 2009. This growth seems to have been caused by the increase in amount of subsidy from the government. The government has subsidized PCIC with PhP 102 million every year between 2002 and 2007. The government's subsidy to PCIC increased to PhP 113.7 million in 2008 and PhP 183.7 million in 2009.

Although insurance coverage for rice farmers has been increasing, the insurance penetration rate still remains low. This situation indicates that if PCIC tries to insure more farmers, they would need more subsidies from the government. Such cycle puts doubts to the sustainability of crop insurance programs in the future.

2) Slow Response Time for Claims Settlement

The second major challenge for PCIC is its reportedly slow response time for claims settlement. The PCIC has set the claims settlement period for 20 days. However, farmers usually desire to get the pay-out from claims within seven (7) days. As a result, a negative impression on PCIC has prevailed among farmers. It is said that one of the reasons for this slow response is that it takes a long and tedious process to do the adjustments and loss verification. In the current process, all the loss adjustment activities are conducted with paper documents.

Revised Claims Settlement Approaches and Procedures Loss Prediction Models and Tables (RECSAP)

If PCIC needs to send loss adjusters to the field, they will employ a reserve or temporary staff as a loss adjuster. Some of them are from cooperatives, rural banks and the different attached agencies under the Department of Agriculture. These temporary or on-call staff has been previously trained about loss adjustment process. In general, one loss adjuster assesses about five (5) farmers per day. The damages in the field area is assessed using a card called "Revised Claims Settlement Approaches and Procedures Loss Prediction Models and Tables (RECSAP)". This card is to calculate loss points from damaged area and its varieties.

The PCIC is planning to introduce portable handheld devices to improve their administration process. Although this is still just an idea, using portable handheld devices is expected to make their operation much more efficient. In fact, PCIC stated that if they use handheld devices, they would be able to assess 40 to 50 farmers per day. This is almost a ten-fold capacity compared to the current loss

adjustment process. In sum, their loss adjustment process causes high administration cost and slow response time for claims settlement.

3) Low Insurance Literacy

The third issue embattling PCIC is on low insurance literacy. While information on crop insurance is readily available, it remains difficult for farmers to understand its effectiveness and relevance to their farming activities. Low-income farmers also cannot afford to pay even just their premium share, even though there is already government premium subsidy for rice and corn farmers. Therefore, in general, there is no strong incentive for farmers to get insured.

In addition, some farmers claim that the amount of insurance cover is too small. However, such farmers do not understand the scheme of crop insurance because the amount of insurance cover is different from each production stage. For instance, if farmers incur damage during their harvest stage, the amount will be paid 100% of its insurance coverage; while, if farmers' plants get damaged on initial stage, they will get only a percentage of the amount cover.

These situations indicate that insurance literacy of producers, especially low-income farmers, should be enhanced to increase their access to crop and other agricultural insurance.

4.2 Weather Index Based Insurance (WIBI)

The Weather Index Based Insurance (WIBI) was developed by the International Labor Organization (ILO) and PCIC under the Climate Change Adaptation Project in Agusan del Norte. This project is a joint program funded from the United Nations Millennium Development Goal (MDG) Achievement Fund called "Strengthening the Philippines' Institutional Capacity to Adapt to Climate Change". The purpose of the project is to strengthen adaptive capacity of vulnerable groups to climate change through increased access to financial resources and economic diversification opportunities.

One of the main characteristics of the WIBI scheme is that payout is based on weather indices and not on the actual damages of the crops. This means that PCIC or insurers do not need to send loss adjusters to the field to assess the damages. Claims are paid out if a certain weather index, such as rainfall, is breached. Therefore, even when there is a bad weather condition farmers are still able to expect to get payout more quickly than traditional crop insurance.

The project was implemented between December 2008 and November 2011. Pilot implementation of the WIBI package was conducted during that time in Buenavista and Remedios T. Romualdez municipalities. Implementation agencies are ILO, Department of Labor and Employment, and Department of Trade and Industry. The ILO and PCIC also have partnerships with Provincial and Municipal Governments, Department of Science and Technology, and PAGASA to develop the WIBI package.

4.2.1 Product Design of the WIBI

In terms of product development, PCIC received technical assistance and has been supported by

the ILO Microinsurance Innovations Facility (MIF) in Geneva, Switzerland. This technical assistance also supported a Microinsurance Innovation Fellow in the PCIC and worked with the ILO project team. As this is technical assistance, the fellow received guidance on product, process and process designing aspects.

In addition to the technical assistance from ILO, PCIC received technical and equipment support from the Department of Agriculture, DOST and PAGASA to develop the WIBI package and implement the WIBI scheme.

The PAGASA provided 30 years of historical weather data as well as climate scenarios and projections for the expansion of target sites. Two Automatic Weather Stations (AWS) in the project site were also installed. The Department of Agriculture cooperated in terms of providing crop yield data. PhilRice provided data regarding water requirements for the farmers' crop. All of these aspects were combined, analyzed and then developed into the WIBI product.

As for the premium rate, pricing calculation was done by PCIC. Premium rate is set at 3.04% for rice and 6.18% for corn. Note, however, that this premium rate was not based on the market price but on the premium rate of Multi Risk Cover. The initial calculation price was high, 9% for rice and 13% for corn, as the losses in typhoon and drought based on the historical data is also high. In addition, this does not include the cost of risk premium, development cost, administration cost, and profit. Therefore, so as not to have the premium rate hinder in the piloting of the WIBI, PCIC has decided to set this premium rate only as a pilot price for the WIBI.

4.2.2 Outline of the WIBI

The target of the WIBI product is both rice and corn farmers. During the pilot implementation stage, PCIC provided the WIBI product bundled with other services such as WIBI literacy support and agricultural technical support. The project team supported WIBI literacy while PAGASA supported the aspect of weather information system. The DA provided agricultural technical support for enrolled farmers. The PCIC played a role in the marketing of the WIBI and managing the payment of claims.

There are three main eligibility requirements for the farmers who would like to avail of the WIBI package: 1) Actual tillers of the farm (able to show Certification from Farmers' Association President and Barangay Captain if Tenant or Lessee); 2) Not presently enrolled in the traditional crop insurance package of PCIC; and 3) Have completed WIBI Literacy Activities/ Seminars.

Farmers were able to apply for this WIBI product at the Municipal Agriculture Office (MAO) or simply asked the Agricultural Technician (AT) for their Barangay. Farmers had to submit the following documents: 1) Farm Location Map; 2) Farm Plan and Budget; 3) WIBI Literacy Certificate; and 4) Actual Planting Report (to be submitted within two weeks of planting).

The farmer does not need to submit documents for claim since payout is automatically calculated by PCIC based on the weather data provided by the local Automatic Weather Station. The farmer will get notification of payout from PCIC or through authorized aggregators such as Local

Governmental Unit (LGU), Rural Bank, or Cooperative. Moreover, the farmer is able to check and monitor the agreed weather index on the website or the database of the Municipal Agriculture Office (MAO).

Table 4.2.1 No. of Farmers and Total Area of Pilot Testing

Pilot Municipality	Lender/ Aggregator	No. of Farmers	Area (Ha)
Buenavista	Baug MPC	4	4
	LGU Buenavista	52	50
RT Romuladez	LGU RT Romualdez	98	113
Total		154	167

The purpose of the WIBI product is to mitigate farmers' weather risks. Thus, WIBI does not cover income losses caused by poor quality seeds, pests, or fire. Additionally, payout is based on agreed amount of rainfall. Crop damage caused by extreme temperature, strong winds, or hailstorm will not be covered. Therefore, the WIBI required the farmers to engage in Good Agricultural Practice (GAP) following DA recommended technology for integrated pest management and organic farming.

4.2.3 Pilot Implementation and its Results

Table 4.2.2 Payout in the Pilot Testing

Pilot Municipality	Lender/ Aggregator	No. of Farmers	Amount of payouts (Php)
Buenavista	Baug Multi Purpose Coop	4	5,023
	LGU Buenavista	52	189,264
	Total	56	244,287

Source: PCIC and ILO

Pilot testing of the WIBI product was conducted from July to December 2011. In total, 154 farmers were enrolled with the WIBI product, with a total coverage area of 167 hectares. During the pilot implementation, 56 farmers received more than PhP 240,000 payout in the municipality of Buenavista as the amount of rainfall breached the set trigger.

These farmers experienced low amount of rainfall between July and August. Thus, their crops were damaged in reproductive stages. According to PCIC, some farmers harvested only 50% from normal yield of 80 to 100 sacks (45 kg/sack). After farmers got the receipt of certified data from the PAGASA, payouts were processed immediately.

4.2.4 Major Potentials and Constrains

One potential for WIBI is its low operational cost. PCIC does not need to send a loss adjuster to damaged fields. In so doing, there is no need to train and employ loss adjusters to assess the damage for traditional crop insurance. This is because payout is based on the weather index and is calculated automatically. Therefore, the WIBI package will contribute in reducing the operational cost of insurance providers.

On the other hand, there are extra burden for other related organizations, particularly with PAGASA. Weather information must be monitored and checked properly. Otherwise, weather indices would not be deemed accurate and useable. In fact, certified weather data is issued by PAGASA and enrolled farmers usually requested the PAGASA to issue certified weather data monthly as farmers wanted to confirm if the weather data has breached the index or not.

In actuality, these farmers could get access to the weather information via the website. However, they wanted to get certified data. Therefore, the PAGASA needed to issue certified data more often. This did not happen before the WIBI introduction. Although WIBI package leads to low operational

cost for insurance providers, it causes high operational cost for PAGASA. During the pilot implementation, PAGASA provided the weather information and certification without any charge. When the WIBI package expands, and the number of insured farmers increases, the PAGASA will surely charge insurance providers with weather information services.

Starting up cost is also one of the major challenges of WIBI. Before launching the WIBI product, the product design team has to do market research, baseline survey, and profiling of farmers and geographical characteristics. After the initial surveys, the team has to analyze historical weather data, identify target farms and crops, set indices, and calculate premium rate. All these product development processes take a lot of time and costs a lot of money, not to mention the need for many experts from different sectors. Therefore, starting up cost for the WIBI is relatively higher compared to the traditional crop insurance.

Moreover, scaling up of the WIBI poses another issue. This is because the WIBI is developed using specific information based on a specific location. In other words, target crop, farmers, indices, premium rate, and other product details will most likely be different from location to location. The PCIC, insurance provider of the WIBI, needs to go through the product development process again in order to apply the WIBI for other areas and crops. Hence, scaling up of the WIBI would also take time and cost a lot.

Finally, the WIBI literacy must be enhanced. WIBI is a new type of insurance scheme to farmers and other implementing agencies such as PAGASA, Municipal Agricultural Office, and underwriters. In scaling up the WIBI, it is necessary to advocate awareness among farmers and educate them on the basic schemes of index based insurance (i.e. how the trigger works, difference from traditional crop insurance, etc.). In fact, one of the eligibility requirements of the WIBI package is the WIBI literacy program. It takes time to introduce new things to farmers. Therefore, effective farmers' education program is necessary to expand the WIBI product.

4.3 Area Based Yield Insurance (ARBY)

GIZ and PCIC have developed the Area Based Yield Insurance (ARBY) as one of the microinsurance innovations under the Microinsurance Innovations Program for Social Security (MIPSS) funded by the Enhancement of Food Security in the Visayas (EFOS) Project of the European Union. The MIPSS is being implemented in Leyte and the main purpose of this program is to improve the risk protection and security of poor people in the Philippines.

Table 4.3.1 Pilot Project Site of the ARBY

Area	System	Service areas/ Municipalities
Leyte 1	Bao	Ormoc and Kananga
Leyte 2	Maint- Pongso	Alang-alang, San Miguel, Barugo
Leyte 7	Hindang- Hilongos-Das ay	Hinunangan, Hilongos

Source: PCIC

The main characteristic of ARBY is that payout is based on average yield of a region. Thus, it can avoid moral hazard and adverse selection problems. The PCIC and GIZ have implemented the ARBY in three National Irrigation Systems in Leyte.

In addition, according to the GIZ, there are two main reasons for the ARBY: limited weather station and availability of historical yield data. There are only two weather stations in their project area and coverage area of one weather station was too large. In general, one weather station should cover a 20 to 25km radius. Otherwise, weather index based insurance will not work properly. Instead of weather stations, they found that National Irrigation Association (NIA) has enough record of historical yield data to develop triggering points for yield. Table 4.3.1 shows the pilot implementation of the ARBY product.

4.3.1 Product Outline

NIA in Leyte has a 15 to 20 years data on rice crop yield, and these data were analyzed to develop triggering points, yield coverage, premium and other factors related to product design. The GIZ commissioned an actuary from the United Kingdom. People in the PCIC, NIA, Bureau of Agricultural Statistics (BAS), the actuary commissioned by the GIZ, and other related staff worked together to develop the ARBY product. Table 4.3.2 shows the agreed triggering points between the GIZ and PCIC.

Table 4.3.2 Premium Rate and Coverage Yield

Region	Leyte 1 Bao	Leyte 2 Maint-Pongso	Leyte 7 Hindang-Hilongos- Das ay
Average Yield: Triggering points (Cavan/ha)	79.33	79.33	78.03
Coverage level	80% of average yield	80% of average yield	80% of average yield
80% of the average yield (Cavan/ha)	63.464	63.464	62.42
Premium	4%	4%	3.5%

Source: PCIC and GIZ
* 1 Cavan = 45kg
* Average yield: Historical BAS data combined with NIA data analyzed and validated with PCIC

During the pilot implementation, the coverage level was set at 80% of the average yield and the amount of cover is 10,000 pesos per hectare. For instance, if a farmer gets his three (3) hectares insured, he would pay PhP 1,200 in total as premium fee (4% premium rate X 10,000 coverage amount X 3 hectares).

4.3.2 Pilot Implementation

Pilot testing of the ARBY product was done for irrigated rice in wet season 2010. The PCIC played the role of main insurer and also has the responsibility for marketing and enrollment of farmers. A microfinance institution also collaborated with GIZ and PCIC. They dealt with farmers directly and their main role is to collect premium and encourage them to enroll in the ARBY. Irrigators Associations played a role in advocacy activities among farmers. During the pilot implementation, Ormoc Community Credit Cooperative (OCCCI) is the microfinance partner of GIZ and PCIC.

OCCCI is a community-type cooperative whose more than 100,000 members are diversified and coming from different sectors. The cooperative existed for more than 33 years and presently, with more than 40 branches and satellites nationwide. It has more than 500 staff running the whole operations. OCCCI provides regular banking loans, microfinancial services, deposit services, insurance and other allied financial services to its members.

OCCCI participated in the pilot testing of ARBY when it was introduced to them by PCIC and the GIZ last May 2011 and subsequently, implemented it after a month. Together with OCCCI is the City Agricultural Office of Ormoc which provided technical assistance and marketing of the product to the farmers. OCCCI is an accredited underwriter of PCIC, which allows them to sell PCIC's insurance products with a 10% service fee as income.

Together, they made a presentation to the farmers group within their areas. From 400 farmers who attended the orientation, only 30 farmers from Ormoc, Kananga, Karigara, and Alang-alang have actually enrolled and participated in the pilot testing of ARBY. This is so because of the limitation or criteria set in the pilot testing: (a) participating farmers must be within a NIA area; and (2) the timing of the planting must be homogenous. Also, there was an issue on a "wait and see" attitude of some farmers who chose to wait for the results of this pilot testing before joining in the next cropping season. Another issue was on the payment of premium fee for ARBY which some farmers consider as prohibitive as they are presently insured with PCIC's regular or conventional multi-peril insurance.

PCIC further explained the details of how ARBY works and some of the differences in terms of comparing it to the Multi Peril insurance product. One of the differences is on the amount of coverage. For ARBY, the maximum amount of cover is only 10,000 pesos per hectare while for Multi Peril, it ranges from 39,000 pesos per hectare to 42,000 pesos per hectare depending whether inbred or hybrid seeds were used by the farmers. In ARBY, the farmers paid a premium of 4% for 80% trigger coverage wherein if the actual area yield did not meet the trigger yield for that area, all farmers will receive a payout whether or not they achieved low yield or high yield in their farms. For Multi peril, on the other hand, the farmers paid a minimum premium of 3% per hectare and they can receive a claim if there is a natural calamity or their farm is infested with pest and diseases.

In terms of processing, ARBY is easier and faster to transact. Once PCIC receives a report from BAS regarding the yield in the pilot areas, PCIC would then compute for the loss, if any, and will process the payout within 2 days. In Multi Peril, there is still a need for adjusters who will evaluate and review the amount of damage in the farm, making the processing take a month to complete.

In terms of the methodology or process, BAS conducts a survey to the field 15 days before harvest or when the rice plants are in the maturity stage. The data gathering technics being employed by BAS is unknown and highly independent. Thus, there were some suggestions to use the "Remote Sensing" technology developed by IRRI as an alternative tool to verify the actual potential yield in an area. In any case, BAS issues a Yield Certification after they have done yield survey for that cropping season. This shall be communicated to PCIC's Head Office. The Head Office will then forward this certification to its Regional Offices for underwriting and farmers can get payouts in 2 days. Farmers usually do check encashment through traders at 0.5% to 1% service fee especially if they live far from PCIC offices. Thus, there is a plan to convert payments from check to cash through ATM or mobile money services.

In terms of marketing ARBY, it was hard to convince the farmers at first since it is a new concept and they are more familiar with the Multi Peril products of PCIC. Furthermore, farmers have

this "wait-and-see" attitude and some still consider their folkloric beliefs in farming. Thus, it was suggested to have more information awareness and campaigns, increase the eligibility requirements, and invite the participation of other stakeholders such as lending institutions.

Since triggering point of ARBY is yield, enrolled farmers have to wait for the payout until yield data of the region is published. BAS data was collected in the target NIS in Leyte and the yield was calculated. This data was submitted to the PCIC head office and BAS has also published the results. After that, the PCIC head office released the data and was disseminate by PCIC's regional office.

4.3.3 Results of the Pilot Implementation

In total, 129 farmers enrolled in the ARBY through Irrigators Associations during the pilot implementation. According to the GIZ project manager, eligibility requirement of the ARBY product should be hybrid seeds. However, there is a problem in sourcing out supplies of seeds. Thus, all kinds of seeds were accepted during this pilot stage.

Table 4.3.3 Results of the Pilot Implementation

ARBY STATUS OF ENROLMENT						ARBY STATUS OF PAYOUT		
JULY - SEPTEMBER 2011						AS OF Nov. 18, 2011		
AREA/NIS	MUNICIPALITY	FARMERS	AREA	AC	PREMIUM	FARMERS	AREA	PAYOUT
BAO NIS	ORMOC	68	93.50	935,000.00	37,400.00	-	-	-
MAINIT-PONGSO	ALANGALANG	20	41.50	415,000.00	16,600.00	20	41.50	33,1160.00
	BARUGO	14	14.50	145,000.00	5,800.00	14	14.50	11,588.00
	SAN MIGUEL	5	4.50	45,000.00	1,800.00	5	4.50	3,596.00
HINDANG-HILONGOS	HILONGOS	2	3.30	33,000.00	1,155.00	-	-	-
	HINDANG	20	17.00	170,000.00	5,950.00	-	-	-
GRAND TOTAL		129	174.30	1,743,000.00	68,705.00	39	60.50	48,344.00
BY UNDERWITER								
PCICRO8-MNM/RMA		62	90.00	900,000.00	36,000.00			
OCCCI CENTRAL /ALANGALANG BR.		45	54.50	545,000.00	21,800.00			
ST. MICHAEL MPC		22	20.30	203,000.00	7,105.00			
TOTAL		129	174.30	1,743,000.00	68,705.00			

Source: PCIC

After harvest for the wet cropping season, the average yield in Mainit Pongso was lower than the triggering point; hence, there was a payout. During the pilot implementation, there was a total payout of PhP 48,000.

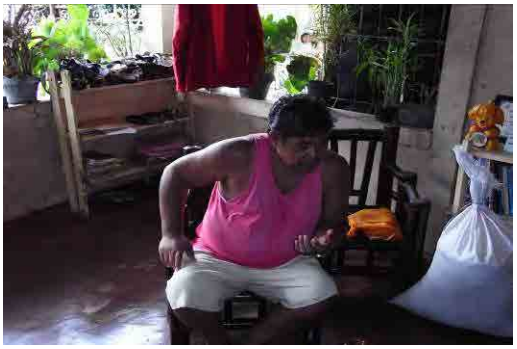
Table 4.3.4 Results of Yield and Payout

NIS/ Area	Average Area (NIS) Yield in 2011 (cavans/ha)	80% coverage yield	Difference	Payout (Difference/80% coverage yield* PhP 10,000 coverage amount)
Bao	65.63	63.464	2.166	0
Mainit- Pongso	58.40	63.47	- 5.07	PhP 799/ha
Hindang- Hilongos-Das ay	87.71	61.336	26.379	0

Source: PCIC and GIZ

Case Study 1: Mr. Jorge Gariando (57 years old)

Area:	Alang-alang
Farm Land:	3.5ha
Crop:	Rice (2 cropping seasons/year)
Average Yield:	100bag/ha
Selling Price:	wet season: PhP 10/kg dry season: PhP 13/kg
Total Farming Cost:	PhP 30,000/ha
Variety of Seeds:	Hybrid
Crop Insurance	Multi-peril Insurance and Area Based Yield Insurance
Premium Paid	PhP 400/ha for ARBY and PhP 900/ha for Multi-peril
Amount Coverage	PhP 10,000/ha for ARBY & Max. of PhP 42,000/ha for Multi-peril



Mr. Jorge Gariando has started farming since his high school days and pursued a degree in agricultural education in college. He is farming about 9 hectares of farmland—1 hectare owned, 2 hectares owned by family members, and another 5 hectares under a rent-to-own scheme purely for rice production; and 1 hectare for coconut plantation.

He is a member of OCCCI since 2006, and presently the chairman of an irrigator's cooperative and president of the federation of irrigators association. Thus, he was chosen as one of the members of the Technical Working Group of ARBY Pilot Project. In June 2009, he was invited and have participated in a seminar workshop held in Manila by GIZ and thereafter, joined the orientation to farmers to promote and explain ARBY. There were 50 farmers who attended the said orientation in his area and only five (5) farmers actually enrolled with ARBY citing the "wait and see" attitude of farmers for any new program or concept.

He is one of the five (5) farmers who initially enrolled with ARBY paying PhP 400/hectare for his two (2) hectares. His reason for joining is that he is convinced with the program and would like to test it himself. Fortunately, for him and the other four (4) farmers, they received a payout amounting to PhP 799 pesos/hectare last November 2011 as the BAS reported a lower average yield for the region than what is set at 63. 47 cavans/hectare. For him, he got a total payout of 1,598 pesos for his two (2) hectares, an amount which can be considered as big assistance to the farmers.

Actually, he did not expect this payout as there were no extreme weather conditions during that season. He thought maybe other farmers in his area suffered damages from pest and diseases that may have contributed to the loss of yield in his area. In fact, he also made a claim to PCIC against pest and diseases last September 2011 and he received a check amounting to 12,000 pesos in October 2011.

Because of the payout he received from ARBY, more farmers got interested with ARBY and in fact, would like to enroll in the next cropping season. However, PCIC, in the meantime, stopped the ARBY implementation for the next cropping season for assessment and evaluation.

But in general, he thinks ARBY is good especially for small farmers who have less than five (5) hectares of farmland because it is easy to enroll and claim payout compared to the traditional crop insurance of PCIC. Further, he thinks that it is a good thing for farmers to have choices. If farmers have a budget for insurance, he could choose the best insurance for them.

Case Study 2: Mrs. Ursulina Mendoza (67 years old)

Area:	Linoan, Ormoc City
Farm Land:	6ha; only 5ha is insured
Crop:	Rice (2 cropping seasons/year)
Average Yield:	100cavans/ha
Selling Price:	PhP 10-12/kg
Total Farming Cost:	PhP 20,000/ha
Variety of Seeds:	Certified Inbred; High Yielding
Crop Insurance	Multi-peril Insurance and Area Based Yield Insurance
Premium Paid	PhP 400/ha for ARBY and PhP 300/ha for Multi-peril
Amount Coverage	PhP 10,000/ha for ARBY & Max. of P39,000/ha for Multi-peril

Mrs. Mendoza has been a farmer since 1970s and it was only in the year 1990 when she got her farm enrolled in the Multi-peril crop insurance product of PCIC through the assistance of the City Agricultural Services Office. Since then, she always made sure that she enrolls with PCIC every cropping season.

In May 2011, PCIC, together with OCCCI, the biggest community-based cooperative in Ormoc, gave an orientation about Area-Based Yield Insurance. She got convinced to enroll with ARBY due to weather/climate change, which she understood to be quite changing very fast in the recent years. Thus, she thought ARBY is a good product to reduce her risk and decided to pay the premium as a kind of investment.

In addition to this, she got interested in ARBY since payout is based on the average yield of production in her area. Thus, even if her production yield is higher than the other farmers, but the total average yield output in her area is low, she has an opportunity to receive a payout. In fact, the set trigger in her region is 63.464cavans/ha, about 36 cavans/ha lower than her average yield. It may seem too high for her but is possible to be hit by the region. For her, it works like a mutual benefit scheme and thus, she joined the ARBY program.

At the time she enrolled in ARBY, she was also already enrolled or insured in the Multi-peril Insurance product of PCIC so she got two insurance policies.

Mrs. Mendoza has a total farmland consisting of six (6) hectares but she insured only five (5) hectares, which are irrigated. She paid a total premium of PhP 1,500 for Multi-peril and another PhP 2,000 for ARBY. Based on the last cropping season, the average yield in the region was 65.63 cavans/ha so there was no payout for the said area. However, she was still able to file a claim in October 2011 for pest and disease covering damage of about 1/3 of her total farmlands. In December 2011, she received a check worth 15,000 from PCIC.

She also mentioned that she is renting a 15-hectare farmland for sugarcane plantation. However, due to high cost of production inputs especially on fertilizers and yet, low buying rate for sugar, it is not profitable for her and just maintains it. She also did not insure her sugarcane plantation to PCIC, as she was not aware it could also be covered. She is willing to insure her sugarcane plantation, however, if the premium is affordable to her. Thus, her main income comes primarily from her rice farming.

She mentioned that one of the benefits of ARBY is that there's no need to fill in "Notice of Loss". She needs to fill out the Notice of Loss form and submit it to an underwriter or the PCIC Office for claiming a Multi-peril insurance. Payout procedure of the ARBY is conducted automatically, if the average yield is lower than the triggering amount.

4.3.4 Major Findings of the Pilot Implementation

One of the major constraints is lack of farmers' understanding and awareness of the ARBY. This pilot implementation was the first time to introduce ARBY to the Philippines and there were no similar type of index in the country. In other words, the ARBY is very new and unfamiliar with insurers and farmers. In general, it is difficult for farmers in rural areas to introduce new things and change their old customs because most farmers, especially in rural areas, are conservative and are not willing to take a risk. ARBY is not exempted from this. It is necessary for all the stakeholders, including the PCIC, MFIs and farmers, to understand why the ARBY is important and how it works.

Another lesson from the ARBY pilot implementation is value chain approach. Triggering point of the ARBY is yield, and yield is influenced by a wide range of different aspects such as agricultural input, irrigation, technical support, and harvest timing. This means that the ARBY product should be combined with other agricultural services. For instance, bundling with certified seeds seems to benefit both farmers and insurers because farmers can buy certified seeds with a certain amount of guarantee while insurers can avoid moral hazard and reduce the basis risk. Therefore, it is necessary to think how the ARBY can be integrated with the whole process of agriculture.

Validity of yield data is also a concern. There are three main issues in this area. First is measurement of yield. Second is the problem about authority and certification of the data. For the pilot implementation, yield data was collected from several different sources including information directly from farmers. Third is the unified standard and data management. If yield data is collected by different sources, there should be a certain standard for yield determination. Also, handling yield data will be extra work for the PCIC and other related institutions. Thus, a more efficient operation system is necessary for the stage of scaling up, especially in integrating this information not only on weather or yield but also on different factors affecting the yield.

Historical data is one of the most important factors for product designing process. In fact, this ARBY product has been developed because the GIZ was able to get access to historical yield data in the past 15 years. Otherwise, if there was no historical data, the ARBY could not be applicable. This aspect is concerning for expansion of the product. However, as mentioned above, there is a need to integrate these historical data with the present conditions as well, taking into consideration different factors affecting the yield.

Validity of the index needs to be reviewed continually. For the ARBY, the index is yield. However, yield depends on various factors. For instance, if new types of seeds are introduced in the future, yield will increase. In this case, the previous average yield of a region is not adequately considered as an index. Therefore, providers of the ARBY product have to review and modify their index regularly. This seems to be one of constraints in applying for a wide range of areas. It also brings doubt about the capability of local organizations for reviewing and modifying the index. Take the case of the result of the pilot where the trigger yield is set too low at around 63–65 cavans per hectare when farmers produce about 80 to 100 cavans per hectare on the average because they are planting high yielding rice varieties.

Therefore, for ARBY to be successful, one needs to develop good yield identifiers on a continuing or regular basis, factor in all other conditions that affect the possible yield, and promote ARBY on the right time, right crop, right season, and on the right location.

4.4 CLIMBS Weather Protect Product

Cooperative Life and Mutual Benefit Services (CLIMBS) is one of the leading cooperative microinsurance providers in the Philippines. CLIMBS is a composite insurance cooperative owned by more than 2,000 cooperative primaries and federations all over the country. They have provided a wide range of insurance services from life to non-life insurance since 1971.

According to their financial report, CLIMBS has more than 800,000 policy holders in 2010. In addition, their financial statements disclose assets of about PhP 390,000 in 2011. This is an increase of 55% compared in 2010. This result indicates that CLIMBS has achieved high growth and their market has a huge potential for insurance products.

In 2010, CLIMBS launched a new product called “Weather Protect”. This is a kind of weather index based insurance product for protecting loan portfolio of cooperatives against extreme weather condition. This product was developed in partnership with Munich Reinsurance Company (Munich Re), one of the largest global reinsurers and GIZ, German Government Technical Cooperation Agency.

CLIMBS has nationwide marketing network scope with three area offices: Quezon City, Cebu City, and Davao City. There are also service offices in Iloilo, a General Agency in Cagayan De Oro, and nine Agency Offices in Luzon, Visayas and Mindanao.

4.4.1 Background of the Weather Protect Product

Extreme weather conditions have a devastating effect not only on poor household but also on financial providers such as cooperatives. After the occurrence of natural catastrophic events, the loan default rate will increase since loan borrowers might be difficult to pay back their loans. Loan portfolio of financial providers is vulnerable in cases of extreme weather event. Responding to this situation, Munich Re developed the Weather Protect product targeting loan portfolio of cooperatives under the GIZ scheme of Public-Private Partnership. Munich Re has partnered with CLIMBS to market the product nationwide.

In addition, CLIMBS pointed out that it is difficult for insurance companies to provide insurance services at Micro level (individual farmers’ level). Operational cost will be high, and how the weather index based insurance works seems to be difficult for farmers to understand. Therefore, they think that providing weather index based insurance at Meso level is the best way for private insurance companies.

4.4.2 Product Outline

This product is to protect loan portfolio of cooperatives from extreme weather event due to wind-speed and rainfall. Trigger indices are wind-speed and rainfall and coverage area of these

indices is usually one municipality, whereby each municipality has different index each for wind-speed and rainfall. The trigger depends on geographical profile of each municipality and vulnerability and risk perception has been taken into consideration for the index.

If either wind speed or rainfall amount exceeds the predefined trigger point in a municipality, cooperatives within that municipality will receive a claims payout regardless if there is loan exposure of their portfolio or not. Since geographical characteristics are different from regions, average and extreme wind speeds are set higher in the northern area of the Philippines. Thus, the trigger point is also higher. The average and extreme rainfall in that area is also higher which again results to a higher trigger point. Wind speed is measured in knot and reflects the minimum wind-speed sustained in 10 minutes. Regarding rainfall, mm per 24 hours will be considered.

These triggers are categorized into three levels according to the frequency of the event: yellow indicates a 0 to 15 years event, orange means a 15 to 20 years event, and red means more than 20 years event. The payout for affected municipality is based on these three levels of triggers. For instance, payout of the red level is 20% of the accrued average loan per municipality, orange level is 10%, and yellow level is 5%.

Table 4.4.1 Trigger Category of Weather Protect Product

Trigger Category	Red	Orange	Yellow
Wind Speed (knot)	Payout 20% of the accrued average loan per municipality	Payout 10% of the accrued average loan per municipality	Payout 5% of the accrued average loan per municipality
Rainfall (mm/24hours)	Payout 20% of the accrued average loan per municipality	Payout 10% of the accrued average loan per municipality	Payout 5% of the accrued average loan per municipality

Source: CLIMBS

4.4.3 Weather Information

Rainfall trigger is based on satellite data provided by the Tropical Rainfall Measuring Mission (TRMM) which is a joint mission between NASA and the Japan Aerospace Exploration Agency (JAXA). The Danish Hydraulic Institute collects the data from the TRMM, and then provides the data to Munich Reinsurance Company. The DHI provide the weather data in an every-3-hours basis on the satellite feedback. They can even provide weather information at least three (3) days before the typhoon hits the particular area. The insurance policy will become effective 10 days after paying the annual premium. Thus, if a cooperative insures their loan portfolio and an event happens in less than 10 days upon enrollment, that cooperative cannot make any claim.

Wind-speed is based on the weather data from Regional Specialized Meteorological Center (RSMC). RSMC is operated by the Japan Meteorological Agency (JMA) within the framework of the World Weather Watch program of World Meteorological Organization (WMO). The main purpose of this center is to support national meteorological services in Asia and the North Pacific in issuing accurate tropical cyclone warnings.

In addition, the cooperative that purchased the policy of this insurance will receive an access code for the web based real-time monitoring system. Every three hours, the actual data will be adjusted and the affected municipalities are visualized as well as categorized.

4.4.4 Premium Rate and Payout

The premium rate for the Weather Protect is 3.5% per annum based on the accrued average loan portfolio of the cooperative it wants to insure. The cooperative has an option to insure only a percentage of the total portfolio. For instance, they have a choice to insure 20%, 30% or 50% of the cooperative portfolio based on its perception of what it can afford to pay.

Once a cooperative insures a percentage of its loan portfolio, it shall then assign to which town or municipality it shall cover and in case of an event, the cooperative will receive an interim payout of 50% of possible claim amount within 14 days. Final payout will be made at the latest of 60 days after the event.

Payout of this Weather Protect product of CLIMBS is not limited to only one occurrence of trigger event per year. If there are numerous occurrences of trigger events in a year, CLIMBS will continue to pay for each occurrence until the maximum amount of coverage has been reached.

Presently, CLIMBS was given an annual quota of insuring PhP 1 billion worth of loan portfolio nationwide.

4.4.5 Current Situation

Since they launched the weather protect product, there have been 10 cooperatives that have purchased the said policy: five (5) cooperatives from Luzon, three (3) cooperatives from Visayas, and two (2) cooperatives from Mindanao. There was already a payout of PhP 100,000. Although the cooperative received a payout, they did not get any damage and neither were their loan portfolio exposed. Thus, they were surprised to receive a payout and now a lot of cooperatives are interested in this weather protect product.

Since the product was developed under the partnership between GIZ and Munich, CLIMBS gets support from the GIZ to market the product and educate farmers. For instance, Weather Protect Road Shows were held in 2011. Participants representing various cooperatives affiliated with CLIMBS were able to get the information on how to protect the loan portfolio of cooperatives through weather index insurance. GIZ supports the advocacy of promoting to cooperatives the necessity of protecting their loan portfolio from these extreme weather events.

However, as of January 2012, CLIMBS has stopped marketing this product. Presently, Munich Re provides 100% reinsurance coverage. However, the Insurance Commission (IC), Munich Re, and CLIMBS discussed CLIMBS' share of or retaining a percentage of risks. According to CLIMBS, once the internal issues are settled, they will promote the product soon. In fact, CLIMBS has a pilot partnership with the Provincial Government of Albay in partnership with Oxfam wherein their provincial budget is being insured with the Weather Protect.

CASE STUDY

Type of Cooperative	Community based
Number of Members	550 regular members 600 associate members
Total Loan Portfolio	PhP 8.5 million
Amount of Loan Portfolio Covered with Weather Protect	PhP 500,000
Premium Cost	PhP 17,500/year; one time
Areas Covered	PhP 300,000 – Lapu-lapu Area PhP 100,000 – Cordova Area PhP 50,000 – Mandaue and Consolacion Areas PhP 50,000 – Cebu City Area

Mactan Island Multi Purpose Cooperative is a community-type cooperative formed in August 26, 2002. Presently, it has around 550 regular members and 600 associate members comprising mostly of market vendors. The cooperative provides lending/credit services, consumer store services, savings/deposit services, and other social services such as health and insurance.

The cooperative is a regular member of CLIMBS and thus, being a member, advocates CLIMBS insurance products and services, which is one of the main priorities of the cooperative for its members. Therefore, enrolling in Weather Protect service of CLIMBS proved to be a good move for the cooperative.

The cooperative committed to enroll PhP 500,000 of its PhP 8 million loan portfolio and paid an amount of 17,500 pesos representing the 3.5% premium fee. The cooperative has no budget for this amount however. They are able to source out the said funds from its Social Fund with PhP 100,000 which is used for the cooperative's medical mission.

Based on the orientation and requirements of CLIMBS for this product, the cooperative has allocated the enrolled PhP 500,000 loan portfolio by areas: PhP 300,000 for Lapu-Lapu City, PhP 100,000 for Cordova area, PhP 50,000 for Mandaue and Consolacion areas, and PhP 50,000 for Cebu City. This allocation is based on the loan profile of the cooperative and not based on any scientific formula or weather conditions of the said areas.

The cooperative got its first payout last October 2011 amounting to 100 thousand pesos representing 20% upon reaching the Trigger Red, of the insured amount of PhP 500,000 due to an event (Heavy Rainfall) that happened in September 2011. This amount was handed to the cooperative during the 1st Visayas Cooperative Congress as a showcase to other cooperatives. Another event (Heavy Rainfall) occurred last December 2011 and would get another PhP 100,000 as payout.

One of the issues raised was the timing of the release of funds though the information of a payout from CLIMBS is fast. Another is in terms of monitoring—the manager has found it difficult to monitor the system provided for this product by CLIMBS as they need another laptop exclusive for just monitoring the weather events. Additionally, they need another staff just to do the monitoring, which as she says, is not their main priority. Thus, she requested CLIMBS to do the monitoring instead and just call the cooperative if a certain breach of the trigger occurs.

For the initial amount of PhP 100,000 that the cooperative received, the cooperative made a plan to form a Trust Fund which will be used for the following—50% as financial assistance for active members only; 25% for payment of premium for Weather Protect; and another 25% as incentive to its board of directors, officers and staff by using this fund to enroll them to another insurance scheme of CLIMBS, which is called "B2K2" – Buhay (Life), Bahay (House), Kabuhayan (Livelihood) and Kalamidad (Calamity).

The cooperative will be renewing its Weather Protect policy with CLIMBS this coming March 2012 and will increase its coverage from PhP 500,000 to PhP 1 million. The additional premium will be coming from the 25% the cooperative allocated in the trust fund and from the percentage allocation out of its patronage refunds and dividends.

4.4.6 Constraints and Issues

One of the main challenges for CLIMBS is how to convince the cooperatives on the importance of this insurance product for them. Most cooperatives are not familiar with this type of insurance. They think of weather protect product as an additional expense rather than as investment or security. In terms of marketing of this product to cooperatives, being relatively new, the cooperative has no extra budget to cover their loan portfolio. Besides, most members of cooperatives are farmers, and most farmers have a "wait-and-see" attitude. In fact, although CLIMBS has a nationwide marketing network and its clients are more than 2,000 cooperatives around the country, only 10 cooperatives purchased the policy so far. Therefore, awareness and understanding of the need of the product is one of the main challenges for CLIMBS.

Another challenge for CLIMBS and its reinsurer partner is the accuracy of the weather data information provided through satellite feeds. Definitely, there is a big difference between the observation feeds from satellite and from the weather stations on the ground. While satellite can observe in a wider area, it cannot actually predict the actual output (i.e. the amount of rainfall that will hit in a specific area). Thus, there is a probability of higher basis risk for this kind of index-based insurance.

Moreover, there is also the matter of regulations in terms of index-based insurance, especially for private companies. For instance, CLIMBS gets reinsured 100% from Munich Re. However, the Insurance Commission requires CLIMBS to retain at least 5% of the risk. It is not going to be easy for CLIMBS to retain 5% of the risk, as this needs additional fund reserve requirement for CLIMBS. They also have experienced difficulty in finding local insurance companies. In fact, the Philippine National Reinsurance waived their right for 10% reinsurance. Therefore, regulation like retaining 5% of the risk is one of the constraints for CLIMBS to market the product.

With their pilot partnership with the Local Government Unit of Albay where CLIMBS shall insure the provincial budget of Albay, there is also a regulation issue on whether this kind of partnership is allowed under the law and approved by the Department of Interior and Local Government in terms of budget allocation for the premium payment. At present, there is no existing rules and regulations for this emerging insurance in the Philippines.

4.5 MicroEnsure's Typhoon and Drought Index-based Insurance

Typhoon index-based insurance was developed under the partnership between MicroEnsure and Malayan Insurance Company in 2008. MicroEnsure has a lot of experience in developing index-based insurance. They conducted the first pilot implementation of weather index-based insurance in Malawi to provide protection against drought from the USD 24.2 million grant received from the Bill and Melinda Gates Foundation in 2007. They have expanded their insurance operation using this grant in other areas such as Ghana, India, and Kenya. In 2006, they established MicroEnsure Philippines to promote microinsurance services.

Malayan Insurance Company, on the other hand, is one of the largest non-life insurance

companies in the Philippines. According to Malayan, there are three main reasons for them to get into the market of index-based insurance. First, they were able to get access to an international reinsurance company in terms of providing typhoon index-based insurance. Second, Agri-Agra law was issued, and the government has encouraged private financial and insurance providers to invest in agricultural sector. Third, the Climate Change Commission considered the effectiveness of index-based insurance. Therefore, these aspects make them convinced to engage in the index-based insurance business.

However, as of present, MicroEnsure and Malayan have ceased to partner in marketing and promoting the Typhoon Index-based insurance developed by MicroEnsure. Based on the initial results of their pilot testing, the product is not suitable mainly due to difficulty or complications in the formulation of the weather indices used. Hence, Malayan has stopped the issuance of policy while MicroEnsure tries to redesign its product.

4.5.1 Product Outline

The Typhoon index-based insurance covers the cost of cultivation against peril of typhoon (defined as crop damage caused by high wind-speed as a result of a typhoon to the insured farm). Crop damage of typhoon is assessed according to the distance from the farm and the typhoon track as well as the corresponding typhoon wind-speed.

The Typhoon Index-based Insurance has the following features: 1) the exact location of the farmer is taken using the Global Positioning System (GPS) stating the latitude and the longitude; 2) the payout and claim amount are based on the "Typhoon Track" that includes its location and intensity; 3) the precise location of the farmer in relation to the typhoon track will also be used as basis for payout; and 4) this distance, together with the intensity of typhoon, will be considered in the total calculation of the payout.

In terms of coverage under this typhoon index-based insurance scheme, it covers only one cropping season or 120 days. This covers from the crop's establishment, to flowering and to yield formation phases. The sum insured is the cost of all farm production, which includes cost of material inputs, cultivation, labor, and insurance plus farmer's equity.

In order to develop region-specific premium rates for typhoon insurance, MicroEnsure divided the areas into a grid across the whole country, consisting of about 6,000 cells. Each cell is approximately of a 25km radius. For each cell, pricing is based on the central point in that cell. Typhoons with wind speed ranging from 50km/hr to 150km/hr captured from the "Typhoon Tracks" passing through these cells will be determined by MicroEnsure for pricing and payout computations. The total claim payout is computed as Sum Insured times Wind speed times Distance up to 100% of Sum Insured that covers only the growing season.

Drought cover, on the other hand, insures the cost of cultivation against the peril of drought (defined as deficit rainfall on the different stages of the crop growth as measured through installed weather stations by the PAGASA). Drought crop damage is determined by the amount of rainfall in

the area of the insured farm. Payout will be given if there is lack of rainfall based on the water requirements of the crop during the three growth stages (establishment, flowering, and yield formation).

The main features of the drought index insurance are: 1) use of historical rainfall data at a weather station to develop index; 2) all farmers growing rice within 20km radius are included; 3) each weather station and crop has a different pricing scheme; 4) a contract monitoring sheet had been developed to automatically calculate payout for each insured MFI or social aggregator and to help stakeholders follow development of each contract; and 5) combined with a pest and disease cover from PCIC.

One dry day is considered when less than 2.55mm of rainfall is recorded. The first trigger happens when there is 18 days of consecutive dry days while the second trigger happens when there is less than required rainfall over 21 blocks of days. Benefit payable is computed as trigger point less cumulative rainfall times payout rate times total sum insured over 1,000.

4.5.2 Weather Information

Weather data is provided by the Japan Meteorological Agency (JMA) through a real-time typhoon track analysis (published live on the web during the typhoon) which determines the wind speed at a destructive level based on the latitude and longitudes of the typhoon. For Saffir Simpson scale, wind speed is used to calculate the category of typhoon.

Meanwhile, MicroEnsure uses different typhoon software as well as premium and claims calculation tools to facilitate its weather index product. A web data extraction software program was developed by MicroEnsure MIS to download typhoon track data from the JMA website into a spreadsheet as typhoon is in progress. Another calculation software is used for the premium and claims monitoring for each individual farmer's GPS location. A separate Rainfall and Cloudiness Forecasting Software is used to forecast the weather conditions, mainly the number of rainy and cloudy days falling under a given harvesting period, in any grain-producing province of the country.

4.5.3 Pilot Implementation and Its Results

The pilot test of the typhoon index insurance was implemented during May to October 2009. There were 470 farmers enrolled in that period, covering a total insured area of 600 hectares. The pilot implementation was relatively large compared to the pilot testing of WIBI package implemented by the ILO and ARBY product implemented by the GIZ.

Although there was typhoon and some of the farmers suffered damages from their crops, there was no payout during the pilot period. This is because both of the trigger indices—rainfall and wind speed—should be breached. When the typhoon hit the farmers, wind speed exceeded the predefined speed. However, the farmers were far from the center of the typhoon. Therefore, the farmers could not receive a payout.

4.5.4 Lessons Learned from the Pilot Implementation

One of the good things of the index-based insurance for the insurers is simple operation. Malayan Insurance Company pointed out that operation of index-based insurance is much easier for them because they did not need to assess the damage of the fields. Also, payout is calculated automatically so they can save the cost of monitoring and operation. From this point of view, simple operation is one of the strong advantages of the index-based insurance for insurance companies.

On the other hand, one of the main concerns is that there is a high reputational risk. As mentioned, although some farmers suffered crop damages from the typhoon during the pilot implementation, there was no payout since the distance of the typhoon did not breach the triggering point. From the farmers' point of view, they do not understand why they could not get payout, even if they paid premium amount to hedge the risk of typhoon. It is not easy for insurers to explain to farmers how the index-based insurance works. Therefore, there was a high reputational risk for Malayan Insurance Company.

Also, there is a limitation of possible scaling up for the Drought Index-based Product. This is because the Drought Index-based Product relied on the rainfall data from the weather station of PAGASA. In other words, they could not expand the product to other areas where there are no weather stations. In addition, even if there was a weather station, they had to analyze historical data again to develop the triggers for the index. Thus, it is difficult for MicroEnsure and Malayan to expand their service area and the number of coverage for farmers was limited.

Another concern of Malayan is the tax burden of premium amount. According to Malayan, they were imposed with around 25% of premium rate. They also have to pay other taxes such as income taxes. Private insurance companies would be imposed with taxes of around 30 to 32%. It could be one of the reasons for high premium rate and high tax burden discourages the private sector to get into index based insurance. Meanwhile, PCIC is exempted from paying taxes because it is a government entity under the Department of Agriculture and any surplus earned from its operations will be remitted to the National Government. Furthermore, PCIC receives premium subsidies from the government; a farmer can access to a Multi-peril insurance with lower premium rate than that of the index-based insurance. This situation indicates that private sector has many difficulties regarding operation of index-based insurance.

In addition, there is an issue for the private sectors when they decide to enter into providing index-based insurance schemes or when they decide to partner with another institution such as PCIC or an international reinsurer. The private sector can play different roles such as co-risk taker, as underwriter, or as product distributor/marketer. In any of these roles, there is corresponding regulatory implications which need to be addressed such as risk sharing issues, legal issues and other policy and guidelines issues.

4.6 Philippines Climate Change Adaptation Project (PhilCCAP)

PhilCCAP is a 5-year project funded by the World Bank that started on January 2011 which

aims to develop and pilot test some adaptive strategies that will promote the climate-resiliency of Philippine agriculture and natural resources management. One of the components of this project is pilot testing of weather index-based crop insurance in partnership with PCIC. As the implementing and developing partner, the experiences and lessons learned from its previous pilot testing done with the assistance of ILO will be further tested. This time, it will be done in other areas specifically in Iloilo (Region 6) and Cagayan Valley (Region 2).

Other participating agencies under this project are the Agricultural Training Institute (ATI) and the Bureau of Soils and Water Management (BSWM). ATI will produce training modules/manuals on climate change and will provide training for farmers in the would-be established climate change field schools. BSWM will install about six (6) portable AWS, developed by IRRI and costing around PhP 75,000 each in the pilot areas. There are four (4) AWS in Region 6 and two (2) AWS in Region 2. Each AWS can cover a 5km-radius area.

One of the major challenges this project would be facing is the commercialization of weather index based insurance where a great deal of participation from the private sector is needed. Being relatively new and perceived to be high risk, the private sector is hesitant to enter into this kind of insurance. However, at the end of the day, the major question is still the willingness to pay of the farmers considering that any type of weather index based insurance is another layer of cost of inputs for them. This is especially so for farmers located at very vulnerable sites most often visited by calamities or extreme weather conditions and are thus expected to pay a higher premium.

The main issue is the relevance of this product to the farmers, whether they understood the product or not and whether they are convinced that this is what they need. Thus, the biggest challenge still is how to convey to the farmers the benefits of insuring their farm through this weather index based insurance schemes.

4.7 Weather Infrastructure in the Philippines

Weather data is one of the most important conditions of a weather index-based insurance. Analysis on historical weather information is fundamental requirement and having a stable weather collection system is essential for the operation and development of a weather index-based insurance. Therefore, there is a need for accessible and reliable weather information readily available for this type of insurance scheme to succeed.

In the Philippines, PAGASA, an attached agency under the Department of Science and Technology (DOST), plays the lead role in providing weather information. PAGASA is mandated to provide protection against natural calamities and utilize scientific knowledge as an effective instrument to ensure the safety, well-being and economic security of all the people, and for the promotion of national progress; as provided for under Presidential Decree No. 78 (December 1972), and as amended by PD 1149 (June 1977).

PAGASA provides a wide range of services from daily weather forecast to astronomical service. Their activities are categorized into six areas: 1) Weather Forecasting and Warning Services; 2) Flood

Forecasting and Warning Services; 3) Climatological and Agrometeorological Services; 4) Astronomical and Space Science Services; 5) Natural Disaster Preparedness and Hazard Mitigation Services; and 6) Information, Education and Communication Services.

PAGASA is part of the initiative of crafting or developing weather index-based insurance with PCIC, other government agencies, and other donor organizations. PAGASA is tasked to provide weather data—historical, forecasted and actual—to create basis for determining the trigger points, which shall be the basis of the payout. Thus, the basic issue on data accuracy in terms of specific locations is raised as there are limited weather stations all over the country.

4.7.1. Weather Stations

The PAGASA mainly has eight types of weather stations: (1) Synoptic Manual Stations; (2) Agromet Stations; (3) Rain Stations; (4) Automatic Weather Stations; (5) Automatic Rain Gauge installed with Smart; (6) Marine Buoy; (7) Automatic Weather Station (ASTI); and (8) Radar Station.

PAGASA operated 55 Surface Synoptic Stations in the whole country. A surface synoptic station observes almost all meteorological elements and weather data are transmitted to the Central Office. Agromet Stations are for agricultural purposes. A sensor for solar radiation and soil moisture is installed in these stations. The Automatic Rain Gauge installed with SMART are those that are installed on ell sites owned by Smart Communications, Inc. The Automatic Weather Station installed by Advanced Science and Technology Institute (ASTI) is also an attached agency under the Department of Science and Technology (DOST). AWS installed by ASTI does not follow the World Meteorological Organization (WMO) standard. Hence, data collected in this station is not published.

Table 4.7.1 Number of Existing Stations (As of February 2012)

Existing Stations	Numbers
1. Synoptic Manual Stations*	55
2. Agromet Stations*	21
3. Rain Stations	75
4. Automatic Weather Stations	69
5. Automatic Rain Gauge installed with SMART*	65
6. Marine Buoy	2
7. Automatic Weather Station (ASTI)*	76
8. Radar Station	10

Source: PAGASA

PAGASA has 5 regional offices (out of the 17 regional provinces nationwide) located in Cebu, NCR, Tuguegarao, Legaspi City, and El Salvador, Misamis, Mindanao. At least four (4) staff are manning the synoptic stations while at least one (1) staff is manning Agromet stations.

PAGASA has a databank and data section that archives the data since 1951. Although these data are not published, private companies are able to get access to historical data, provided that they pay for it. All collected data at stations are sent to the Central Office via Short Message Services (SMS) or radios and then are processed and analyzed before being archived manually.

4.7.2 Collaboration with the Private Sector

In 2010, PAGASA and the three telecommunication companies (Smart Communications, Globe Telecom, and Sun Cellular) have agreed to install weather observation equipments such as rain gauge and Automatic Weather Station in their cell sites. The purpose of this collaboration is to help upgrade the weather infrastructure in the country and flood forecasting system.

One of the challenges for PAGASA is to find a safe place for weather observation equipment. The advantages of installing weather observation equipments on cell sites are security and stability of data transmission. Cell sites are managed and operated by the telecommunication companies under certain security conditions. PAGASA, on the other hand, shall install the equipments, and then weather data from the equipment would automatically be sent to PAGASA Central Office via SMS.

PAGASA has already installed 65 automatic rain gauges and are co-located in Smart cell sites. In this automatic rain gauge, a tipping bucket for rain is used to measure the amount of precipitation. Data from the gauge is automatically sent to PAGASA's server via SMS to evaluate the data. This data, which is also published on the web, is utilized for weather forecast.

Rain gauge data published on the website
URL: http://202.90.149.66/predict/stations.php

4.7.3. Potentials and Constraints

One of the weaknesses of PAGASA is the lack of weather infrastructure, especially the Automatic Weather Station (AWS) type where data could be sent automatically and retrieved electronically. Furthermore, the coverage of existing weather stations is too wide, wherein areas range from 100-150km radius. As such, the evaluated data is based on interpolation. There is a need for a more accurate and real-time weather data, based on reduced area coverage of at least 50 km radius. In this scenario, more AWS are needed to be installed. Recently, PAGASA installed AWS through the Climate Change Adaptation Project at the pilot sites of WIBI in Agusan del Norte in Mindanao.

In addition, accessibility of the weather information is not easy. Though real-time weather information data is gathered, this is not published. PAGASA does not publish raw real-time data on the web and just provides weather forecast and warnings for public use through their website.

The main reason of this constraint is that they do not have an efficient information system. Once the Central Office gets the raw data, they would input it to other formats again before they will be able to analyze the data. If they do not have capabilities and systems of handling large amount of weather data, they would not be able to increase the number of AWS.

To cope with this problem, PAGASA will establish the "Unified Meteorological Information

System (UMIS)". In this unified system, data gathering and processing will be done electronically and automatically. In addition, the system will link their website and provide their weather data on the web. According to PAGASA, establishment work for this Unified Meteorological Information System will start this year as it is considered a priority project of the government.

4.8 Insurance Commission (IC)

The Insurance Commission (IC) was established through Presidential Decree No. 612 known as the Insurance Code of the Philippines that was signed and issued on December 18, 1974. The IC's mandate is to regulate and supervise the insurance industry in accordance with the provisions of the Insurance Code in order to ensure that adequate insurance protection is available to the public at a fair and reasonable cost and to assure the financial stability of the insurance industry so that all legitimate claims of the insuring public are met promptly, fairly and equitably.

Therefore, one of the functions of the Insurance Commission is to assess the effectiveness and viability of the insurance product being proposed, evaluate its risk exposure and approve the design and marketability of the insurance product.

With regards to Weather Index-based Insurance, the Insurance Commission, at present, does not have specific regulations, policies or circulars on the said type of insurance. Weather Index-based Insurance is still in a gray area being a new, innovative and trailblazing product. Some people in the IC think this is a form of microinsurance while some says it falls under the Casualty Insurance, which will need special regulations and policies. Thus, the question whether Weather Index-based Insurance is under the Insurance Commission's jurisdiction is still unclear. However, the IC welcomes this new development and supports the move for the development of this new type of insurance to protect Filipinos, especially the poor, from natural calamities and perils.

4.8.1 Product Approval Process

At present, the Insurance Commission has approved two weather-based insurance products: one issued by CLIMBS and another by Malayan Insurance. Both products cover payout against 3-levels of weather condition, specifically the amount of rainfall. Both products are also reinsured with Munich Re and the Danish Hydraulic Institute provides the weather information for both through their satellite information systems.

Both institutions have passed the rigorous approval process of the IC by submitting its Insurance Policy and Plan that includes product design, underwriting guidelines, claims procedure, rating structure and marketing platform.

These were validated in conformity with the Insurance Code and the amount of risk exposure. For CLIMBS, the IC required them to share at least 5% of the payout amount as its contribution. IC explains that CLIMBS is subject to a "Credit Risk" where there is a probability of default in performance of the obligation by its reinsurance partner.

4.8.2 Issues and Constraints

Therefore, despite of the initiatives by these institutions in introducing weather-based insurance, some regulatory issues may need to be addressed. First, as mentioned, is the proper classification of Weather Index-based Insurance. Second is the proper implementing rules and regulations on product development and management, including the underwriting processes. Third is the appropriate risk-based capitalization structure. Fourth is the appropriate legal structure of "Counter Partying" or partnership between direct insurers, reinsurers and other stakeholders. Finally, fifth is the effective and responsive marketing platform, awareness and advocacy for these weather index-based insurance schemes.

Addressing these regulatory issues would provide an enabling environment to the private sector to further participate and develop this Weather Index-based Insurance scheme in the Philippines.

Table 4.8.1 Existing Crop Insurance and Index Based Insurance

Name of Products	Multi Cover Risk Crop Insurance	Weather Index Based Insurance	Area Yield Based Insurance	Weather Protect Product	Typhoon and Drought Index Based Insurance
Provider	PCIC	PCIC	PCIC	CLIMBS	MicroEnsure and Malayan
Type of Provider	Governmental Agency	Governmental Agency	Governmental Agency	Private Company	Private Company
Implementation Partner	-	ILO	GIZ	GIZ and Munich Re	-
Implementation Scheme	-	Technical Cooperation Project	Technical Cooperation Project	Public Private Partnership	-
Area	Nationwide	Butuan	Leyte	Nationwide	Iloilo
Sales Period	-	June 2011- December 2011 (pilot implementation)	June 2011- December 2011 (pilot implementation)	Since 2010	May 2009- Oct 2009 (pilot implementation)
Target Crop/ Insurance	Rice	Rice	Rice	Loan portfolio	Rice
Covering Risk	All risks	Low and Excess Rainfall	Low Production Risk	Extreme weather	Typhoon and Drought
Triggering Index	--	Rainfall amount	Average Yield of a Region	Rainfall and wind speed	Wind speed, Distance from Typhoon, and Rainfall
Source of Weather Data	--	PAGASA	BAS yield data	TRMM*	PAGASA Japan Meteorological Agency
Premium Rate	2%- 7%*	3%	4%	3.5%	8%- 12%
Coverage Amount	PhP 10,000～	PhP 10,000-42,000	PhP 10,000	Based on Portfolio	Based on Production Cost
Current Status	-	Initial pilot done Planning to scale up the pilot	Initial pilot done Planning to scale up the pilot	10 cooperatives committed Policy review on going	Redesigning the Product
Remarks	-	154 farmers enrolled in the pilot	129 farmers enrolled during the pilot	PPP GIZ and Munich Re	-

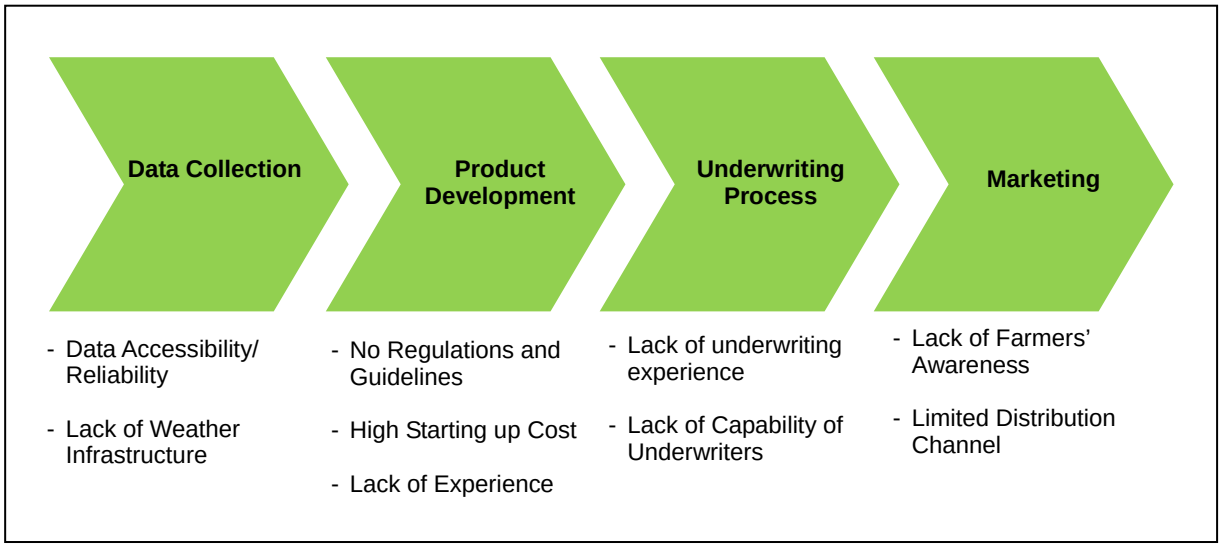
Source: JICA Survey Team

*TRMM: Tropical Rainfall Measuring Mission
*Premium rate of Multi Risk Cover subsidies by the Government. Farmers share 2% to 7% premium rate. This is not total premium rate.

4.9 Issues and Concerns: A Summary

In summary, introducing an index-based insurance scheme as an alternative to the traditional crop insurance or indemnity-based insurance is highly feasible in the Philippines. However, there are some issues and concerns that need to be addressed in order for this insurance scheme to further develop and to encourage more participation of the private sector. Most importantly, the creation of an enabling policy environment for Index-based insurance will benefit the poor farmers who are more vulnerable to all kinds of risks, especially climate change and weather-related risks.

Figure 4.9.1 Product Development Process for Index-based Insurance



4.9.1 Data Collection

1) Data Access and Reliability

Having data, both historical and actual or real-time, is a prerequisite for any Index-based Insurance scheme to be successful as this serves as the basis of creating the trigger points, yield identifiers and future policy directions. Data must be reliable as the integrity of the Index-based Insurance relies heavily on the different parameters set for the insurance products. Data must also be accessible at all levels so that all stakeholders will have trust and confidence on the Index-based insurance schemes.

2) Lack of Weather Structure

There is a need to increase the number of AWS in the country. PAGASA is now responding to this concern through the collaboration with other government agencies and with the private sector such as telecommunication companies. The challenge now is on: how to integrate and harmonize the information from the different sources and existing weather stations; how to manage these data; and how to disseminate these data properly and in real-time for public use.

3) Homogeneity of Parameters

Aside from weather information, there is a need to develop other parameters that are homogeneous in

nature. Such can be used especially in area yield index-based insurance. This shall result to a reduced basis risk.

4.9.2 Product Development

1) No Regulations and Guidelines

There is a need to develop specific implementing rules, procedures and guidelines in order for index-based insurance to prosper and convince the private sector to participate. An enabling policy environment is needed to make index-based insurance viable and sustainable while the end-clients are protected and secured.

2) High Start-up Cost

Introducing any index-based insurance product or scheme is highly costly as it involves gathering a wide array of data based on specific locations. Thus, too many probabilities have to be tested before it can be released for public use. Any change in location or in parameters would result to another set of varying probabilities which again needs to be tested. Therefore, the government sector can support the private sector in the development of index-based insurance through a Public-Private Partnership to create different products and approaches that are feasible at the micro, meso and macro levels.

3) Lack of Experience

Index-based insurance is relatively new and present implementation and applications are still in a pilot stage. Learnings from the said pilots are limited, having been tested with just a few farmers in limited locations and in just one or two cropping seasons. There is a need for continuous product research and improvement in terms of the design, features, benefits, modeling and applications for other locations, target markets and even in other crops.

4.9.3 Underwriting Process

1) Lack of Underwriting Experience

Since index-based insurance schemes are new and the reason for a payout is based on triggers and parameters and not on “indemnity”, the insurance providers lack the experience to underwrite index-based insurance policies. As such, there is a need for all stakeholders to share the experiences and learnings of the underwriting procedures and improve these using the existing methods and processes.

2) Lack of Capabilities of Underwriters

As such, there is a need to capacitate all underwriters at all levels including the PCIC, the Insurance Commission, and the private sectors to develop their capabilities in underwriting index-based insurance schemes.

4.9.4 Marketing

1) Lack of Farmers’ Awareness

For the index-based insurance to be accepted by farmers, there is a need to increase their awareness on the importance of insurance as their risk mitigating tool especially for their farming business that is now, more than ever, affected by climate change conditions. A literacy program is required to assimilate this importance to the farmers' lives, including their families. Further, there is a need to establish effective dissemination tools and processes so that whatever insurance literacy program that is to be developed will be responsive to the actual needs of the farmers.

2) Limited Distribution Channel

Index-based insurance cannot be a stand-alone intervention. There is a need to bundle it with credit or other agricultural inputs. This is where the other key players in the whole financial chain are at utmost importance, especially for the participation of the lending institutions such as rural banks and cooperatives. Right product mix and the right distribution channels should be identified for the effective and efficient delivery of index-based insurance products to the target market.

CHAPTER 5 PROPOSED PROJECTS/PROGRAMS

Based on the findings, observation, result of field survey, interviews with concerned Governmental and private sector both in the Philippines and Japan during the Survey, and feedbacks made in Project Formulation Workshop held on 30 January 2012, possible programs/projects on the application of ICT in agriculture have been identified.

As stated in Inception Report, Projects/Programs were proposed in three (3) major sub-sectors in agricultural development, i.e. 1) Agricultural Marketing/Extension, 2) Irrigation Development and 3) Agricultural Insurance.

Furthermore, Proposed Project/Programs were classified into two (2) groups by level of contents, i.e. a) *"Project Proposals"* which are considered as most effective and necessary projects in each sub-sector, and b) *"Project Concepts"* which are considered as projects/programs for future consideration. The summary table of the proposed projects for both a) and b) are shown in Table 5.1.1 starting from next page.

On this Report, a) Project Proposals for 3 sub-sectors are shown in Attachment-1, 2 and 3 at the end of the Report, while b) Project Concepts are shown in this Chapter.

Since some projects/programs can be implemented more effectively by simultaneous implementation in combination with other proposed projects for synergy effects, expected effect(s) to be generated between plural projects/programs are summarized in Table 5.1.2 at the end of this Chapter.

Table 5.1.1 List of Proposed Projects for ICT Application in Agricultural Sector

Page	Proposed Project	Issues to be approached	Sub-Sector	Outline of the Project	Advantage in introducing ICT	Anticipated Challenges in Implementation	Countermeasure for the Challenges	Possible Participation of Private Sector	Mode of Participation and Technology/ Services to be offered	Possible Implementation under Japan's ODA and Applicable Scheme
Attachment-1	**Market Operation and Information System Development**	Improvement of Farmers' Income	Marketing Improvement	1) improvement of market operation systems of individual trading centers by introducing ICT; and 2) advancement of market information systems by networking the information system of central and satellite markets. 3) effficient dissemination of marketing information from government units to the end-users (producers, traders, cooperatives, institutional buyers, etc.	Organized and faster transactions, paperless trading, traceability	Agricultural cooperative's capacity to perform the group activities expected, Number of centers for coop trading, Competencies to use ICT-based applications,	GoP to strengthen farmers' coop before or in parallel with project, AgriPinoy Trading Centers, Municipal and barangay food terminals are being built and supported by DA-AMAS, Conduct ICT-related capacity building activities	Agri-ICT vendor company	Dispatch individual system engineers of private firm with enough experiences in marketing system design	- Dispatch of long-term Experts (agribusiness/marketing expert, system development experts) - Trainings - BOP Scheme (ICT Vendor Company)
Chapter 5, P5-4 - P5-8	Online Marketing System Development Project			1) To establish online marketing system to work as a platform to link producers, buyers and sellers to minimize high searching cost (due to present limited networking for buyers and sellers, limited knowledge of goods/services), 2) to minimize gap on pricing information and product standards.	Distance trading, benefit by acquiring good price, wider sales with more buyers, database of transactions for market trading information and product profiles	Availability of ICT equipment and internet, Competencies to use ICT-based applications	Tap ICTO, ITCAF, Telecom or other agencies that can provide access options (esp for areas outside project pilot), Conduct ICT-related capacity building activities	Tele-communication Company Online-shopping Company	–Installation in mobile phones (system menu) and computers (software/application) and training on the use of mobil applications (mobile money, SMS, MMS, etc.)	- Dispatch of long-term Experts (agribusiness/marketing expert, system development experts) - Trainings - BOP Scheme (ICT Vendor Company)
Attchment-2	**Efficient Irrigation Service Fee (ISF) Collection though Payment by Mobile Phone**	Stable production by maintaining functions of production infrastructure	Irrigation	1) To promote ISF payment through cell phone, to improve collection efficiency by increase of payers far from NIA/IA office. 2) NIA/IA will provide information to mobile ISF payer through SMS, such as advices on agronomy, water management, etc.. Also, by including advance notice on ISF billing amount to this information services, it will also contribute collection efficiency through farmer's readiness for ISF payment.	Mobile (distant) remittance, simulatneous delivery of information	Reluctance of farmers (especially senior generation) to adopt new technology	Provide useful information though SMS to the farmer who adopt mobile payment method	Tele-communication company	-provide mobile payment service -system development -Campaign, seminars	-Technical Cooperation Project or dispatch of Expert (IA financial management) -Trainings in Japan (introduction of Japense experiences) -YLTA (new and past irrigation projects funded by Japan)
Chapter 5, P5-9 - P5-12	Accurate and Prompt ISF Billing by the Confirmation of Planted and Irrigated Area by using GPS			To verify the planted area declared by farmers on LIPA (List of Irrigated and Planted Area) by joint works of farmers and NIA/IA collector using GPS, to increase accuracy on ISF billing amount, for the improvement of ISF collection efficiency.	Easy land survey by GPS to minimize time, cost and labour	IA's insufficient capability and policy, especially the IA which IMT was introduced recently	To provide intensive trainings, seminar and continuous campaign	Trading firm	Procurement services of GPS and other equipment	-Dispatch of Japanese ICT Expert -In-Country Training Program -YLTA (new and past irrigation projects funded by Japan)
Chapter 5, P5-13 - P5-18	Project for Scaling up of Index Based Insurance in the Philippines	Protection of Farmers	Agricultural Insurance	The objective of this project is to expand and enhance the development of index-based insurance schemes by replicating the lessons learned and apply these into new areas, new crops and through different delivery schemes.	N. A	farmers' "wait and see" attitude, basis risk of insurance product	To provide proper campagin and literacy program, Appropriate site selection and setting indices	-Private insurance companies and reinsurance companies -Agricultural Inputs Providers	- Individual insurace experts from private companies - Public Private Partnership for product development - Implementation of BOP products	- Technical Cooperation Project - BOP scheme -In-Country Training Program

Page	Proposed Project	Issues to be approached	Sub-Sector	Outline of the Project	Advantage in introducing ICT	Anticipated Challenges in Implementation	Countermeasure for the Challenges	Possible Participation of Private Sector	Mode of Participation and Technology/ Services to be offered	Possible Implementation under Japan's ODA and Applicable Scheme
Attachment-3	**Development of Index Based Insurance Policy Framework**	Protection of Farmers	Agricultural Insurance	The objective of this project is to develop Index Based Insurance Policy Framework. The purpose f the Policy Framework is to create enabling operational environment for index based insurance. This Policy Framework will cover product development process, marketing activities, and all other activities regarding index based insurance. Private sector, international donors, and PCIC will be able to develop and expand their index based insurance products based on the same Policy Framework.	N. A	Failure to institutional arrangement	Bring out strong Governmental initiative to set up the Policy Framework	Private insurance companies and reinsurance companies	-Individual insurace experts from private companies -Public Private Partnership for product development -Implementation of BOP products	-Technical Cooperation Project -BOP scheme -In-Country Training Program -Technical Cooperation Project and Development Study
Chapter 5, P5-19 - P5-22	Study for Application of Index Based Insurance in the Philippines			The Objective of this project is to formulate profiling database for facilitating development of new index based insurance. The profiling database will provide basic potential index based insurance application and possibility of introducing index based insurance.	N. A	Delay or failure to collect information because of lack of information and coordination among different sectors	To facilitate coordination among related agencies by the Government	Private insurance companies and reinsurance companies	-Dispatch individual insurance experts from private companies	-Study (Data Collection Survey)
Chapter 5, P5-23 - P5-28	Project for Improvement of the Insurance Underwriting Process			The purpose of this project is to create a solution or a system for the improvement of the administration processes starting from the application/enrollment stage up to the claim processing stage; moving from manual operations to automated operations reducing the processing time.	Faster loss adjustment and reduce operational cost	Stakeholders' adaptaiton to new technology	To provide trainings and ivolve a wide range of stakeholders in development process	-ICT vendor -Application Service Providers	- ICT experts from private companies - Implementing system design	- Technical Cooperation Project
Chapter 5, P5-29 - P5-35	Pest and Disease Information System Development		Agricultural Extension	To improve slow, inefficient and costly delivery of extension services, especially for pest and disease management, the project would develop a more effective real-time pest and disease prevention and control mechanism through prioritization of the experts' intervention with the use of an automated information system.	Incident reporting through mobile phones lessens the cost and also allows faster sending of information	Availability of ICT equipment and internet, Competencies to use ICT-based applications	Tap ICTO, ITCAF, Telecom or other agencies that can provide access options (esp for areas outside project pilot), Conduct ICT-related capacity building activities	Tele-communication company	–Installation in mobile phones (system menu) and computers (software/application) and training on the use of the information board system	- Dispatch of long term vegetable P&D Expert for knowledge base development and ICT Expert - Funding for trainings

(Note) **Project Name in Bold**.....Prioritized Project (on which proposals are shown in Attachment-1 to Attachment-3)

PROJECT CONCEPT
(Agricultural Marketing)

Sub-sector: Agricultural Marketing

Name of the Proposed Project: Online Marketing System Development Project

Existing Issues, Problems and Constraints to be solved:

Agricultural production is more on being market-led; limitations in production may not entirely be due to lack of agricultural lands or application of technologies. In some instances farmers opt not to increase the use of their lands because the cost of farm inputs and implements are high and the farm-gate prices remain low. This is due to oversupply of a product in an area (i.e. cabbages of Benguet in Northern Luzon) that is taken advantage of by capital-laden traders, which profit from the situation as they purchase it at low prices. With the farmers having limited networking opportunity with traders from other areas (i.e. Cebu in Central Visayas or Davao in Mindanao) that are willing to buy their products at higher prices, farmers have no choice but to take the offer of traders in Benguet.

Traders that have high volume of products are able to command higher prices. Farm products have to pass through the multi-layered marketing system, handling losses are incurred and the products' prices continue to rise. Cabbages from Benguet reaches Metro Manila from P17/kilo farm-gate price to P60/kilo retail price at public markets and supermarkets.

The issues on high shopping cost due to limited networking for buyers and sellers, limited knowledge of goods/services, gap on pricing information, and product standards should be addressed. The government has initiated farmers' trainings on market information and commodities pricing, information dissemination for prices of commodities, and publishing availability of inputs/ implements in the agency websites. However, an actual market-matching mechanism that will bridge the gap between agricultural producers and potential buyers is not yet in place.

Project Outline:

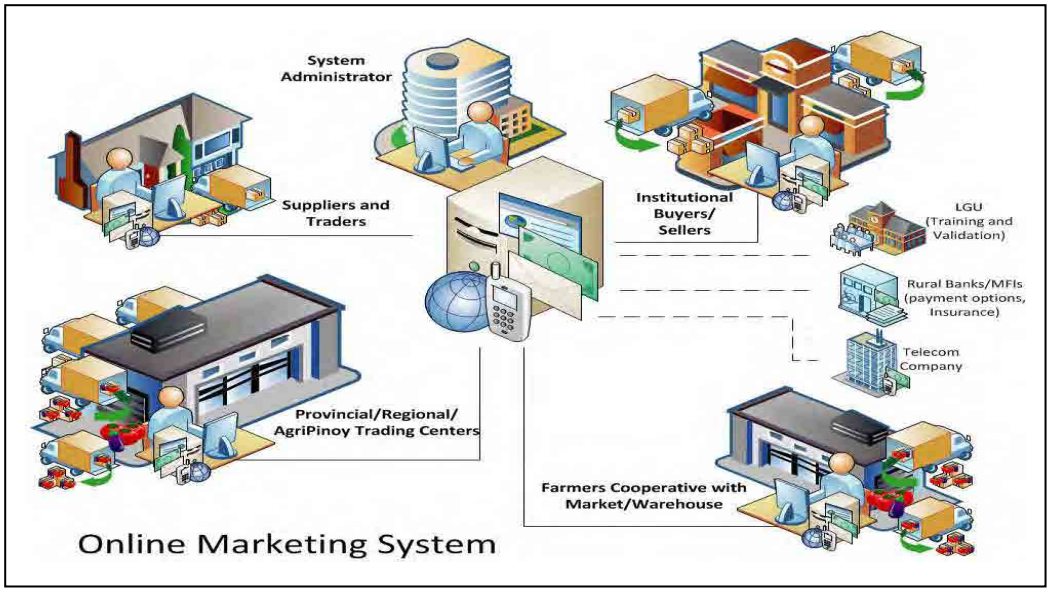
An online marketing system development project is being proposed to address these issues. The online marketing system can be used as a platform to link Users i.e. producers (with focus on established farmers cooperatives), trading centers, institutional buyers, big traders for commodities, and suppliers of agri-related commodities. Users of the online marketing system would need to register before they would be able to access the portal. The Users will update their profiles to include contact information, SEC/CDA registration, business permits, availability and prices of products.

The proposed system will serve as a "virtual" market through institutionalizing a buy-and-sell forum wherein Users can do online trading in real-time. This can be done using electronic order and payment forms (all of which are recorded and sent to the users' account and copied in the central database). Payment can be facilitated between banks using credit card/bank deposits, electronic money, mobile money services, cash or other payment terms agreed by both parties.

Even in the absence of "virtual" market, the platform will still connect Users. Succeeding communication can already be done through SMS, MMS, email or even video conversation. In addition, the online marketing system can also be used to generate other data that can be accessed both by Users and System Administrators depending on the information and their clearance levels. For instance, the transactions made between Users are stored in a central database. Transaction information can be extracted from the database (i.e. type of commodity, location of production, volume sold, location of delivery, average prices, etc.) to prepare the online market trend reports. The generated reports can be sent to Users in a weekly, monthly or quarterly basis.

Moreover, the generated reports can be used for demand-supply (i.e. type of commodity, volume being traded, average prices, etc.) profiling and geographic demand-supply modeling (i.e. type of commodity, volume traded, produced from and sold where, etc.). The online marketing system will create a "directory of buyers and sellers". This directory can be complemented by GIS for Users' physical locations. Such directory and mapping system will help in validating the Users' information to avoid issues of scam/s and abuse, and for easier pick-up or delivery of products and services.

Project Figure:



Implementing Agency/Tasks:

Agribusiness and Marketing and Assistance Service (AMAS) – the lead agency mandated to assist farmers and producers in the marketing aspect of agricultural commodities. AMAS shall collaborate with ITCAF, ATI, LGU, and Private Telecommunications Company in the ICT Protocol in accordance within the provision of the law.

Participating Agencies/Tasks:

Agricultural Training Institute (ATI) – mandated by the law, ATI shall facilitate the conduct of trainings and capacity building on the use of the ICT mechanisms that will be put in place, but not limited to the promotion of the use of the online marketing system through Information Caravan and push messaging through the Farmers' Contact Center and the DA's e-Extension portal. Facilitate the

streamlining of services offered in AFMIS and e-Trading (e-Extension portal). Also, to facilitate the development of training modules and user manuals on how the online marketing services can be accessed and operated, even for areas outside the original target sites.

Information Technology Center for Agriculture and Fisheries (ITCAF) – established as the core office with responsibilities to manage, operate and maintain ICT systems of DA and attached Bureaus and Agencies. It is mandated to manage the National Information Network (NIN) that links all offices and levels of the Department with various institutions and local end-users in order to provide easy access to information related to agriculture and fisheries. This include the design, protocols, database, software and applications, set the specifications (and perhaps even facilitate the procurement if possible to be included) of ICT-related hardware that are necessary for the development and use of the system for the central database and pilot areas.

Local Government Units (LGUs) – vested by Local Government Code 1991, the LGU shall provide basic agricultural services. The LGU will collaborate with participating agencies in validating or accrediting the registration of the farmers' cooperative, business registration of traders or agricultural suppliers, increase the ICT and microfinance literacy of farmer-cooperatives and traders, public relations and dissemination for smooth implementation and sustainability.

Cooperating Stakeholders/Roles:

Rural Banks and Microfinance Institutions (MFIs) – facilitate payment through bank-to-bank transactions or cash-to-cash transfers. To collaborate with AMAS and MFIs in establishing the protocols and security measures in facilitating online payments.

Private Telecommunications Company (Telecom) – It will provide the platform for the mobile money services and payment transactions. In addition, it will work with AMAS and ATI in the promotion of the online marketing system and mobile money services.

Advantage of ICT application:

There will be a broader interconnected network of users (producers, buyers, suppliers and other players in the marketing industry). Communication is easily done through SMS or phone calls even outside the online marketing portal. Lesser costs for shopping of products or services are expected. In addition, operational costs are reduced as there are only a limited number of transactions through direct marketing and trading.

Farmer-cooperatives can bargain for higher farm-gate prices to buyers and sellers who can offer better prices. It will remove unnecessary agents in the marketing system, thus reduce spoilage due to transport and handling. Online trading system include posting of pictures, videos and even live stream so that products can be viewed. Payment arrangements will be made easier. Traditional bank-to-bank transactions will still be used. ICT-powered payment options such as electronic cash transfers and mobile money transactions built in the system is more efficient. Mobile money transactions are increasingly becoming popular - it is accessible even in rural areas, it is more convenience and expedites transactions.

The database system of the Online Marketing System provides added benefits using GIS-aided mapping system in determining and validating the location of buyers, sellers, suppliers, and other users. It provides additional information for supply-demand profiling and geographic modeling.

Time Frame: Two years (24 months)

1) Preparatory Study for (a) project identification, (b) analysis on beneficiaries, (c) system design, (d) selection of pilot area - 6 months
2) Procurement and system set-up - 3 months
3) Operational testing - 1 month
4) PR activities for (a) AEWs and (b) Users in pilot area - 3 months
5) Training for (a) System and administrator, (b) AEW, (c) Users (farmer-cooperatives, traders, suppliers), (d) Rural Banks/MFIs - 4 months
6) Implementation of Pilot project - 12 months
7) PR Activities for (a) AEWs and (b) Users outside the pilot area - 3 months
8) Evaluation of pilot project and extraction of lessons - 2 month

Expected effect/outcome/impact:

- Improved access and networking between buyer and sellers
- Establishment of trading protocols and trading/quality standards
- Increase in the number of online trading activities and volume of transactions
- Faster trading transactions
- Reduce agents in the marketing system
- Increase profit for farmer-cooperatives and members

Expected number of beneficiaries:

Pilot Areas: (to be estimated)

Areas outside the System: (to be estimated)

Necessity of the amendment of existing laws/regulations, change of organizational set-up, etc.

- Partnership with Rural Banks and MFIs require signing of Memorandum of Agreement.
- Partnership with Telecommunications Company requires signing of Memorandum of Agreement or Understanding.

Possible areas (portion) wherein participation of private sector are expected:

- *Rural Banks/MFIs* – as each cooperative is required to open a bank account as part of their registration with the Cooperative Development Authority (CDA), the farmers' cooperative can have arrangements for cash flow of their accounts through online, mobile and traditional banking methods.
- *Telecommunications Company* – Using mobile phones of mobile money services/transactions with adequate software packages in collaboration with ITCAF, AMAS, and ATI .

- *On-line Transaction Company* –Provide system for on-line payment (by credit card, electric banking) as main platform of transaction for proposed on-line market.

Mode of participation by private sector and its implementing method:

- *Rural Banks/MFIs* – project participation as form of Public-Private Partnership through MOA.
- *Telecommunications Company* – Project participation as a form of corporate social responsibility activity through their Public Affairs or CSR Department through MOA.

Possible areas (portion) wherein Japan's ODA are expected:

- Dispatch agribusiness and marketing expert for needs assessment, content development, and product quality and trading standards
- Dispatch ICT expert for protocol designing, web platform design and development, database development, and infrastructure evaluation
- Provision of ICT-related infrastructure or equipment especially in the target areas
- Support initiative of AMAS on the establishment of web platform. It is necessary to establish uniformed platform under governmental initiative, to avoid confusions by un-controlled and insufficient on-line marketing systems by various firms/organization.
- Funding for trainings and other operational costs, including the promotion and development of modules and manuals that can be used for future replication

Scheme (system) under Japan's ODA and its implementing method:

- The possible scheme of Official Development Assistance (ODA) of Japan will be technical cooperation project (TCP) including dispatch of Japanese Expert(s) and training, as stated above. This TCP can be either independently implemented or become of component in Yen Loan Technical Assistance for physical rehabilitation project, to contribute to increase of ISF collection to support operation and maintenance of irrigation facilities to be rehabilitated therein.
- Another possible ODA Scheme is Base-of-Pyramid Scheme (BOP), wherein JICA will finance the activities of private firms such as agricultural development (and system development) firm(s) to provide technology, investment, as well as training for AEWs.

Other proposed projects (under this ICT Study) which can be combined, and its effect:

- *Agricultural Insurance* – Online Insurance Ordering and Underwriting System Users can avail insurance for their products that are being shipped or delivered. Insurance can be ordered for farm implements and warehouse/storage facilities as well. The nearest Rural Bank or MFI can be accredited by PCIC as underwriter.

PROJECT CONCEPT
(Irrigation Development)

Sub-Sector: Irrigation

Proposed Project: Improving Accuracy and Transparency in Irrigation Service Fee (ISF) Collection Using the Global Positioning System (GPS)

Existing Issues, Problems, and Constraints:

Challenges in the NIA, specifically in NIS are the clear delineation and gap between the service area and the irrigated and planted area. Every cropping season, some of the target area for irrigated and planted areas varies. The most common reasons are due to scarcity of water, inundations, and drought. In the field interview, these claims have no technical basis of the boundaries for the affected areas.

Generally, the geodetic ground survey method used in delineation of irrigation service area for NIS and CIS combined area of 1.32 million hectares are the traditional method (e.g. Transit-Level-Chain, EDM-Total Station). Most of the NIS relied from the result of the geodetic survey during the project implementation stage or construction phase way back more than three (3) decades ago. Rarely, upon turnover of the completed irrigation facilities for operation and maintenance a verification ground survey for service area boundaries were conducted. For some reason, this would take time and money to complete the survey works.

Another issue is the update of the service area, the delineation of the boundaries of irrigation service areas relied mostly on result of the geodetic ground survey more than three (3) decades ago, after the construction period of the irrigation facilities. Now, based on ocular observations, conversion of lands from irrigated to residential, commercial, industrial, is very common, not to mention the road network construction, hence reduction of service area can be obviously seen.

In line to the above issues, farmer's land holding as declared so many decades ago and the reflected measurement in paddy parcellary map was virtually not updated. Further, the declaration of the List of Irrigated and Planted Areas (LIPA) is always based on the guess estimate by NIA Collector or IA Ditch Tender and the Farmer. Using chain and ropes could be acceptable, but in the totality may have less degree of accuracy in calculating area. Such estimate sometimes causes dispute between NIA Collectors and farmers, as one of the reasons for low Irrigation Service Fee (ISF) collection efficiency, since ISF is calculated based on planted areas.

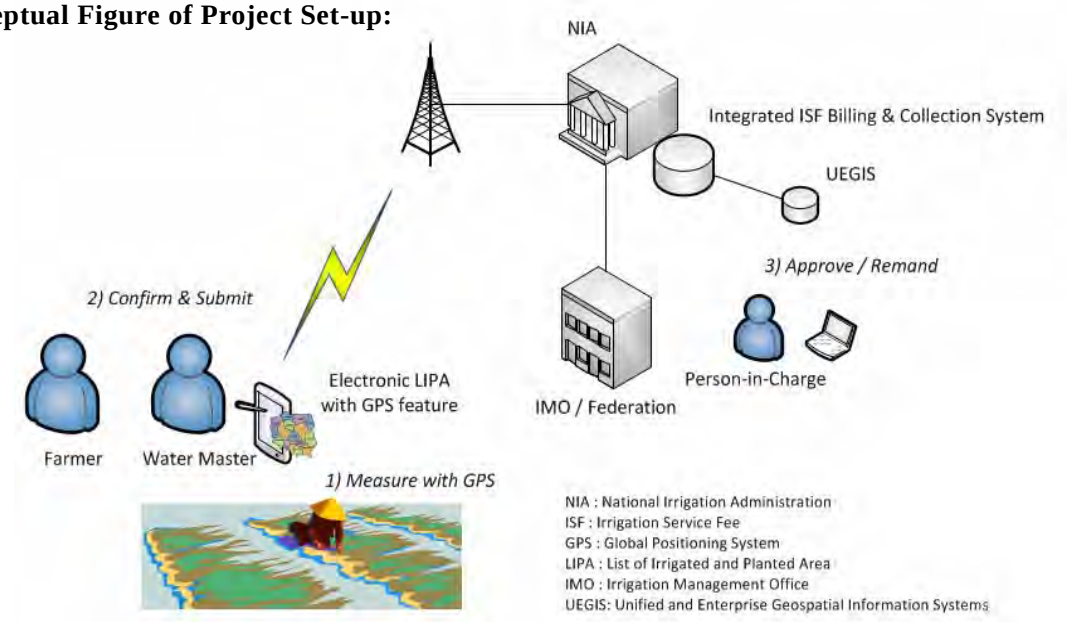
Project Outline

Use of GPS in geodetic ground survey produce fast result compared to traditional method. Relatively, this will clear the issue of the gap between irrigation service area and firmed-up service area against the paddy rice harvested area. The specific objective in the utilization of GNSS and GPS is to;

- provide expeditious and higher level of accuracy in preparation of LIPA
- provide expeditious and higher degree of accuracy in update of geographical data

The output of this proposed project will lead to the preparation of basic data in complementation to the Department of Agriculture ICT Program on the establishment the Unified and Enterprise Geospatial Information System (UEGIS) under the office of Information Technology Center for Agricultural and Fisheries (ITCAF).

Conceptual Figure of Project Set-up:



Implementing Agency:

National Irrigation Administration (NIA)

Participating Agency:

The participating agencies include Department of Agriculture (DA), DA Information Technology Center for Agriculture and Fisheries (ITCAF), Department of Environmental and Natural Resources, and Local Government Units (LGU).

Task of Each Implementing/Participating Agency:

Agency	Task of Each Participating Agency
National Irrigation Administration	• Overall responsibility of the Project • Take initiatives in necessary training, promotion and equipment supply (hand held GPS, etc) • Take necessary coordination works with other agencies
Department of Agriculture	• To provide necessary assistance to NIA and IA • To implement AFMA Law
DA-Information Technology Center for Agriculture and Fisheries (ITCAF)	• Provide assistance for the ICT utilization • Participate in training for NIA collectors • To discuss and coordinate with NIA and other agencies on the use of data under UEGIS
Department of Environment and Natural Resources (National Mapping Resources and Information Authority & Land Management Bureau)	• To provide updated cadastral map or parcellary map • Provide vertical and horizontal reference for GPS use • To collaborate with NIA-IEC in Training of Trainers using GPS in Irrigation System Management

Agency	Task of Each Participating Agency
Local Government Unit (LGU)	• Support the development basic services in coordination with National Government (e.g. irrigation, information services) as mandated in Local Government Code. • Maintain peace and order

Advantage of ICT Applications:

By use of ICT (Global Positioning System), NIA collectors and farmers can easily confirm the List of Irrigated and Planted Area (LIPA) with minimum time and manpower. Such works can improve accuracy of the ISF computation which leads to the improvement of ISF collection efficiency, also with the strengthening of partnership and mutual trust between NIA collectors and farmers, since GPS measurement work can be made as joint works. The data on riceland area obtained and accumulated by this project can also works as database, to be utilized in many other purposes.

Time Frame:

1) Confirmation of Project objectives and set-up - 1st to 2nd month
2) Selection of pilot implementation area (NIS) and data collection - 2nd to 4th month
3) Training for trainers on the use of GPS - 3rd to 4th month
4) Procurement of equipment - 4th month
5) Training on NIA/IA Collectors on the use of GPS - 5th to 6th month
6) Implementation in Pilot NIS - 7th to10th months and shall include one harvest period in Dry Season
7) Evaluation of Pilot implementation and strategy for nationwide implementation - 11th to 12th month

Expected Effect/Outcome/Impact

The effect or impact on the utilization of GPS in irrigation system operations and maintenance has a chain effect on the irrigation services provided by the NIA to the end users/client of irrigation services or the farmers/IAs. The expected effect or impacts would be to:

- Contribute in the increase of irrigation service fee revenue
- Contribute in the literacy of ICT application in irrigation
- Contribute in the accuracy and transparency in irrigation system management
- Contribute in the acceleration of IMT Program

Expected Number of Beneficiaries

The expected direct beneficiaries are the farmers and the NIA management under the IMT program. In the irrigated rice farms, actual number of registered IA farmers for NIS is 499,898.

Necessity of the Amendment of Existing Laws/Regulations, Change on Government Set-up

The proposed project will not require any amendment of existing laws, Implementing Rule and Regulation (IRR) and other present set-up on the collection of Irrigation Service Fee. The proposed

project requires only method of the confirmation of LIPA (shift from estimate to GPS), therefore no special arrangement is necessary on present legal and institutional situation in NIA.

Possible Areas (Component) on which Participation of Private Sector are Expected:

The proposed project aims to improve NIA's field operation with small investment, for the quick adoption and implementation by NIA. By such reason, development of new hardware and software is not included, but utilize handheld GPS in commercial market. Also, as stated in "Tasks of each participating agency", resources person for the training of trainers for the use of GPS can be arranged within the governmental human resources in such government agency. Therefore, participation of private sectors are expected in the works such as procurement services for NIA on the purchase of handheld GPS.

Mode of Private Sector's Participation its Implementing Method:

As stated above.

Possible Areas (Component) on which Japan's ODA are Expected:

For the implementation of proposed project, monitoring of IMT promotion by NIA shall be made, since billing and collection works shall be continuously transferred to IA. For the IAs and federation of IA in advance area can manage this ICT assisted billing and collection works since they have offices and manpower with ICT experiences, however, assistance shall be still necessary for the IA which newly joined IMT programs. Such IAs has difficulties in their work efficiency with ICT, therefore, it is important to dispatch Japanese ICT Expert(s), as well as to provide In Country Training Programs for farmers to be trained in ICT-advanced NIS nearby.

Scheme (system) under Japan's ODA which the Proposed Project may apply:

Aside from the dispatch of Japanese Expert(s), In-Country Training Programs for farmers to be trained in ICT-advanced NIS nearby can be applied. Also, it may also possible to include this GPS-assisted LIPA system as one of components on the YLTA for the rehabilitation project for NIS under Japan's Yen Loan.

Furthermore, this project can be implemented not only as part of YLTA for the future but also can be applied to the National Irrigation Systems which wereconstruct4ed under Japan's Yen Loan in the past. Proposed project will contribute to increase impact of Japanese assistance in irrigation sector in the past, through the improvement of ISF collection efficiency.

Other Proposed Projects (under the ICT Study) which can be combined and its Effect

Since the information on accurate planted area can be easily and timely obtained and to be utilized as basic data, this project will contribute to the promotion of agricultural insurance. The data obtained can lead to speedy damage evaluation process on traditional agricultural insurance, as well as to become basis for pay-out on Whether Index Based Insurance, in the aspects of transparency and efficiency.

PROJECT CONCEPT
(Agricultural Insurance)

Sub-Sector: Agricultural Insurance

Proposed Project: Project for Scaling up of Index Based Insurance in the Philippines

Existing Issues, Problems, and Constraints:

Index-based insurance is an alternative insurance scheme that can work for the poor farmer in reducing their vulnerability to climatic changes. In recent years, a number of pilot programs have been tested and implemented and based on its initial results, there are numerous potential benefits of converting traditional agricultural insurance products into index-based insurance schemes. One is that, it reduces dramatically the operational cost as there is no need to do actual field damage assessments and thus, no need for extensive paperwork. Farmers are able to get a quick payout based on the agreed triggers of an extreme weather event. Secondly, it reduces risks on moral hazards and adverse selection of potential farmers who can and should be enrolled in any insurance schemes.

Hence, the Philippine government is testing and promoting this innovative insurance scheme as one of the tools to mitigate climate change risk. The PCIC, being the government's arm in providing crop insurance, has introduced and pilot tested Index-based insurances based on Area Yield and Weather. PCIC has collaborated with ILO in developing and pilot testing Weather Index-Based Insurance (WIBI) under the Climate Change Adaptation Project in Agusan del Norte; while, another type of index-based insurance called Area Yield-Based Insurance (ARBY) is being developed and pilot tested under collaboration with GIZ.

Private insurance companies such as CLIMBS and Malayan Insurance have also subscribed to index-based insurance by coming up with their own insurance products; both, being a partner of Munich Reinsurance. This situation indicates the growing interest of the government, the private sector and the international donors on index-based insurance.

Challenges: However, these innovative insurance products are still in the infancy stages and are not yet ripe for commercial implementation. The initial results of PCIC's pilot implementation yielded few farmers joining the program; pilot testing in one cropping season is too limited to produce a valid conclusion; and, more yield and parametric indicators must be determined and tested in order to reduce the basis risk. On the part of the private companies, some regulatory issues were raised and need to be addressed. Therefore, there is a need to further demonstrate the benefits and mechanisms of index-based insurance in aid of better operations, management and policy making.

Major constraints of scaling up index-based insurance schemes are limited marketing channels and few crops applications and thus, there is low penetration rate in the pilot stage. Introducing index-based insurance products as a stand-alone is not effective. It must be bundled with credit and other agricultural inputs to be more responsive to the actual needs of the farmers. Further, there is a need to widen the range of distribution channels in order for the delivery of index-based insurance to

be efficient. As such, right product mix and right distribution channels should be identified.

Project Outline:

The objective of this project is to expand and enhance the development of index-based insurance schemes by replicating the lessons learned and apply these into new areas, new crops and through different delivery schemes. This will serve as a platform for a more comprehensive approach towards enhanced productivity and resiliency of farmers to numerous climate change risk and other agricultural risk by providing better access to agricultural insurance.

Project Activities:

1) Expand the area coverage of index-based insurance pilot implementation

The objective is to demonstrate further the applications of index-based insurance into a larger scale in support of the Philippine government's policy to ensure insurance coverage for the greater majority of the poor farmer. The main activities are:

- Conduct of Vulnerability and Adaptation (V&A) Assessment in the target expansion areas for the proper identification of climate change and disaster risks, existing coping mechanisms and risk reduction initiatives compared to the needed actual strategies.
- Customization of the index-based insurance package for the new implementation areas and profiling of prospective enrollees including their farming conditions.
- Index-based insurance program administration including underwriting and marketing processes and activities.
- Post-claims assessments and evaluation.

2) Expand the product delivery schemes by offering index-based insurance in different product mix and distribution channel.

The objective is to find the right mix such as bundling of insurance product, credit and agri-inputs; and the right channel given the weather conditions, and topographical situation where the farmer is located. The main activities are:

- Conduct an assessment, review and inventory on existing insurance products, credit providers and other agricultural inputs providers in the target expansion areas.
- Develop and customize different product mix for the index-based insurance and also, different possible distribution channels.
- Test the different possible product delivery schemes.
- Conduct a post-test review and evaluation.

3) Expand the crop coverage of index-based insurance to other crops such as high-value crops and industrial crops.

The objective is to test and analyze existing index-based insurance platform's adaptability and application to these other crops as well. The main activities are:

- Conduct an assessment, review and inventory of existing crops in the target expansion areas.
- Develop and customize an index-based insurance product for possible crops to be tested under this index-based insurance scheme.
- Test the index-based insurance scheme for the target crops.
- Conduct a post-test review and evaluation.

For all of these main activities, there will be a conduct of farm risk literacy education program for the intended farmers in the targeted expanded areas.

Pilot Implementation site:

The targeted areas for expansion and scaling up of index-based insurance products are the areas of Madongan Area (Ilocos Norte), Solsona Area (Ilocos Norte), San Fabian (La Union), Porac-Gumain (Pampanga), Dumacaa (Quezon), Malatgao (Palawan), Sta. Barbara (Iloilo), Muleta (Bukidnon), Mal (Davao Del Sur), Lambayong (Maguindanao, Sultan Kudarat), Simulao (Agusan Del Sur) --- all areas under the National Irrigation Sector Rehabilitation and Improvement Project (NISRIP), a P4.3 billion project funded by JICA in partnership with NIA, which involves the rehabilitation of irrigation facilities, strengthening of IA's capacity in operation and maintenance to enhance IMT program, and assistance in farming technology.

Scaling up of index-based insurance products through these areas is a viable proposition as there are rich-source data information available and extensive support mechanisms in place that can be used for studies, surveys, creation of baseline parameters and market research; especially for testing index-based insurance in a larger area base.

Further, through the NISRIP project, it is expected that in these areas, there would be more farmers willing to join the index-based insurance scaling up project as they would experience an increase in income brought by the improved irrigation facilities and strengthened operations and maintenance system.

Implementing Agencies:

Philippines Crop Insurance Cooperation (PCIC) - PCIC shall be the main implementing agency for this project and will play a key role of coordinating with other stakeholders and documenting the results of the scaling up implementation. The learning and experience of PCIC in index-based insurance through its collaboration with other donor agencies is vital in finding and determining the right product mix and the right distribution channel that is most fitted for farmers given the different conditions. PCIC will be part of the overall Project Oversight Committee headed by JICA Team to monitor and evaluate the progress of the scaling up of this index-based insurance during the project period.

Participating Agencies:

Insurance Commission (IC) - The IC, being a regulatory government agency for the private insurance sector, shall also be part of the Project Oversight Committee and its main role is to assist and provide guidance in the formulation of policies and implementing rules and regulations during the scaling up stage. IC shall review the processes and risks involve in the delivery and product mix of the index-based insurance during the scaling up stage ensuring its safety and soundness.

Philippine Insurers and Reinsurers Association (PIRA) - The PIRA, an umbrella organization representing the non-life insurance companies in the Philippines, shall help in the design of the right product mix and the right distribution channel for index-based insurance during the scaling up stage; responding to issues that may be brought up by the private sector during the scaling up stage.

Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) - PAGASA will provide its technical expertise in providing weather information, both historical and actual, of the targeted expanded areas during the scaling up stage. Further, PAGASA shall work with other government agencies in installing weather stations in the targeted expanded areas.

International Rice Research Institute (IRRI) - The IRRI shall provide its technical expertise in providing rice technologies and inputs for the targeted expanded areas during the scaling up stage. IRRI will assist in developing yield indicators or yield identifiers for the targeted expanded areas in this scaling up stage.

Burea of Soils and Water Management (BSWM) / Bureau of Agricultural Statistics (BAS) - These organizations will assist in the development data gathering and agricultural and economic research activities.

Agricultural Training Institute (ATI) - The ATI will develop training modules and design awareness, advocacy and literacy program for farmers in the targeted expanded areas under this scaling up stage.

Local Government Units (LGUs) - The LGUs, through the Municipal Agricultural Office (MAO) will serve as the underwriter-solicitors for self-financed farmers. They will promote the index-based insurance and assist in the enrollment of farmers up to filing or monitoring of payouts.

Microfinance Institutions (MFIs) - The MFIs that include cooperatives, rural banks and other agricultural input providers will serve as the underwriter-solicitors for borrowing farmers.

Irrigators' Associations (IAs) - The IAs serving as the farmers' organization shall assist in the implementation of the scaling up activities; and shall assist in profiling of prospective farmer-enrollees.

National Irrigation Administration (NIA) - NIA, through its NISRIP project, will provide the necessary support mechanisms, especially on the targeted expanded areas such as support on data yields, irrigation and farm/crops management.

Time Frame: 5 years (60 months)

Items	Period				
	1st year	2nd year	3rd year	4th year	5th year
Situation Analysis					
Capacity development of project stakeholders					
Selection of target area (1st round)					
Activities in 1st selected areaa					
Selection of target areas (2nd round)					
Activities in 2nd selected areas					

Expected Outcome/ Impact:

At the end of this scaling up project on index-based insurance, it is expected that the following results have been achieved:

1. A new developed or improved set of parametric indices for index-based insurance applicable to a larger market based.
2. A set of index-based insurance products based on different mix and match of other agricultural inputs such as credit, other insurance products, farm technical inputs, etc. for rice and corn and other agricultural crops suitable for index-based insurance schemes.
3. A set of distribution channels suited for the delivery of index-based insurance products to the intended farmers, including but not limited to operating guidelines, procedures and flow charts.
4. An improved policy guidelines and implementing procedures for regulatory use widening the scope and extent of index-based insurance applications to the agricultural sector.
5. A set of index-based insurance commercial models which the private sector can use, adopt and replicate for their use; and can participate in different modalities as risk carrier, reinsurer or distributor of index-based insurance products.

Possible areas (portion) which participation of private sector are expected:

Private insurance companies will participate in situation analysis to develop applicable index based insurance. Not only private insurance companies, but also private companies related to agricultural inputs such as seeds growers and fertilizer companies will also be able to join the Project activities. For example, they will be one of the new distribution channels of agriculture insurance by bundling insurance with their products.

Furthermore, some of private companies such as international insurance companies and reinsurers

will be able to play a role of reinsurers of the product.

Mode of participation by private sector and its implementing method:

One of the participation methods is to join the Project Team as an insurance expert. Another way is Private Public Partnership. The JICA will have a partnership with a private insurance company which is interested in index based insurance. New index based insurance product will be developed together with the private company, and then the Project will provide enabling business environment so that the private company will operate smoothly after the project.

In addition, the Base of Pyramid (BOP) will be applicable. If a private insurance company which already has ideas of new index based insurance, the company will be able to try out the new product during through the project.

Possible areas (portion) wherein Japan's ODA are expected:

Japan's ODA have implemented various irrigation projects including capacity building of irrigators associations. Therefore, the project should be implemented in the sites where the JICA have implemented project so far or in on-going project site. In these sites, irrigation facilities are improved and strengthened operations and maintenance system. Hence, Japan's ODA will link with other JICA's project.

Also, capacity building of project stakeholders and product development will be assisted by Japanese experts. In addition, Japan can provide their knowledge and expertise regarding insurance scheme and marketing.

Scheme (system) under Japan's ODA and its implementing method:

Technical Cooperation Project (TCP) can be considered as possible scheme of JICA's ODA. Japanese experts assigned to support the project activities organized with Philippines counterparts. The possible areas of expertise are: weather index based insurance, microfinance, agriculture, and agricultural value chain analysis.

Furthermore, the BOP scheme will also be integrated in TCP scheme. In the portion of product development, private companies which have ideas or product of index based insurance will be able to implement pilot testing in this project. Private companies will be selected through JICA's BOP scheme.

Other proposed projects (under this ICT Study) which can be combined, and its effect:

This project can be collaborated with the Project "Improving Accuracy and Transparency in Irrigation Service Fee (ISE) Collection Using Mobile Phone". Operation of Index bases insurance can be integrated in Irrigation Service Fee Collection activities. Index based insurance can be provided bundle with ISF. For example, ISF will be paid automatically from the payout when farmers get payout. In this case, index based insurance will contribute to increasing ISF collection.

PROJECT CONCEPT
(Agricultural Insurance)

Sub-Sector: Agricultural Insurance

Proposed Project: Study for Application of Index Based Insurance in the Philippines

Present Condition:

Index-based insurance is an alternative insurance scheme that can work for the poor farmer in reducing their vulnerability to climatic changes. The agricultural risks brought by this unpredictability of nature and the impact of natural disaster cannot be taken lightly. Therefore, it is imperative and of paramount importance to safeguard the investments and interests of agricultural stakeholders, especially of the poor farmers.

Potential benefits of index based insurance are huge; reducing the risk of moral hazard and adverse selection. Operational cost of insurance can also be reduced since there is not necessary to assess the field. Farmers are able to get payout quick after extreme weather event happens.

In fact, the Philippine Government is promoting this innovative insurance scheme as one of the tools to mitigate climate change risk. The Philippines Crop Insurance Cooperation (PCIC) plays a key role of promoting index based insurance. The PCIC has collaborated with the ILO and developed Weather Index Based Insurance (WIBI) under the Climate Change Adaptation Project in Agusan del Norte. In addition, the PCIC has developed another type of index based insurance called Area Yield Based Insurance (ARBY) under the collaboration with the GIZ.

Not only the PCIC and international donors, but also private insurance companies have developed their own index based insurance products. For example, Malayan Insurance Company implemented pilot testing of typhoon and drought index based insurance in 2009. CLIMBS Live and General Life Insurance Cooperative has also launched index based insurance named “Weather Protect Product”.

However, one of the main challenges for index based insurance is high starting up cost. In fact, introducing any index based insurance product or scheme is highly costly as it to be tested before it can be released for public use. Any change in location or in parameters would result to another set of varying probabilities which again needs to be tested. Therefore, this situation is one of the constraints particularly for private sector.

In addition, Index-based insurance is relatively new and present implementation and applications are still in a pilot stage. Leanings from the pilots are limited, having been tested with just a few farmers in limited locations and in just one or two cropping seasons. There is a need for continuous product research and improvement in terms of the design, features, benefits, modeling and applications for other locations, target markets and even in other crops.

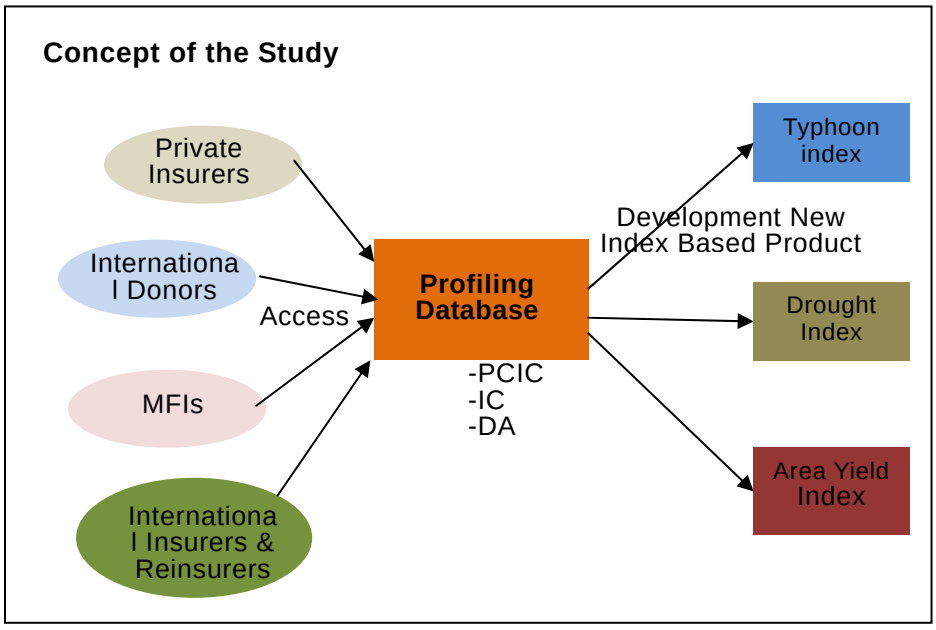
Although the PCIC and other international agencies have promoted the index based insurance, these

experience are very limited and there is not enough information and data for private sectors to judge the potential of index based insurance. Therefore, governmental support to facilitate private sector to invest in the area of index based insurance in order to develop the potential for index based insurance.

Project Outline:

The Objective of this project is to formulate profiling database for facilitating development of new index based insurance. Developing new index based insurance is necessary to gather wide range of information from historical weather data to agricultural characteristics. Data and information which are necessary for development of index based insurance will be profiled in one database. This database will be utilized by private companies, microfinance institutions, and international agencies.

The profiling database will provide regional historical data, climatic characteristics, agricultural features, basic socio and economic conditions, and condition of infrastructure including weather station and irrigation facilities. Also, basic potential index based insurance application and possibility of introducing index based insurance will also be provided.



Activities:

1) Needs Assessment

- Stakeholder Analysis, interview with potential uses

2) Collecting Information

- Survey on existing index based insurance product

- Collecting historical weather data, agricultural data, topographical data, climatic data, etc.

3) Analyze the Data

- Analyze collected data

- Identify potential sites and application for index based insurance

Study Area:

The study area is nationwide since profiling data indicate possibility of introduction of index based insurance in the whole nation. Data at regional level will be profiling as output of the study.

Implementing Agencies:

Philippines Crop Insurance Cooperation (PCIC) - PCIC shall be the main implementing agency for this study. In particular, they have already experiences in index-based insurance, and may have on-going project implemented by other donors such as the ILO, GIZ, and the World Bank. Thus, they will be able to lead development of profiling database.

Participating Agencies:

Philippine Insurers and Reinsurers Association (PIRA) - The PIRA, an umbrella organization representing the non-life insurance companies in the Philippines, will assist in the formulation of practical profiling database. They shall also help coordination between the Study and private sector.

Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) - PAGASA plays the lead role in providing weather information, both historical and actual. PAGASA shall assist in profiling weather data and weather infrastructure. Also, PAGASA is planning to establish Unified Meteorological Information System. Their new information system will also be considered to utilize.

International Rice Research Institute (IRRI) - The IRRI shall provide some of its rice technology and inputs as possible contributory in developing index bases insurance.

Bureau of Soils and Water Management (BSWM) - The BSWM, a staff agency under the Department of Agriculture tasked to established agromet stations in highly vulnerable areas to generate location specific weather projections and serve as early warning system for local farming and fishing communities, shall provide the necessary assessments on existing irrigation systems, soil and water resources.

Bureau of Agricultural Statistics (BAS) - The BAS, also a staff agency of the Department of Agriculture mandated to serve as the central information source of all official agricultural statistics, plays a big role in term of developing the indices on index-based insurance, both the historical and the actual, on different crops. BAS, together with other agencies, will develop data gathering and economic research activities and tools. BAS will assist the other players in accessing and analyzing the right products, market information and technologies.

Time Frame: 20 months

Activities	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Needs Assessment																				
Collection of basic information																				
Analyse and Evaluate Data																				
Consideration of possibility of IBI																				
Sumarize IBI informaiton as database																				
Report to concerned agencies																				

Expected Outcome/ Impact:

- Increase the number of institutions, donors, and private companies which engage in index based insurance
- Developed low basis risk weather index based insurance
- Increasing the number of insured farmers by index based insurance
- Reducing the cost of index based insurance development for the PCIC, donors, and private companies

Possible areas (portion) which participation of private sector are expected:

Private sector will collaborate with analyzing collected data to consider possibility of index based insurance application. Particularly, private sector will play an important role to consider a type of index based insurance which PCIC have no experience such as Typhoon index.

Also, some of the private insurers already have experience in developing index based insurance. Thus, these experiences will contribute to build database for index based insurance.

Mode of participation by private sector and its implementing method:

- Setting up the Technical Advisory Board, and give advise through this board
- Experts from private companies will participate in the Study Team

Possible areas (portion) which Japan's ODA are expected:

Japan has experienced many types of natural disasters. Based on these experiences, Japan is one of the leading countries for disaster risk management. In fact, Japan has developed advanced policies and technologies for disaster risk reduction. Therefore, Japan can contribute to risk mitigation mechanism including insurance schemes. Japanese knowledge and expertise are applicable for development of the Index based insurance database.

Scheme (system) under Japan's ODA and its implementing method:

Study (Data Collection Survey) can be considered as possible scheme of JICA's ODA.

PROJECT CONCEPT
(Agricultural Insurance)

Sub-Sector: Agricultural Insurance

Proposed Project: Project for Improvement of the Insurance Underwriting Process

Existing Issues, Problems and Constraints:

The agricultural sector is very much vulnerable to the unpredictability of nature. The impact of climate change, natural disasters and other agricultural risks affect the agricultural production representing the major livelihood of many resource-constrained farmers. Therefore, it is of utmost importance to protect and safeguard the interests and investments of these farmers and other agricultural stakeholders as well.

In this regard, the Philippine government, through the PCIC, develops a range of risk management programs and services for the agricultural sector. PCIC'S principal mandate is to provide insurance protection to the country's agricultural producers, particularly the subsistence farmers, against crop losses arising from natural calamities, plant diseases and pest infestations, and non-crop agricultural asset losses due to perils for which the asset has been insured against.

PCIC has developed 6 major insurance lines and presently, pilot-testing two different types of index-based insurance. These insurance products are all in-house and thus, PCIC underwrites these. Therefore, PCIC does not only take the risks of insurance but also does the selection, evaluation of risks; determining its terms and conditions, including the amount of retentions and coverage, under which such risks are to be accepted by PCIC. PCIC then process the application of either a self-financed farmer or a borrowing farmer, reviews the documents, receives premium payments and issues the Certificate of Insurance Cover.

In case of a claim by any farmer due to natural calamities or pest and diseases, PCIC shall process the application upon the receipt of Notice of Loss from the insured farmer. PCIC will send a Loss Adjuster to conduct actual field verification and loss assessment. The Loss Adjuster will then prepare and submit a Claim Adjustment Verification Report that will be the basis for the approval or disapproval of claims by farmers.

Challenges: The present underwriting process of PCIC from the time of application to the time of release of claims are all done manually. Under the present setup, there are challenges that need to be addressed such as 1) slow response time for claims settlement; and 2) low penetration rate to the target market.

PCIC set the standard claim settlement period of 20 days. However, it takes them more than 20 days to process the claims depending on the availability of Loss Adjusters in the area. Further, the procedure of assessing field damage and loss verification takes too long as it entails extensive paper trails and paper documentation requirements. Thus, only a limited number of claims can be validated

or adjusted per day by the Loss Adjuster due to these manual procedures.

Consequently, this is one of the causes of low penetration rate of PCIC to their target market. For example, the penetration rate is only 4.7% for rice crop in 2010 and 0.4% for corn crop. Farmers are discouraged to apply and get insurance from PCIC basically because of the long and tedious process from application up to the processing of claims. Though there are accredited underwriters-solicitors of PCIC on the field to assist the farmers, still the processing takes time.

Further, if there would be more farmers who will be insured with PCIC's insurance products, especially if these are bundled, there is a great reputational risk on the part of PCIC if these issues are not addressed.

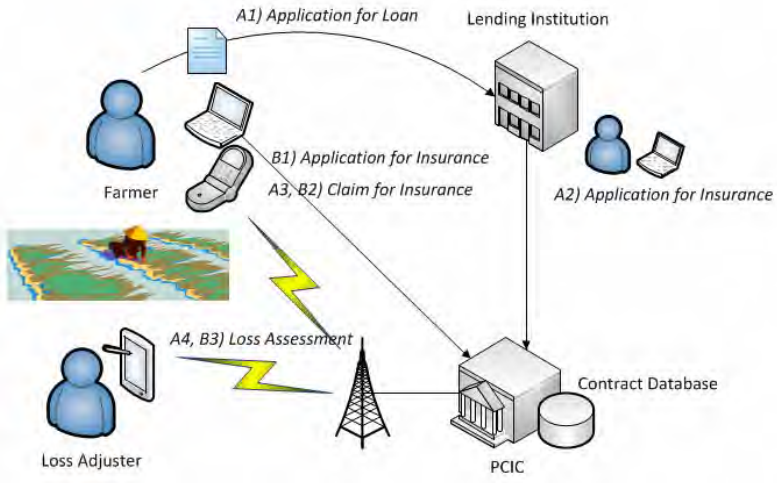
Project Outline:

The objective of this project is to improve the insurance underwriting process for the agricultural sector. The purpose of this project is to create a solution or a system for the improvement of the administration processes starting from the application/enrollment stage up to the claim processing stage; moving from manual operations to automated operations reducing the processing time. The new system will take advantage of the new technologies especially using tablets or handheld devices for actual underwriting procedure right on the field.

The new system will include both the front office and back office support procedures and the different work and business channels. Therefore, the inputs from other stakeholders are necessary on the development of this new system and platform.

This project can be incorporated and implemented as one of the components of other index based insurance projects since the purpose of this project is to enhance the insurance underwriting process.

Project Figure:



Project Activities:

Therefore, in order to develop this new system or platform, the following activities are necessary:

- Review existing underwriting procedures including policy administration focusing on agricultural insurances

- Conduct a needs assessment and survey among the stakeholders
- Develop a new and improved underwriting procedures including policy administration with the use of ICT applications and tools
- Pilot test the new system in selected target area and beneficiaries
- Review the results of the new system and amend based on the new findings, if any
- Develop training modules/materials for this new underwriting procedures
- Train underwriters-solicitors on this new underwriting system
- Create policy guidelines for this new underwriting procedures

Pilot Implementation Site:

The proposed project site for the study, development and pilot testing of this improved insurance underwriting process is Region 4 consisting of the provinces of Cavite, Laguna, Batangas, Rizal, Quezon, Mindoro, Marinduque, Romblon and Palawan. Region 4 is the largest region in the Philippines in terms of size, area and population. Agriculture represents around 50% of the total economy of the region. Region 4, being near to the National Capital Region, is accessible for almost all of the participating agencies under this project; and thus, it will be easy for any institutional arrangements especially on data gathering, research and development.

Further, because of the topographical features of Region, which has the most varied landforms in the country consisting of flat coastal areas, upland interior areas of slightly moderate rolling or undulating plains and hills and mountains; Region 4 is well suited for the pilot implementation of developing this new or improved underwriting processes. With the differing topographical features, different underwriting conditions can be tested and evaluated. Further, different modalities of communication lines can also be tested and evaluated such as via mobile, web or radio.

Implementing Agencies:

Philippines Crop Insurance Cooperation (PCIC) - PCIC shall be the main beneficiary of this project being the sole underwriter for agricultural insurance; and thus, shall be the primary implementing agency. PCIC will play a key role of coordinating and collaborating with other stakeholders in this project.

Participating Agencies:

Insurance Commission (IC) - IC shall assist in the formulation of the improved underwriting process by reviewing the inherent risks and exposures within the underwriting process that will be the basis of future guidelines for the private sector.

Philippine Insurers and Reinsurers Association (PIRA) - PIRA shall help in the design of the underwriting process and respond to issues that may arise by the private sector during the review up to the pilot implementation.

Agricultural Training Institute (ATI) - ATI will develop the necessary modules and training materials under this project for training use of future Adjusters and Underwriters using the new and improved underwriting procedures.

Local Government Units (LGUs) & Microfinance Institutions (MFIs) - The LGUs, specifically the Municipal Agricultural Offices (MAO) and the other MFIs located in the pilot area under this project serving as PCIC's underwriter-solicitors will participate in the development of this underwriting process by sharing their opinions and collaborate with the review of the existing setup and processes.

Farmers' Group - Representatives from different farmers' group such as Irrigator's Association will also be part of this project during the initial stages of development by getting their necessary inputs; and also, be part of the pilot implementation.

ICT Application and Its Advantages:

The major ICT application under this project is the actual development of the underwriting system. Developing the system will enable the processing and administration more efficient and responsive to the needs of all stakeholders. Farmers can just send a text message or SMS for enrollment and filing of claims; Underwriters-solicitors can just now monitor through a web-based system; Adjusters can do their validation and assessments electronically; and PCIC can now process claims in a day.

Here are some sample innovations that can be introduced through this new system as follows:

Area of Operation	Innovations
Client Interface	- Use of a Point-of-Sale and Handheld Devices such as Tablets and Cellphones for enrollment, premium payment (via mobile money schemes), filing of claims, monitoring and payments.
Back Office/Front Office	- Call/Text Messaging Centers designed to handle inquiries and complaints - Effective Management Information System to efficiently manage client data - Claims processing system that pays quickly and on time - Collection processing system that efficiently manage receipts
In Between	- Communication systems between all stakeholders - Tagging system that facilitates the effective management of business and work channels

Time Frame:

This project will take about 18 months to completion as follows:

Activities	Month 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Review current situation/ Assessment survey	■	■																
Planning new underwriting process and system		■	■															
Development of new underwriting process and system			■	■	■													
Pilot testing/ Evaluation						■	■	■	■	■	■	■	■	■	■	■		
Development training modules														■	■	■	■	■

Expected Outcome/ Impact:

This project will make damage assessment and loss verification more objective and efficient with less paper works and reduced errors and moral hazards. PCIC will be able to do their assessment from 40 to 50 farmers a day on a more accurate indemnity computation; almost ten times their existing capacity. Further, it will automate their administration process by having the data sent directly to the head office server for validation, approval and up to check releases to the intended farmer. Thus, significant savings on operational expenses and processing time are achieved.

At the end of this project, the following results have been achieved:

1. A new and improved underwriting system for agricultural insurance use with the use of ICT tools such as handheld devices (tablets).
2. An improved policy guidelines and procedures for the efficient delivery of agricultural insurance especially to remote and underserved farmers and fisherfolks. This will improve the agricultural insurance supply chain as all players are secured and protected from the risk carrier, to underwriters, to the different delivery channels.
3. An increased participation of the private sector is also expected, as their role will be now more defined in the underwriting process. They can participate in different modalities such as a co-risk carrier, as a reinsurer or as a delivery channel (underwriter-solicitor or pure agent).
4. A new operating policy guidelines for regulatory use and purposes that will define the scope and areas of responsibilities within the underwriting process that will enable a safe and sound agricultural insurance framework.
5. An increased penetration rate of PCIC due to an enhanced image of the institution and on its insurance products and services brought by the new and improved underwriting processes that reduces the response time.

Possible areas (portion) wherein participation of private sector are expected:

Japanese ICT vendors have advanced experiences in the area of system development. Private sector will also participate in developing and providing tablets devices.

Mode of participation by private sector and its implementing method:

- Base of Pyramid (BOP) scheme can be possible to develop system. Inviting system engineers from private companies is possible. Competitive bidding can also be recognized to develop system or procure equipments.

Possible areas (portion) wherein Japan's ODA are expected:

Japan has many project experiences in developing ICT infrastructure and system development. Therefore, Japan's ODA will support system development by dispatching ICT experts. Also, Japan's ODA is expected to provide ICT related equipment such as handheld devices, training, and

other operational cost for the project.

Scheme (system) under Japan's ODA and its implementing method:

One of the possible schemes of Japan's ODA is Technical Cooperation Project (TCP). Under this scheme, Japanese experts are assigned to support the project activities organized with Philippines counterparts.

Other proposed projects (under this ICT Study) which can be combined, and its effect:

This project can be collaborated with the project "*Pest and Disease Information System Development Project*". The system can be linked with the above system. When a loss adjuster assess the field and find pest and diseases, they can refer to causes and effective measures of pest and diseases. Farmers will be more manageable for pest and disease, and the PCIC can reduce risk of moral hazard.

In addition, it is possible to collaborate with the Project called "Accurate and Prompt ISF Billing by the Confirmation of Planted and Irrigated Area by using GPS". GPS data will be linked with the system of the PCIC so that the PCIC can get the accurate planted area automatically.

PROJECT CONCEPT
(Agricultural Extension)

Sub-sector: Agricultural Extension

Name of the Proposed Project: Pest and Disease Information System Development

Existing Issues, Problems and Constraints:

Every year, billions of pesos in investments are lost due to damages caused by pests and diseases to tons of agricultural crops such as rice, corn and high-value cash crops. Infestations and spread of plant diseases always affect the Farmers.

The Department of Agriculture and its concerned attached agencies has been implementing programs to help prevent and mitigate the occurrences and damages by pest and diseases. Thousands of farmers field schools (FFS) on integrated pest management has been conducted nationwide (e.g. pest and disease-resistant varieties for paddy rice *"palay")*. In addition, an online e-Extension portal and Farmers' Contact Center (FCC) have aided in expanding the reach of agricultural advisory services.

However, only a number of farmers are able to access and avail these support services. Basic agricultural services were devolved to Local Government Units under the Local Government Code of 1991. As such, the national government programs are often delayed in the implementation due to lack of extension workers and support transport equipment. The current estimate puts the number of agriculture extension workers (AEW) based at the local government units at around 17,000 nationwide.

Given the situation, there is a need to develop a pest and disease information system (PDIS) as a platform to virtually link Farmers, AEWs and Advisory Service Providers (ASP) in real-time to be able to communicate, pass information necessary in diagnosing and screening pest and disease incidences. No need for AEW to be physically on the farm.

Project Outline:

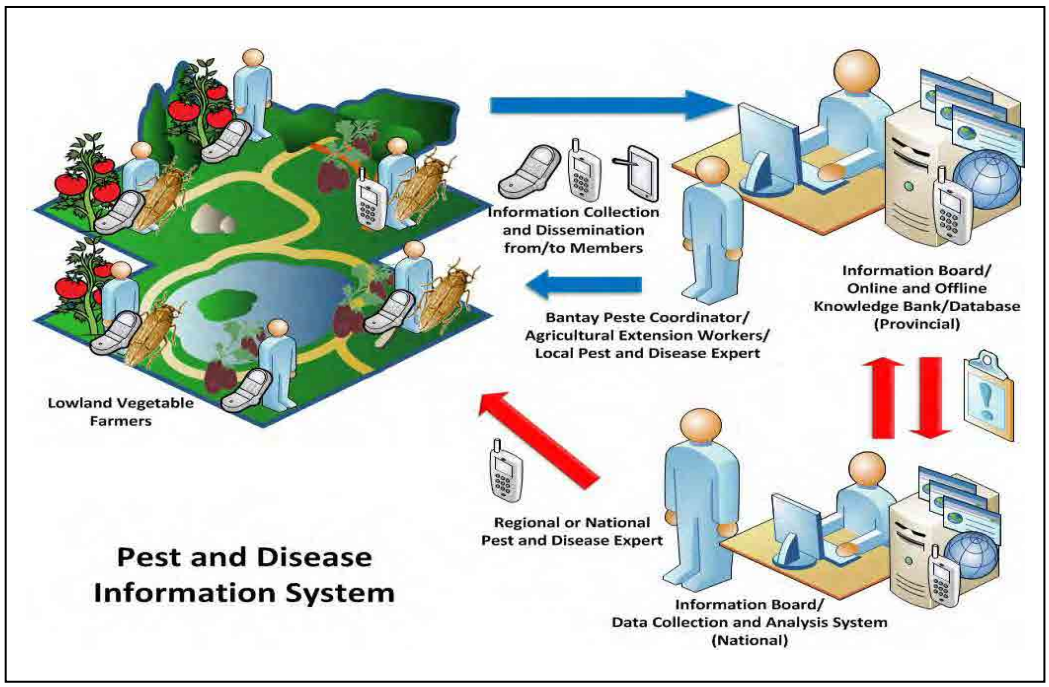
The PDIS is aimed at resolving issues on slow, inefficient and costly delivery of extension services, especially for pest and disease management. The project would develop a more effective real-time pest and disease prevention and control mechanism through prioritization of the experts' intervention with the use of an automated information system.

A step-wise approach will be prepared by standardizing incident reporting and response system between farmers and experts. Level 1 approach is to set provincial level local-based experts that will provide advisory services through SMS- and Web-Based platform operated by designated administrator. Based on identified parameters (i.e. location, number of incidents, number of days, etc.), the system would automatically categorize and prioritize.

For level 2 approach, collected and pre-screened information (using a text and digital photo) will be uploaded and downloaded in central database at regional/national levels. This allows experts and specialists to look into the incident and to determine the prioritized area that needs most attention and which part will be handled local trained technicians.

Both Level 1 and 2 approaches will broadcast information to registered users, National/Regional to Provincial Administrators; Provincial to Local-Based Experts; Provincial to registered farmer-users for any disseminated information on pest and disease management.

Project Figure:



Implementing Agency/Tasks:

Agricultural Training Institute (ATI) – mandated by the law as to facilitate the conduct of trainings and capacity building, in collaboration with the participating agencies such as ITCAF, Private Telecommunications, BPI-CPD, DA-RFU, DOST-ICTO, SUCs, and LGUs. It is to promote the use of ICT services and mechanisms in the PDIS pilot areas and project areas. It will act as administrator of the e-Extension portal, develop training modules and users' manuals accessible and operable online, and facilitate synchronized information system so as not to duplicate services and/or confuse users. To facilitate the formation of the "Communities of Practice" (COP composed of experts, researchers, farmer-scientists, etc.) and coordinate with the individuals/groups/agencies concerned. The COP would develop the P&D knowledge base for online and offline use of AEWs and farmers i.e. Web, CD, PC, Handheld Device, or Smart Phone versions.

Participating Agencies/Tasks:

Bureau of Plant Industry-Crop Protection Division – is tasked to strengthen crop protection services in the country by employing biological control and cultural mechanisms and improve available

control technologies with effective, safe and environmentally friendly to adequately address pest problems ensuring increase in farm productivity and attain food sufficiency and security.

The agency is tasked to develop and formulate guidelines and standards on management of plant pests, to provide technical assistance, coordination, and where necessary, supervision over regional facilities such as the Regional Crop Protection Center and surveillance and early warning system (SEWS, IPM-related national as well as bilateral/multinational technical program implementations are involved. They are to provide facilities for plant pests and disease diagnosis; mass production and rearing of biological control agents for field distribution; training for crop protection staff and extension agents, to maintain and update technical library on crop protection and act as the central monitoring and repository of regional pest data.

They will perform along with experts' part of the "Communities of Practice" and take the lead in providing the expertise needed for the pest and disease information database.

DA-Regional Field Unit Crop Protection Center – RCPC aims to undertake research to develop crop protection system, perform actual pest control and field extension work, and implement manpower training program to upgrade the capability of its personnel along pest control in collaboration with participating agencies.

They will be a part of the COP for the creation of the P&D database and respond to the incidents/reports, and advice local networks to send out early warnings on pest and disease outbreaks, formulate training modules for pest and disease information accessible online by AEWs.

Information Technology Center for Agriculture and Fisheries (ITCAF) - established as the core office with responsibilities to manage, operate and maintain ICT systems of DA and attached Bureaus and Agencies. It is mandated to manage the National Information Network (NIN) that links all offices and levels of the Department with various institutions and local end-users in order to provide easy access to information related to agriculture and fisheries and provide services in line to its mandate.

DOST-Information and Communications Technology Office (ICTO) – the ICTO (formerly Commission on Information and Communications Technology, renamed and reassigned through E0 47 S. 2011) is tasked to perform the following functions, among others: ensure the provision of efficient and effective information and communications technology infrastructure, information systems and resources, to support efficient, effective, transparent and accountable governance and, in particular, supply speedy and efficient enforcement of rules and delivery of accessible public services to the people; and build the capacities of public sector institutions and their personnel in the use of ICT to improve planning, management, delivery of mission, critical functions, and monitoring and evaluation.

As such, the ICTO through the National Computer Center and its eLGU and Community e-Centers (CeC) projects shall work with ITCAF in setting the specifications (and perhaps even facilitating the procurement if possible to be included) of ICT-related hardware that are necessary for the development and use of the system for the central database and pilot areas. The Community e-Center

(if found or placed in the provincial LGU) can serve as the Provincial Information Board.

State Universities and Colleges (SUCs) – there are SUCs that have research and extension as part of their functions. Especially for SUCs that focus in Agriculture, their experts can also be tapped to form the COP through an institutionalized policy for members of the Consortium formed by PCAARD (Philippine Council for Agriculture, Aquatic and Natural Resources Research and Development). Additionally, some SUCs that are part of the consortium also house or support several FITS (Farmers Information Technology Services) Centers. SUCs may be targeted as supporters of Provincial LGUs with FITS Centers (providing Internet subscription, technical support, and/or venue for farmers to consult with local experts) especially in the expansion stage of the project.

Moreover, SUCs can also work with ATI and the other participating agencies for the knowledge base and database development as well as in developing the training modules and user manuals for accessing the services and operating the PDIS.

Local Government Units (LGUs) – vested by Local Government Code 1991, the LGU shall provide basic agricultural services in collaboration with participating agencies. To facilitate incident report validation, data collection and pre-screening activities will be done by local experts from the PAO or Municipal Agriculturist Office as well as *Bantay Peste* Coordinators or *Magsasaka Siyentista* (Farmer Scientist) connected with the FITS Center.

Cooperating Stakeholders/Roles:

Telecommunications Company (Telecom) –To closely work with ITCAF for the development of the PDIS software package in collaboration with participating agencies. Work with ATI in the conduct of training and preparation of training modules. Prepare manuals for mobile phone and computer-based applications relevant to the use of the Information accessible online.

Advantage of ICT application:

There will be a faster, convenient, and more cost-efficient delivery of extension services especially for vegetable pest and disease management, vice versa incident reporting through mobile phones will reduce cost in the farmers' side and fast sending of information.

The knowledge database for diagnosis and screening will help AEWs and farmers in acquiring additional knowledge on vegetable pest and disease management and serve as reference for similar cases in other areas and in developing protocols for incidence responses or actions.

Moreover, the push messaging feature of the information board will allow delivery of essential information between the national and local administrators, or the local administrators and registered users.

Time Frame: 36 Months (3 Years)

1) Preparatory Study: (a) project identification; (b) Analysis of beneficiaries; (c) System design; (4) Selection of Pilot area - 6 months

2) Content build-up: (a) Organization of COPs; (b) Workshops and consultations with COPs; (c) Knowledgebase development (especially along local knowledge and experts knowledge as conferred by the COPs) - 6 months

3) Procurement and system set-up - 6 months

4) Training: (a) System administrator; (b) System operator; (c) AEWs; (d) Farmers - 3 months

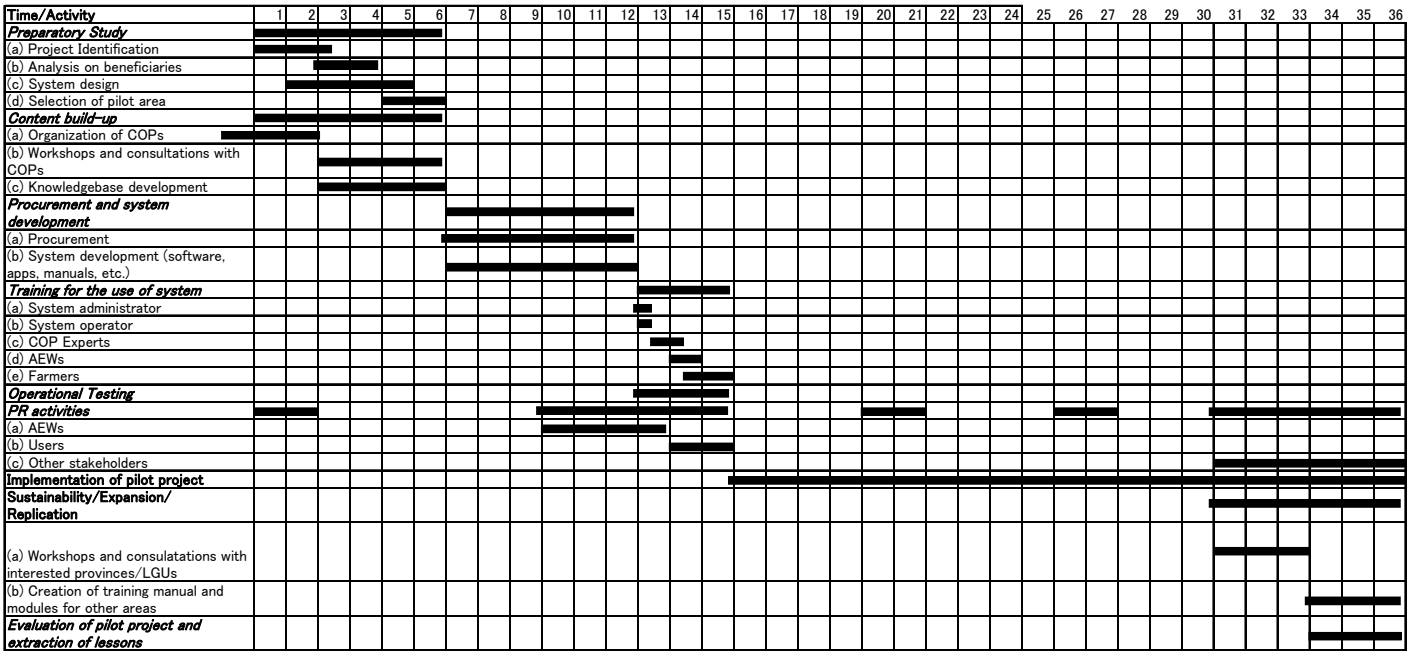
5) Operational Testing - 3 months

6) PR Activities and public dissemination; (a) AEWs; (b) Farmers; (c) Other stakeholders - 18 months, staggered

7) Implementation of the Project - 24 months

   Sustainability/Expansion/Replication: (a) Workshops and consultations with interested provinces; (b) Creation of training manuals and modules for use of other areas - 6 months

8) Evaluation of the Project: (a) Evaluation; (b) Extraction of lessons; (c) Submission of end-of-project reports and documents - 3 months



Expected effect/outcome/impact:

- Efficient allocation of manpower and financial resources for extension and advisory services
- Lesser crop damages and losses due to pests and diseases
- Improved support service program planning and implementation (seed positioning, NFA intervention for market stabilization, provision of insurance coverage, etc.
- Conduct of location- and trend-specific researches on pests and diseases as well as trainings for P&D management
- Elimination of redundant services and spending for similar platforms through single system development and utilization

Expected number of beneficiaries:

Direct Beneficiaries (LGU staff/farmers in Pilot Area): To be estimated

Indirect Beneficiaries (LGU staff/farmers nationwide): To be estimated

Necessity of the amendment of existing laws/regulations, change of organizational set-up: Partnership with Telecommunications Company will require signing of Memorandum of Agreement or Understanding.

Possible areas wherein participation of private sector are expected:

Telecommunications Company – Design and Installation of software packages to successful and smooth implementation of the project

Mode of participation by private sector and its implementing method:

Telecommunications Company – Project participation as a form of corporate social responsibility activity through their Public Affairs or CSR Department.

- Conduct of trainings on use of system for farmers and information board administrators
- Free text and internet subscription allocation for provincial information board system computers/offices
- Provision of camera-enabled phones for assigned local experts (as component for the pre-screened information reporting)

Possible areas (portion) wherein Japan's ODA are expected:

- Dispatch of long term vegetable P&D expert for knowledge base development (work together with expert pool)
- Dispatch of short-term (or long-term also) ICT expert for protocol designing, database development and infrastructure evaluation (work together with ITCAF)
- Provision of ICT-related infrastructure or equipment especially in the target areas
- Funding for trainings and other operational costs, including the promotion and development of modules and manuals that can be used for future replication

Scheme (system) under Japan's ODA and its implementing method:

- To assign Japanese Expert(s) to utilize Japan's long history of agricultural development and recent ICT technology. For such purpose, Technical Cooperation Project (TCP) can be considered as possible scheme of Japan's ODA.
- In-Country Training Program (ICTP)

Other proposed projects (under this ICT Study) which can be combined, and its effect:

- *Agricultural Insurance* – Epidemic Index (Yield Loss based on Crop Pest and Disease Infestation)
    - With existing statistics or record of Pest and Disease Infestation levels in a given area and the amount of consequential/corresponding yield loss, an Epidemic Index can be established. The data collected and validated from incident reports would allow analysis of the expected level of pest and disease infestation and harvest projections. Beyond the standard high average infestation level and lower projected harvest, payout can be made. Information from the data collected and pre-screened report can update database and use part of the criteria for Area Based Yield Index Insurance.
- *Irrigation Service Fee Collection* – pest and disease infestation reports can also serve as supporting information that can be used together with the GPS device in validating or confirming ISF exemption for those that harvest lesser than 40cavans per hectare.

Table 5.1.2 Summary of Expected Effects between Plural Projects by Simultaneous implementation

Issues	Sub-sector	Proposed Project	Outline	Possible sub-sector for Collaboration	Related Project (under this Survey)	Expected Synergy Effect	Impact on Beneficiaries			
Improvement of Farmers' Income	Marketing Improvement	Market Operation and Information System Development	Improvement of market operation systems of individual trading centers by ICT, and advancement of market information systems by networking the information system.	Marketing Improvement	Online Marketing System Development	The online marketing system would enable farmers' organizations or individual farmers to sell their high value crops or agri-related commodities directly to the end consumers or a big buyer with relatively better selling price.	Farmers (to be able to increase production, command higher price, attract more buyers)	Cooperative (to be able to expand operations and encourage more member/community participation)	Telecommunication Company (to be able to increase profit through communication and banking charges)	Rural Banks/MFIs (to be able to have higher repayment rates for farmers' production loans)
		Online Marketing System Development	To establish online marketing system to work as a platform to link producers, buyers and sellers, and to minimize gap on pricing information and product standards.	Agricultural Insurance	Project for Scaling up of Index Based Insurance in the Philippines	Users can order insurance for their products that are being shipped or delivered. Insurance can be ordered for farm implements and warehouse/storage facilities as well.	Farmers (to be able to insure their products and claim payout through simpler process)	Insurance Company (to be able to increase profit by increased clientele)	Rural Banks/MFIs (to be able to increase income from underwriting)	
Stable production by maintaining functions of production infrastructure	Irrigation	Efficient Irrigation Service Fee (ISF) Collection though Payment by Mobile Phone	To increase Collection Efficiency of ISF by introducing Mobile Money for easy payment for farmers far from NIA/IA Office	Agricultural Insurance	Project for Scaling up of Index Based Insurance in the Philippines	Incentive of discount of insurance premiums for farmers who pay ISF by mobile phone	Farmers (to be able to insure their land by discounted insurance premiums)	ＮＩＡ（to be able to increase collection efficiency)	Telecommunication Company (to be able to increase profit by communication charge and banking charge)	Insurance Company (to be able to increase profit by increased subscriber)
				Marketing Improvement	Market Operation and Information System Development	Enhance ISF Payment by increase of farmers income through marketing improvement	Farmers (to be able to increase profit by improved marketing, which leads to ISF payment)	ＮＩＡ（to be able to increase collection efficiency)		
		Accurate and Prompt ISF Billing by the Confirmation of Planted and Irrigated Area by using GPS	To minimize disputes between NIA farmers on the billing amount computed by actual planted area, verify the land area by using GPS as joint works of NIA/famer, to create farmers sense of trust on NIA's services	Agricultural Insurance	Project for Improvement of the Insurance Underwriting	Planted area confirmed by GPS will be a basis of the damage evaluation and pay-out for insurance	Farmers (to be able to receive prompt pay-out of insurance)	Insurance Company (to receive good reputation by prompt pay-out to farmers)		
Protection of Farmers	Agricultural Insurance	Study for Application of Index Based Insurance in the Philippines	The Objective of this project is to formulate profiling database for facilitating development of new index based insurance. The profiling database will provide basic potential index based insurance application and possibility of introducing index based insurance.	N.A.						

Issues	Sub-sector	Proposed Project	Outline	Possible sub-sector for Collaboration	Related Project (under this Survey)	Expected Synergy Effect	Impact on Beneficiaries			
Protection of Farmers	Agricultural Insurance	Development of Index Based Insurance Policy Framework	The objective of this project is to develop Index Based Insurance Policy Framework. The purpose f the Policy Framework is to create enabling operational environment for index based insurance. This Policy Framework will cover product development process, marketing activities, and all other activities regarding index based insurance. Private sector, international donors, and PCIC will be able to develop and expand their index based insurance products based on the same Policy Framework.	N.A.						
		Project for Scaling up of Index Based Insurance in the Philippines	The objective of this project is to expand and enhance the development of index-based insurance schemes by replicating the lessons learned and apply these into new areas, new crops and through different delivery schemes.	Irrigation	Efficient Irrigation Service Fee (ISF) Collection though Payment by Mobile Phone	Increase ISR collection through ISF collected from insurance payout	Farmers (to be able to insure their land by discounted insurance premiums)	ＮＩＡ（to be able to increase collection efficiency)	Insurance Company (to be able to increase profit by increased subscriber)	
		Project for Improvement of the Insurance Underwriting Process	The purpose of this project is to create a solution or a system for the improvement of the administration processes starting from the application/enrollment stage up to the claim processing stage; moving from manual operations to automated operations reducing the processing time.	Irrigation	Accurate and Prompt ISF Billing by the Confirmation of Planted and Irrigated Area by using GPS	Planted area confirmed by GPS will be a basis of the damage evaluation and pay-out for insurance and GPS data will be linked with system in the PCIC.	Farmers (to be able to receive prompt pay-out of insurance)	Insurance Company (to receive good reputation by prompt pay-out to farmers)		
				Agricultural Extension	Pest and Disease Information System Development	Loss adjuster can refer to causes and effective measures of pest and diseasess so that farmers will be more manageable for pest and disease, and the insurers can reduce risk of moral hazard.	Farmers (to be able to insure their land/crop and claim payouts through a simpler process)	Insurance Company (to be able to speed up payout, to improve reputation/image of the company and increase number of clients)		
	Agricultural Extension	Pest and Disease Information System Development	To develop a more effective real-time pest and disease prevention and control mechanism through prioritization of the experts' intervention with the use of ICT.	Agricultural Insurance	Project for Improvement of the Insurance Underwriting Process	For index type insurance on which trigger would be damages from pest and disease, the data collected and validated from incident reports would allow analysis of the expected level of pest and disease infestation and harvest projections.	Farmers (to be able to insure their land/crop and claim payouts through a simpler process)	Insurance Company (to be able to speed up payout, to improve reputation/image of the company and increase number of clients)		
				Irrigation	Improve ISF Collection by Using GPS	Pest and disease infestation reports can also serve as supporting information that can be used together with the GPS device in validating or confirming ISF exemption.	Farmers (to be able to have simplified process for ISF exemption)	NIA (to speed up finalization of ISF bill, which leads to increase in collection)		

CHAPTER 6 PARTICIPATION OF PRIVATE SECTOR AND POSSIBLE IMPLEMENTATION SCHEME UNDER JAPAN'S ODA

6.1 Participation of Private Sector

On the Survey, possibility as well as mode of participation by private sector, such as telecommunication and insurance companies of both the Philippines and Japan, was considered based on the result of the survey on the opinion from private companies, and its analysis.

1) Agriculture

For the proposed Market Operation and Information System Development, Japanese Agri-ICT vendors which have gained advanced experiences in the field of marketing system development can be tapped. Their products are even introduced in the marketing and distribution system of big supermarkets to manage an entire process of ordering, purchasing, and delivering agricultural produce. These companies also have much experience in improving the operation and management system of small to large market places by digitizing the system using ICT. Therefore, it should be considered to involve such companies as partner entities for developing market operation and information systems in the pilot market places. Participation can be realized by inviting individual system engineers from those companies who have enough experiences in the system design in agricultural and marketing field. They can be involved in the project as the members of the project management team.

For the proposed Online Marketing System Development Project, Telecommunications Company can participate for the Installation in mobile phones (system menu) of mobile money services/transactions. Work with ITCAF in installing mobile applications (receiving SMS/MMS) money services in the online trading system. Coordinate with AMAS and ATI in the promotion of mobile applications (SMS and MMS) and mobile money services among users. Their participation to the project can be made as a form of corporate social responsibility activity through their particular section for CSR by Memorandum of Agreement.

For the proposed Pest and Disease Information System Development Project, Telecommunications Company can also participate for the Installation in mobile phones (system menu) and computers (software/application) and training on the use of the information board system, information board hosting, allocation of free text messages for administrator accounts, and linking between the information board network for the administrators.

2) Irrigation Development

One of the project proposals under the Survey is to introduce mobile payment system, on which users are rapidly increasing in the Philippines, to contribute to the improvement of the collection efficiency of Irrigation Service Fee. As described on the Project Proposals in Attachment-1, the project aims to increase collection efficiency by utilizing various services which is being provided by the private telecommunication companies (such as information distribution simultaneously to many subscribers through text message, mobile payment and mobile banking services). Private

telecommunication companies can directly participate to the Project by offering such services, and be able to make profit by the increase of subscribers, communication charge and remittance charge, and/or to contribute to their social reputation by the implementation as CSR.

While offering existing services to this project, telecommunication company can also enhance their participation by the development of special application for the Project once they confirms the profitability and feasibility on the participation to the Project.

In Japan, know-how is accumulated in private telecommunication company since users of mobile payment system for various social services. However, it may be difficult for the Japanese private telecommunication companies to directly participate in the proposed project due to the difference in system and profitability. Also, it may be efficient and effective for farmers to utilize existing services which is extended by the telecommunication company in the Philippines, with consideration the more and more Irrigators Association shall enter into ISF billing and collection works as they are to be tasked for these works under IMT concept.

3) Agricultural Insurance

Index based insurance development is divided into three stages; preparatory stage, development stage, and scaling up stage. Preparatory stage is initial stage to introduce index based insurance. Development stage includes specific regulations and guidelines, and product development. Scaling up stage is to expand coverage area and crops of index based insurance.

Private sector will play different roles in different stages. At the preparatory stage, “Study for Application for Index Based Insurance in the Philippines” is proposed. The purpose of this study is to show the feasibility of application for index based insurance.

In this stage, private sector will collaborate with analyzing collected data to consider possibility of index based insurance application. Particularly, private sector will play an important role to consider a new type of index based insurance. Also, private companies which have index based insurance product in other countries can contribute to profiling data and establishing database for index based insurance.

In the development stage, private sector will be able to participate in setting up regulations and creating operational guidelines for index based insurance. “Development of Index Based Insurance Policy Framework” will be proposed in this stage, and pilot product will be developed in this project. Private sector will be able to participate in this product development process.

Through the participation of private sector in product development process, private companies will be able to redesign the product and develop new index based insurance product more easily, and they can reduce the cost of product development.

Furthermore, private insurance and reinsurance companies will play a role of reinsurers in pilot product implementation. They will take risk more easily if index based insurance products will be developed with international risk modeling standard, and assisted by the JICA’ s ODA project. Also,

local insurance companies will play an underwriter of the product if reinsurance companies take their risks.

In the scaling up stage, a wide range of private companies will be able to participate. There are three main areas that private sector can participate; index based insurance development, underwriting, and marketing channel. For example, private insurance companies can join product development process in the project of "Project for Scaling up of Index Based Insurance in the Philippines".

Also, private sector, especially local private companies can be an underwriter in the project. As such, capacity of local underwriter will be improved and the project will expand effectively. Private sector will participate in the project as a marketing channel as well. In this case, a wide range of private sectors can participate. For example, agricultural inputs providers such as seeds growers and fertilizer companies can sell their products with index based insurance. Microinsurance companies can also combine their non-life insurance with index based insurance.

Moreover, Base of Pyramid (BOP) provider will be able to join in this stage. Private companies which have ideas of BOP business can try to develop their products in the scaling up project. BOP business is not limited in index based insurance. Index based insurance will be integrated in various BOP businesses.

6.2 Possible Implementation Scheme under Japan's ODA

For the implementation of ICT utilization projects proposed by the Survey, various implementation mode can be considered such as 1) to include in the existing Japan's ODA development programs to the Philippines, and 2) to implement as independent projects focused on the ICT-based agricultural development. While proposed ICT utilized projects can become one of components under Yen-Loan Attached Technical Assistance (YLTA) to be simultaneously made with the implementation of agricultural infrastructure projects, the proposed projects were indentified to be able to be independently implemented on this Survey. However, these proposed independent projects can also be applied for the implementation as part of YLTA.

In consideration of the present policy and future possibility, it may be difficult to form Grant-Aid projects wherein equipment supply for telecommunication is made for ICT utilization. Therefore, possible ODA Scheme for the implementation of proposed projects may be 1) part of consulting services for detailed design and construction supervision works on the implementation of Yen-Loan package, and 2) technical assistance including dispatch of Japanese Experts, training, and Technical Cooperation Project (TCP). Furthermore, new scheme as BOP (Base of Pyramid) and PPP can be also possible, in consideration on the participation of private sector stated above.

1) Agriculture

For the proposed Market Operation and Information System Development, it may be possible to dispatch long-term Japanese agribusiness and marketing Expert(s) for needs assessment, overall system design, and application of trading standards, as well as dispatch long-term agricultural

marketing system development Expert(s) for protocol designing, system design and development, database development, and infrastructure set up. Such assignment can be made by PPP, in which JICA will finance the private firms' study activities. Another possible scheme of Japan's ODA would be of a Technical Cooperation Project (TCP), in which some Japanese experts are assigned to support the project activities organized with Philippines counterparts for market development.

For the proposed Online Marketing System Development Project, long-term Japanese agribusiness and marketing Expert(s) may be possible, for needs assessment, content development, and product quality and trading standards. Also, Japanese telecommunication company and electric transaction company may also dispatch long-term ICT Expert(s) to be assigned for protocol designing, web platform design and development, database development, and infrastructure evaluation. These dispatch of experts can be considered also under TCP or BOP scheme.

It may be important to support initiative of AMAS on the establishment of web platform. It is necessary to establish uniformed platform under governmental initiative, to avoid confusions by un-controlled and insufficient on-line marketing systems by various firms/organization. In such viewpoint, technical assistance by Japan may play important role.

For the proposed Pest and Disease Information System Development Project, dispatch of Japanese long term rice P&D Expert (s) can be made under ODA for knowledge base development (work together with expert pool), together with ICT Expert(s) for protocol designing, database development and infrastructure evaluation (work together with ITCAF). These assignments of Expert can be also made under TCP or BOP scheme.

2) Irrigation Development

For the proposed project on the introduction of mobile payment system to ISF for the improvement of collection efficiency, participation of private telecommunication company shall be made as stated in 6.1 especially for the training and promotion of ICT to farmers. In this set-up, portion of project which requires Japan's ODA may be limited to technical assistance but not to the equipment supply, construction of facilities, in consideration on the fact that ICT in the proposed project can be made by the application of existing services on celphone. Therefore, possible assistance under Japan's ODA shall be on the technical assistance such as to dispatch Japanese Experts on the financial management of IA by utilizing Japan's long history on the management of Land Improvement District (LID) to enhance improvement and enhance of ISF collection including mobile payment method, as well as to provide trainings for IA in Japan to share experience in IA management.

Even the project may be implemented by the Government basis through Japan's ODA, it may be necessary to utilize existing services under the private telecommunication company, therefore the set-up below may be realistic:

- Project set-up and policy making: ODA (by Japanese Expert(s))
- Criteria of the pilot area selection and baseline survey: NIA
- System design and development: Private telecommunication company

- Training, campaign and public relations: Private telecommunication company
- Guidance and promotion of ISF Collection (including ICT) : ODA (by Japanese Expert(s))
- Introduction of Japan's experiences in LID Management: ODA (Trainings in Japan)

For the other ICT –based project on the Survey, utilization of GPS for the accuracy of LIPA (List of Irrigated and Planted Area) on which concept paper is shown in Chapter-5, careful monitoring of IMT promotion by NIA shall be made, since billing and collection works shall be continuously transferred to IA. For the IAs and federation of IA in advance area can manage this ICT assisted billing and collection works since they have offices and manpower with ICT experiences, however, assistance shall be still necessary for the IA which newly joined IMT programs. Such IAs has difficulties in work efficiency on the management of ICT, therefore, it is important to dispatch Japanese ICT expert(s), as well as to provide in-country training for farmers to be trained in ICT-advanced NIS nearby. Also, it may also possible to include this GPS-assisted LIPA system as one of components on the YLTA for the future rehabilitation project for NIS under Japan's Yen Loan package.

Both projects (mobile ICT payment and use of GPS) can be implemented independently or to be implemented as one of components under future YLTA as stated above. Furthermore, these projects can be also implemented in National Irrigation Systems nationwide which was constructed under Japan's Yen Loan in the past, since required technologies are already existing (mobile phone and GPS), and the nature of these projects is not location specific. By improving operation and maintenance of these Japanese-funded irrigation systems through the improvement of ISF collection with such ICT-based effort, it will contribute to the efficient utilization of Japan's past assistances in irrigation sector.

3) Agricultural Insurance

Japan has experienced many types of natural disasters. Based on these experiences, Japan has one of the leading countries for disaster risk management. In fact, Japan has developed advanced policies and technologies for disaster risk reduction. Therefore, Japan's ODA will contribute to developing policies, regulations, and guidelines in terms of insurance operations.

Capacity building of stakeholders regarding index base insurance will be conducted by Japan's ODA since Japan can provide their knowledge and expertise. For example, Insurance School of Japan (ISJ) has been provided various insurance training courses for people in developing countries since 1972. Japanese experiences and facilities in insurance training will be utilized for the project.

Further, Japan's ODA have implemented various irrigation projects including capacity building of irrigators associations. Therefore, scaling up of index based insurance project should be implemented in the sites where the JICA have implemented project so far. In these sites, irrigation facilities are improved and strengthened operations and maintenance system. As such, new insurance scheme will be introduced easily.

Finally, Japan has many project experiences in developing ICT infrastructure and system development. Therefore, Japan's ODA will support system development by dispatching ICT experts. Also, Japan's ODA is expected to provide ICT related equipment such as handheld devices and trainings to reduce the cost of insurance operation.

CHAPTER 7 LESSONS LEARNED & RECOMMENDATIONS

7.1 Lessons Learned

The Survey aims to collect information for the future direction of JICA's assistance to the agricultural sector, through the confirmation and analysis on the policy, investment plans, undertakings under donor countries, and intentions of private sector, for ICT utilization in the agricultural sector in the Philippines, as well as reflecting proposals from private sector including Japanese and Philippine enterprises. Through the Survey, it was observed that ICT application has potentials in agricultural development, and it may contribute to the increase of income and improvement of livelihood for farmers in the Philippines.

On the other hand, various factors are found in ICT application to agricultural sector during the course of Survey which was not able to be foreseen at the commencement of the Survey. Some of these factors are exampled as follows:

1) Need for the clear setting of beneficiaries and strategy

During the Survey, the Team found necessity to differentiate its strategy on ICT application in agriculture depending on who will be benefitted by the proposed projects. Implementer of the Project (governmental office) may be benefited through the decrease of transaction cost, private sectors may be benefitted through increase of profit, while farmers may be benefitted by the increase of agricultural production. This means, advantage to one stakeholders may be disadvantage of others.

For example, efficiency on implementer (improvement on efficiency such as easy damage evaluation for insurance and efficient collection of Irrigation Service Fee) may require additional burden to farmers (such as time and manpower), while advantage to farmers may require additional burden to implementer (such as manpower, staff training and equipment supply). Therefore, it is necessary to consider balance of advantages and disadvantages on each stakeholders during the formulation of projects.

2) Combination of ICT-based solution and other traditional solutions

Though the Survey set utilization of ICT as its objectives, it is important to keep in mind that ICT itself can not solve all present development constraints. For example, introduction of mobile payment for Irrigation Service Fee may contribute to the increase of its collection efficiency, however this method can only be a part of comprehensive solutions. It is important to simultaneously consider the fundamental and comprehensive solution on collection efficiency, i.e. to improve performance of existing irrigation facilities, proper operation and maintenance, and adequate water management for the farmers' satisfaction on NIA's services.

This means, it is also important to consider the combination of newly identified ICT-based solutions with traditional (existing) efforts on the solution for development constraints.

Another example in irrigation sector is the opinion that farmers start planting without observing agreed cropping calendar, which gives difficulty for NIA/IA to execute proper water management. For this

issue, several considerations have been made such as introduction of telemetry system, however, detailed analysis on the reasons of such farmers behavior were not made. Needs analysis shall be made prior to the introduction of ICT for physical improvement of facilities.

3) Consideration of the level of ICT literacy in farm level

The Survey Team made proposals on ICT-based projects, however, sometimes exposed to the logical failure in setting introduction of ICT itself as objectives but not tools in proposed project. Such logics were reinforced by the discussions and project formulation with counterpart personnel of the Survey who are basically "city people" with rich knowledge on ICT, and have tendency to propose higher ICT level which are difficult to be widely spread in rural area wherein ICT literacy is lower than the expectation of City people.

It is necessary to consider ICT application in rural areas with the fact that present use of internet, mobile banking system in rural area is very much limited as stated in Chapter-2 of this Report.

4) Differences in the operation between governmental services and private sector

Particularly on the development and enhancement of agricultural insurance, it may be difficult to consider governmental operation and activities by the private company in same level. For example, setting of insurance premium by the government side include subsidiary in a certain contents, while private company shall consider the profitability, reputational risks in premium setting.

Another example, private telecommunication may have difficulty in implementing long-term ICT based community development movement in wider geographical area in CSR basis. As private firms, profitability based on the increase of communication charge and other charges shall be considered. In such case, scale merit shall be a important factor for the participation in agricultural development wherein preparation and implementation is in longer time span.

7.2 Recommendations

In view of also the lessons stated above, the following recommendations are made as factors to be considered for the development of ICT-based projects on agricultural development:

1) It is sometimes easier for the project planners to fall in the logic that higher ICT level leads to higher impacts, especially when ICT itself becomes objectives of the projects but not as tools to make solutions. Under such idea, sometimes low ICT literacy in farm level may be defined as problems in implementation of the project, which is contrary to the basic principles in rural/agricultural development. When project planners consolidate project outline which requires participation of farmers to ICT activities higher than their present ICT literacy, due consideration shall be made on the inclusion of adequate public relation activities, familiarization and guidance for farmers on ICT, as well as incentive for farmers who are required to participate in such ICT-based activities.

2) As for the participation of private sector which was one of the important issues in the Survey, it is necessary to consider its legality of designating specific company to avail their particular services in compliance with Republic Act 9164, which stipulates procurement process in governmental operation. Even if the participation of private companies are not based in technical and financial tender procedure (such as Memorandum of Agreement between governmental agency and private firm), justification shall be made prior to the implementation for selecting particular company as implementing partners.

3) When introducing ICT to farmers, there is a need to consider the participation of their family members as well as their community. Most of old farmers are intimidated with sophisticated and modern gadgets so they only use traditional mobile phones, while their children may have multifunctional mobile phones. Younger farmers are more interested and have better knowledge and skills in using ICT gadgets than their parents. They are also eager to learn, and are willing to adapt to and embrace new ICT services. The community can also encourage the farmers to use these available technologies and help in lowering the barriers between ICT and old farmers. Thus, the young generation and the community will play an important role to promote and assist the farmers to make use of ICT.

Attachments

Attachment-1 **Proposal on Priority Project (Agricultural Marketing)**

Attachment-2 **Proposal on Priority Project (Irrigation)**

Attachment-3 **Proposal on Priority Project (Agricultural Insurance)**

Attachment-4 **Presentation Materials on the Project Formulation Workshop on 30 Jan. 2012**

Attachment-5 **Minutes of Meeting on the Project Formulation Workshop**

Attachment-6 **Pictorial Record**

Attachment-1 Proposal on Priority Project (Agricultural Marketing)

PROJECT PROPOSAL
(Agricultural Marketing)

Sub-sector: Agricultural Marketing

Name of the Proposed Project: Market Operation and Information System Development

Present conditions of (sub) Sector/ Existing Issues, Problems and Constraints to be solved:

Issues, Problems and Constraints in the Marketing System

Vegetables and fruits production have been an important source of livelihood for small-scale farmers with land holding ranging from 100m^2 to a hectare. More than just income sources, the crops provide sustainable daily food diet for resource-poor farmers as well as a source of employment in the community. Given the importance of those commodities, the Department of Agriculture (DA) has provided a series of assistance in increasing and stabilizing the farmers' level of productivity.

Yet, the farmers do not always enjoy the benefit from vegetables and fruits production. This is mainly due to the fluctuation of market trend by years and by commodities. For instance, according to the Bureau of Agricultural Statistics (2011), annual average farm-gate price of celery from 2006 to 2010 had significantly dropped from PhP 25.34/kg in 2009 to PhP 12.84/kg in 2010, a decrease of around 49%. In contrast, the farm-gate price of asparagus had significantly increased from PhP 41.71/kg to PhP 77.58/kg, an increase of 86%.

As such, there are also differences in trend by commodities. In the same report from BAS in 2011, it has been recorded that while the farm-gate prices of asparagus (86%), papaya (65%), and mungbean (46%) had increased from 2009 to 2010, the prices of celery (-49%), carrots (-43%) and cabbage (-41%) had decreased.. In fact, among a total of 96 types of vegetable and fruit commodities listed in the BAS statistical data, 52 commodities (54% of the total) had increased but 44 decreased (46%). In such situations, farmers are having difficulties in determining which crop would increase next.

It is often claimed that farmers easily rush to plant the commodity which marked higher price in a season. However, the price of that commodity in the next season can automatically go down as well. The statistical data from BAS well describes such practices behind the market scene. Furthermore, at the local level, vegetables and fruits farmers also face some structural problems. The typical issues and challenges are summarized in the problem tree as shown in the next page.

The two major issues shown in the problem tree that vegetables and fruits farmers are suffering from are the low market price and weak bargaining power of individual farmers. Low marketing price is generally caused by oversupply of commodities that farmers produce. Farmers tend to produce without or with less consideration of market trend. Such practice stems from insufficient knowledge of market prices. It can also be due to challenges in terms of the farmers' capacity to interpret the market trend, if and when this information is available.

Meanwhile, the lower bargaining power can be attributed to several causes: individual selling, not well understood price information, unmet product standards, and unfavorable loan terms from capital-laden middleman or traders. There are two major reasons contributing to the problem of farmers' insufficient knowledge on price information—it can be due to lack of access to price information and price information is, first of all, not available. Unavailability of information may be due mainly to the lack of comprehensive market research that is responsive to the farmers' information needs on the ground.

In recent years, market research itself is being more organized through the efforts of the DA's Agribusiness and Marketing Assistance Service (AMAS) and BAS. In addition, the results of research are already being published on several of DA's information board such as the Agriculture and Fisheries Market Information System (AFMIS) and BAS website. Therefore, it is more likely that the problem has fallen more into the issue in lack of access to that kind of information. This can be caused by factors such as inappropriate dissemination system of price information, insufficient knowledge on how to access the market information, or even the lack of means of communication (ICT tools). As a result, farmers are often than not unaware of the price information to be used in the negotiation with buyers.

Another issue is that the commodities being produced do not always meet the quality standard. When the size, color or the appearance of the vegetables and fruits does not meet the standard required by the market, buying price can be really low. Insufficient knowledge or know-how on such standards or Good Agricultural Practices (GAP) is underpinning this issue.

Furthermore, in the Philippine context, lack of access to production loan is a central issue in agricultural production and marketing. The only choice left for farmers who do not have access to formal lending institutions is to access production loan from informal lenders such as the middlemen, buyers, and even the so-called "loan-shark." In addition to the relatively higher interest rate from the informal sector, a 5% per month or a 20% per production period of four months, farmers sometimes have to sell their produce to the lender as part of the loan agreement. In this case, price negotiation cannot be in favor to the producer/borrower.

As discussed, several issues are mutually connected and structurally force farmers to lower income levels. On top of that, when discussing the agricultural marketing sector, the other end of the value chain should also be given attention—the consumers. As shown in the right-bottom portion of the problem tree, deficit or oversupply of vegetables and fruits is an indicator of demand-supply imbalance, which further causes fluctuation of market prices. Coupled with fluctuations of market prices and multi-layered market systems, wherein a number of intermediaries get some margins in each and every transaction, a high-cost structure of the vegetables and fruits marketing is definitely existing in the country. This makes improvement of livelihood for small-scale farmers' a far bigger and daunting challenge and issue that needs to be resolved.

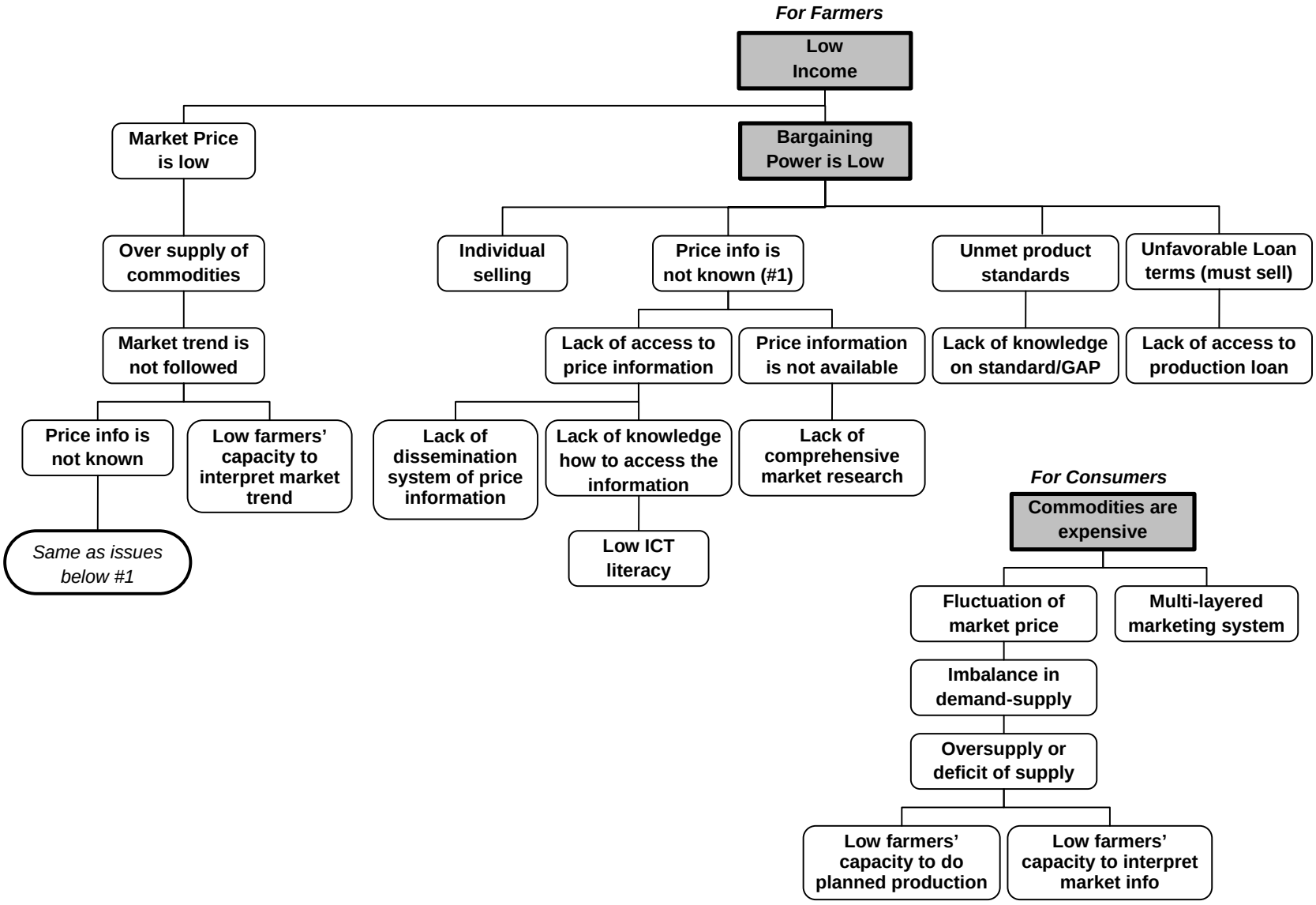


Figure: Problem Trees on Agricultural Market System

Issues, Problems and Constraints in Marketplaces

Looking at the local level, inefficient market operation systems at marketplaces are also claimed as causes of incoherent flow of commercial distribution. Especially in municipal or barangay wet markets a series of mutually disengaged negotiation-transaction occurs from one party to another. Essentially, commodities producers or middlemen bring into the marketplace may not necessarily be the ones that consumers want and those that are demanded may not be the once that are being brought.

For Institutional Buyers who play a pivotal role in the market system, it is necessary to obtain commodities in bulk, at a pre-determined timing and at a level of expected quality. However, it is not easy for Institutional Buyers to expect such commercial distribution by trading with individual traders and sellers in the local marketplaces.

In reality, shipping amounts of certain commodities are very much influenced by the weather condition, producers' farming practice or preferences of commodities, and deals by other buyers. In addition, there are only a few farmers' organizations or agribusiness and marketing cooperatives that can satisfy the demanded amount of commodities to begin with. What's more, multi-layered transactions and handling of commodities may increase the amount of post-harvest losses. Lack of a unified encoding system makes it difficult to deal with multiple markets or buyers who maintain different coding or tagging systems and methods for their products.

As commonly practiced in the Philippines, market operation is being handled and organized through face-to-face negotiations. Most of the time, especially in local wet markets, it is done without systematic arrangement. Even in the case of an advanced local market, the Sariaya Trading Center (provincial vegetable market) for instance, wherein only wholesale transactions are taking place, transactions are recorded on a paper -by-paper basis. In so doing, to see the aggregated data of market information by commodity becomes a difficulty. That is, there's difficulty in making a production plan based on the analysis of actual market trend.

Moreover, there are multiple transactions for both commodities and the payment from producers to marketers, marketers to traders/buyers, marketers to cashiers, cashiers to accountant, accountant to inspectors, accountant to farmers, etc. Everything is being managed on a manual and paper-by-paper basis. These areas are seen as problematic especially in trying to develop a more efficient handling, transaction and distribution process for vegetables and fruits marketing in the Philippines.

Project Outline:

The Market Operation and Information System Development Project is to address the inefficient value chain of fruits and vegetables in the Philippines. The Project will have two pillar components: 1) improvement of market operation systems of individual local markets by introducing ICT; and 2) advancement of market information systems by networking the information system of central and satellite markets, by which

producers can make rationale decisions of what crop, when, and how much quantity they are going to produce based on the end-side information of the value chain.

First of all, all the operation systems of merchandizing in the selected markets are to be digitized. In this system, transactions are managed through electronic data interchange prior to the actual/physical distribution of vegetables and fruits. By introducing such operation systems, unnecessary transactions in between producers and consumers are to be eliminated.

In principle, necessary information such as (a) name of producer, (b) type, size, quality, and quantity of crops, and (c) production places are coded in accordance with the national coding system maintained by AMAS. Then, all the expected transactions are to be integrated in the system so that bulk transactions to institutional buyers can be easily organized in less handling. With this system, actual transaction and physical handling of the commodities can be minimized. Thus, unnecessary post-harvest losses can be lessened.

By digitizing the transactions, there won't be a need for most of the paper works. In addition, volume of sales and cost can be easily analyzed by the type of commodity and cost items. Such analysis can be the basis for making necessary improvements in the market operations system.

As for the second pillar, agricultural market information systems in several market places (pilot markets) will be integrated as a network. This can even include the existing mega-markets in Metro Manila. Through the integrated market information system, market demand and transactions will be available online. With this accessible information, producers can make rationale decisions on production. Producers can even choose where to sell by themselves based on the market trend shown in the system.

The advantage of such systems for producers' side is to be able to comprehensively grasp the market trend and thus understand their relative advantages over the others. The advantage for buyers' side is to be able to find bulk amount of productions before sending out their trucks. Unlike the current system, wherein institutional buyers visit markets one by one to see if they can collect the necessary amount of quality commodities requested by their clients, having a comprehensive market information system would allow them to pre-determine and even order the commodities beforehand.

The market information system will facilitate two major functions of vegetables and fruits marketing: collection and distribution. On the collection side, the challenge is to deal with a large number of producers involved. Similarly, the challenge to the distribution side is to handle a great number of buyers. In these two vital functions, Information and Communications Technology, or electronic data interchange, can make the facilitation much smoother and easier.

Project Figure:

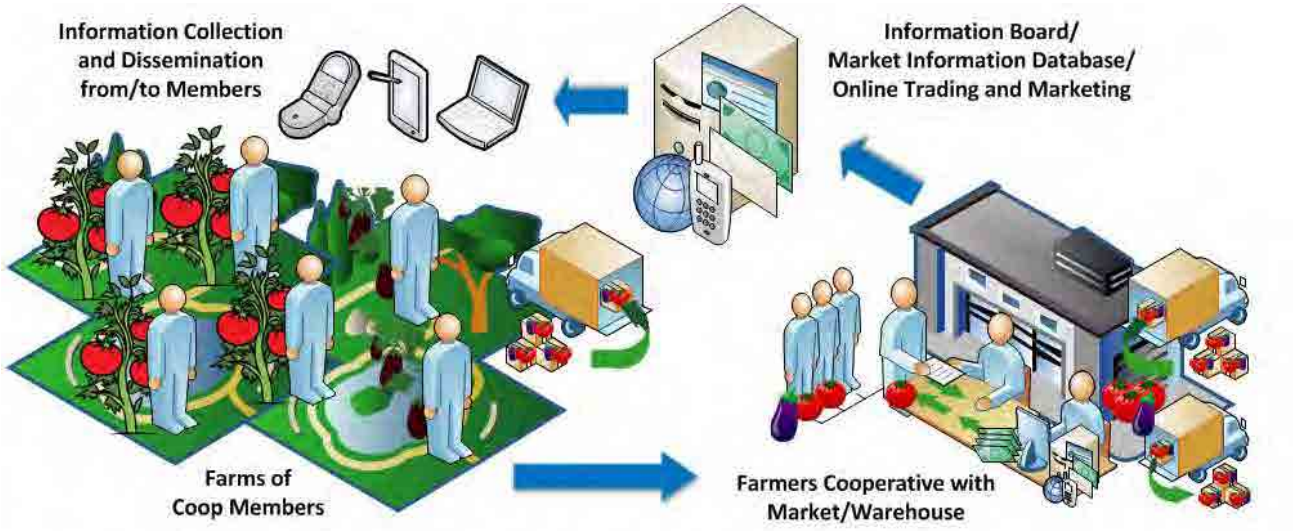


Figure: Digitized Marketing System

Implementing Agency/Tasks:

Agribusiness and Marketing Assistance Service (AMAS) – as the lead agency mandated to promote agribusiness investment and assistance to the agribusiness concerns of small and medium enterprises (SMEs) development in the urban and rural areas,[1] AMAS will lead the development process of the entire project cycle with Japanese counterparts. This includes (a) setting the criteria for site (market) selection; (b) identification of farmers' cooperatives; (c) establishment of new marketing framework; (d) preparation of electronic information services; (e) installation of equipment and software; and facilitation of trainings.

[1] http://www.da.gov.ph/about/staff_offices/staff_offices.htm#amas

After the selection of pilot provinces, identification of particular markets and farmer participants (farmers' cooperatives) will be organized in cooperation with LGUs in the area. In so doing, it is the responsibility of AMAS to facilitate the meetings with other stakeholders who are or who would be involved in the value chain associated with the selected market places. These stakeholders would include institutional buyers, supermarkets, other markets, wholesalers, local traders, middlemen and retailers. Through the needs assessment and stakeholders' analysis that will be conducted by AMAS, better marketing systems can be designed.

In addition, AMAS shall make full use of existing facilities and services, such as DA's price monitoring systems and information board like AFMIS or "e-Trading" of the e-Extension portal in coordination with other implementing agencies such as Agricultural Training Institute (ATI), BAS, and Information Technology Center for Agriculture and Fisheries (ITCAF).

Participating Agencies/Tasks:

Local Government Units (LGUs) – by mandate of the Local Government Code, the LGU, through its Provincial Agriculturist Office and Municipal Agriculturist Office, shall be the ones working on the ground to deliver the extension services to the farmer cooperatives and traders in the pilot area. The LGU will also work with AMAD in validating or accrediting the registration of the farmers' cooperative and the business registration of traders or agricultural suppliers. The LGU will work with AMAS and other participating agencies in coordinating, supporting, and regulating the marketing activities at the pilot sites.

Information Technology Center for Agriculture and Fisheries (ITCAF) – ITCAF was established as the core office with responsibilities to manage, operate and maintain ICT systems of DA and attached Bureaus and Agencies. Under the Agriculture and Fisheries Modernization Act (AFMA), ITCAF is mandated to manage the National Information Network (NIN) that links all offices and levels of the Department with various institutions and local end-users in order to provide easy access to information related to agriculture and fisheries.

In the project, ITCAF will closely work with AMAS and other agencies or ICT companies for establishment and management of agribusiness and marketing information through the information board of DA websites: AFMIS, e-Trading, and/or a new portal. In this process, ITCAF, in coordination with Japanese experts, will focus on technological aspects of market information management, including protocol, database, software and applications development.

Agricultural Training Institute (ATI) – mandated by the law as the extension arm of the Department, ATI together with AMAS shall facilitate the conduct of trainings and capacity building on the use of the ICT-based marketing mechanisms that will be put in place. In parallel with, if not in, the project, ATI will work with AMAS in facilitating the training of provincial agricultural extension workers and municipal extension workers to support the marketing activities. In addition, ATI is designated in administrating the DA's "e-Trading" portal site, wherein proposed agribusiness and market service information may be installed. In this

regard, ATI will work with ITCAF in the streamlining of services offered in AFMIS and e-Trading so as not to duplicate activities and avoid confusion among users or clients.

Cooperating Stakeholders/Roles:

Institutional Buyers/ Traders/ Middlemen/ Retailers/ Supermarkets – improvement of market operation and management systems is aimed at providing more efficient marketing mechanisms to both producers and buyers. Therefore, in addition to the operators of the market, farmers' cooperatives and institutional buyers, traders, middlemen, retailers and supermarkets need to be involved as the users of the market place. They are thus expected to participate, through the facilitation by AMAS and LGUs, in the planning process of the project components and also in the actual practice of market management.

Project Organizational Chart:

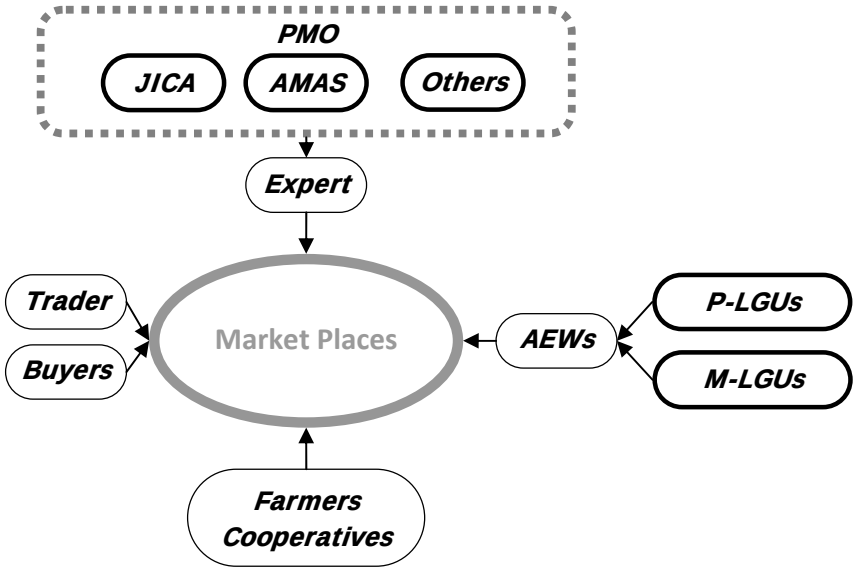


Figure: Project Organizational Chart

Advantage of ICT application:

Multiple layers of ICT applications are expected to be organized. First of all, commercial transactions of vegetables and fruits in the selected markets or trading centers will be computerized/digitized in order to manage the transactions more efficiently. By using the system, unnecessary paper works, which are currently a big burden to both the dealers and market administrators, can be eliminated. Furthermore, as transactions are already digitized, it will be easier to check and track the movement of commodities and prices, allowing a more transparent system. In addition, ordering and billing information can be easily aggregated through digital retrieval systems. In so doing, market matching with bulk buyers can be smoothly organized. This is expected to be a win-win situation both for producers and buyers.

Second, market information systems will be established in several markets, including the mega-markets of Metro Manila, and will be integrated in one central system. By using such a networking system, producers at each end of the distribution chain can identify which market offers higher prices. It also helps in determining the comparative advantages they potentially maintain among other production areas. This in turn helps farmers' cooperatives to make rational decisions on the actual products needed by the buyers.

The system is to be shared by multiple stakeholders, who currently maintain totally different coding system, if any. By implementing such a system, the national standard of merchandise coding is to be institutionalized. Based on the national coding standard coupled with electronic data interchange systems, producers can provide what is needed by the buyers at the end side of the value chain. Through the system implementation, unnecessary handling and transactions can be lessened. As a result, it is expected that producers and consumers can both enjoy fair and more stable prices.

If the project proves the effectiveness of the system, it can be further applied to the existing food terminals at barangay and municipal levels. As of February 2012, AMAS reports that 786 Barangay food terminals and 138 municipal food terminals are established nationwide. In addition, application of the same system can even be done with the AgriPinoy Trading Centers. These major trading centers are to be constructed nationwide in the next couple of years. At present, one AgriPinoy Trading Center is already being constructed at Benguet and 10 other possibole areas for Trading Centers have already been identified.

In general, AgriPinoy Trading Centers are a large scale marketplace where fresh agricultural produces, including vegetables and fruits, are to be traded. In the current plan, however, only the physical facilities are to be constructed. There are no management systems or operation systems included yet.

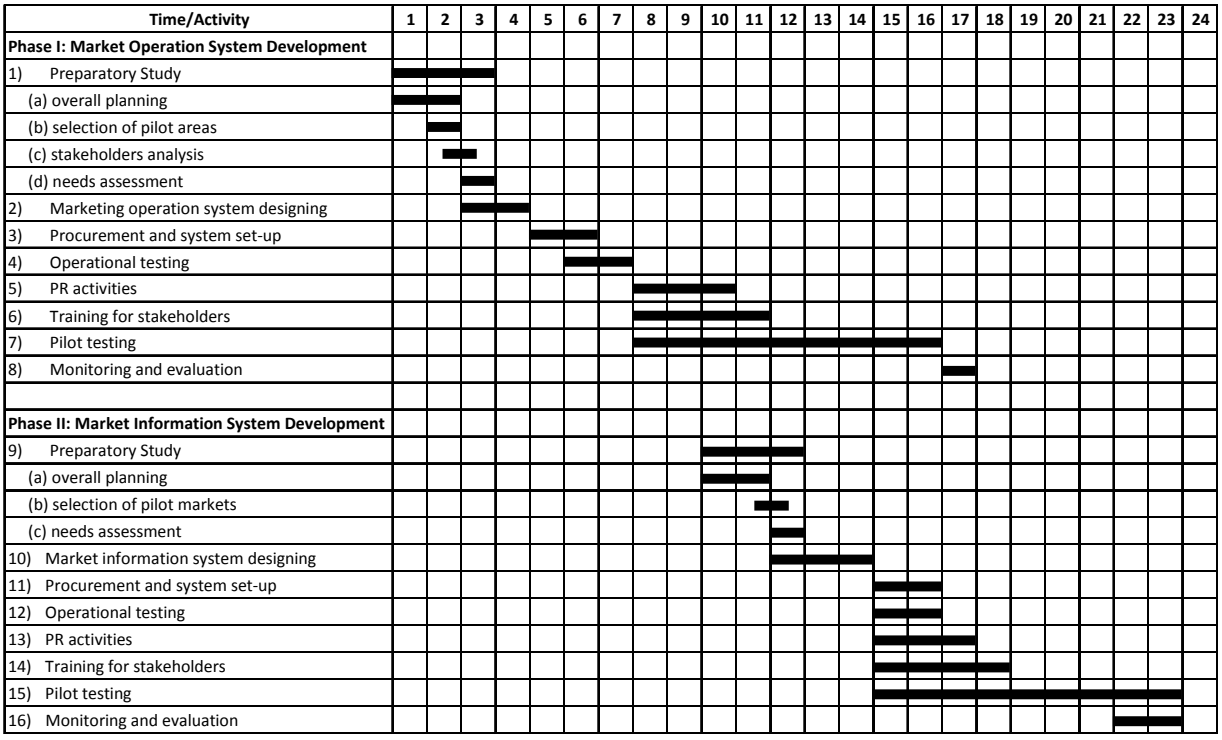
Time Frame: Two years (24 months)

Phase I: Market Operation System Development

1) Preparatory Study for (a) overall planning; (b) selection of pilot areas; (c) stakeholders analysis; and (d) needs assessment (3 months)
2) Marketing operation system designing (2 months)
3) Procurement and system set-up (2 months)
4) Operational testing (2 months)
5) PR activities (3 months)
6) Training for (a) market administrators/operators; and (b) Users (farmers' cooperatives, traders, suppliers, etc.) (4 months)
7) Pilot testing (9 months)
8) Monitoring and evaluation (1 month)

Phase II: Market Information System Development

9) Preparatory Study for (a) overall planning; (b) selection of pilot markets; and (c) needs assessment (3 months)
10) Market information system designing (3 months)
11) Procurement and system set-up (2 months)
12) Operational testing (2 months)
13) PR activities (3 months)
14) Training for (a) market administrators/operators; and (b) Users (farmers' cooperatives, traders, suppliers, etc.) (4 months)
15) Pilot testing (9 months)
16) Monitoring and evaluation (2 months)



Expected effect/outcome/impact:

- Market-oriented production of vegetables and fruits
- Reduced handling of vegetables and fruits, leading to reduced post-harvest losses
- Reduced transaction cost between producers and end-side buyers
- Stabilized market trading (quality, amount and price)
- Improved bargaining power of producers/ farmers' cooperatives
- Increased income for farmers' cooperatives and members
- Improved access and networking between buyers and sellers

- Establishment of trading protocols and trading/quality standards
- Faster transactions (ordering, delivery, payment) through electronic data interchange prior to the physical transactions
- Real-time market analysis

Expected number of beneficiaries:

Pilot Areas: To be identified when stakeholder analysis is conducted.

Direct Beneficiaries: In general, members of farmers' cooperative who produce vegetables and fruits, as well as buyers and traders who would use the improved marketing system.

Indirect Beneficiaries: Include market participants who uses the market information system through the network, particularly those who retrieve market information from the system to make better production plan or trading strategies.

Necessary Inputs

1) Human resources

Japanese Side:

a) Team Leader/ Agribusiness and Marketing
b) Agricultural marketing system development (1)
c) Agricultural marketing system development (2)
d) Coordinator/

Philippine Side (National Level)

a) Agribusiness planning
b) Market analysis
c) ICT System development
d) Agricultural development
e) Institutional development
f) Coordinator

Philippine Side (LGUs)

a) Provincial Agricultural Extension Officers
b) Municipal Agricultural Extension Officers

2) Equipment/Facilities

a) Personal computer (2 per market)
b) Computer server (1)
c) Project management vehicle (1)
d) Other market facilities (i.e. digital media signages (for price bulletins and information board), barcoding equipments,)

3) Training Cost

    a) as required

Necessity of the amendment of existing laws/regulations, change of organizational set-up, etc.

- Not Applicable

Possible areas (portion) wherein participation of private sector are expected:

- *Marketing System Development Companies* – Japanese Agri-ICT vendors have gained advanced experiences in the field of marketing system development. Their products are even introduced in the marketing and distribution system of big supermarkets to manage an entire process of ordering, purchasing, and delivering agricultural produce. These companies also have much experience in improving the operation and management system of small to large market places by digitizing the system using ICT. Therefore, it should be considered to involve such companies as partner entities for developing market operation and information systems in the pilot market places. It would be beneficial for Philippine stakeholders—such as institutional buyers, supermarkets and other suppliers— to utilize such systems that have been tried and improved through the actual usage in Japan.

Mode of participation by private sector and its implementing method:

- *Marketing System Development Companies* – Public-Private Partnership (PPP). Participation can be realized by inviting individual system engineers from those companies who have enough experiences in the system design in agricultural and marketing field. They can be involved in the project as the members of the project management team.

Possible areas (portion) wherein Japan's ODA are expected:

- Dispatch of long-term agribusiness and marketing expert for needs assessment, overall system design, and application of trading standards. Since farmers are required to have capacity on the production which is harmonized with marketing trend in quality and quantity, trainings for farmers are expected to be initiated by Japanese expert.
- Dispatch of long-term agricultural marketing system development experts for protocol designing, system design and development, database development, and infrastructure set up
- Provision of ICT-related infrastructure or equipment especially in the target areas
- Funding for trainings and other operational costs, including the kick-off training in use of new system, promotion, and development of modules and manuals that can be used for future replication

Scheme (system) under Japan's ODA and its implementing method:

- Japan's agribusiness and marketing sector maintains the relative advantages of marketing system development using ICT. For instance, information system developers in agribusiness sector have developed such marketing systems for big wholesalers, importers and/or supermarket so as to manage every transaction along the value chain. Those systems are often introduced as a package covering the whole chain and modified to be suited to the particular circumstances of the commodities or the stakeholders. In this background, introduction of such a system into the selected market would be a potential idea of operation—BOP, in which JICA will finance the private firms' activities.
- Another possible scheme of Japan's ODA would be of a Technical Cooperation Project (TCP), in which some Japanese experts are assigned to support the project activities organized with Philippines counterparts. In light of the current setting of Philippines' agribusiness and marketing sector, Japan still maintain a relative advantage in the sector of marketing system development using ICT. The possible areas of expertise are: 1) team leader/agribusiness and marketing; 2) market information system development (1); 3) market information system development (2); and 4) agricultural value-chain analysis. In this TCP, experts are expected to analyze the strengths, weaknesses, opportunities, and threats of current market to identify the area of improvement. After which, experts are to design the market operation system of the selected market or pilot site. Based on the designed operation system, ICT platform and operation guidelines will be formulated. Stand alone systems developed in each market will then be streamlined together as one system. This would include the ones in central markets in Metro Manila, serving as the basis of market analysis for producers.

Expected issues/problems upon the implementation of the Project and its possible solutions:

Looking at the bigger picture of agricultural production and marketing system, small-scale individual farmers have always been placed in a disadvantageous position. This is mainly due to lack of market information, insufficient negotiation power with traders/buyers, and inadequate funding. This project is therefore to make the market information available to the producers, by which farmers can make more rational decisions and thus fetch higher income.

However, lack of market information is not the only cause of producers' problems associated with agricultural marketing. To make the best use of market information, producers need to be better organized as farmers' organization or farmers' cooperative. In so doing, they can do crop programming as a group and thus, facilitate group negotiation that is much better than before. A strong farmers' organization is the key factor for the successful implementation of the project.

To begin with, therefore, it is necessary for the project to find out such existing organizations that have concrete institutional foundation in doing producing, selling, and marketing as a group activity. As the project is to generate a successful practice of marketing operation and information systems, it should not give higher priority to the "poorest of the poor" type farmers but strong farmers' organizations. It is further expected that

institutional development activities will be organized by the implementing agencies, aside from but in tandem with the project activities, so that the project can be more focused and successful.

Other proposed projects (under this ICT Study) which can be combined, and its effect:

- *Online Marketing*– Online Matching of Sellers and Buyers in Agricultural Commodities
    - Online marketing system can be incorporated as a part of the marketing operation and information systems to be introduced in the project. The online marketing system would enable farmers' organizations (or financially-viable individual farmers) to sell their high value crops directly to the end consumers or a big buyer with relatively better selling price.
    - This can be organized by the advancement of current AFMIS platform or DA's "e-trading" platform in which market trends of major agricultural commodities and registry of major wholesalers are readily available to date.

Attachment-2 Proposal on Priority Project (Irrigation)

PROJECT PROPOSAL
(Irrigation Development)

Sub-Sector: Irrigation

Proposed Project: Improving Accuracy and Transparency in Irrigation Service Fee (ISF) Collection Using Mobile Phone

Present condition of Sub-Sector:

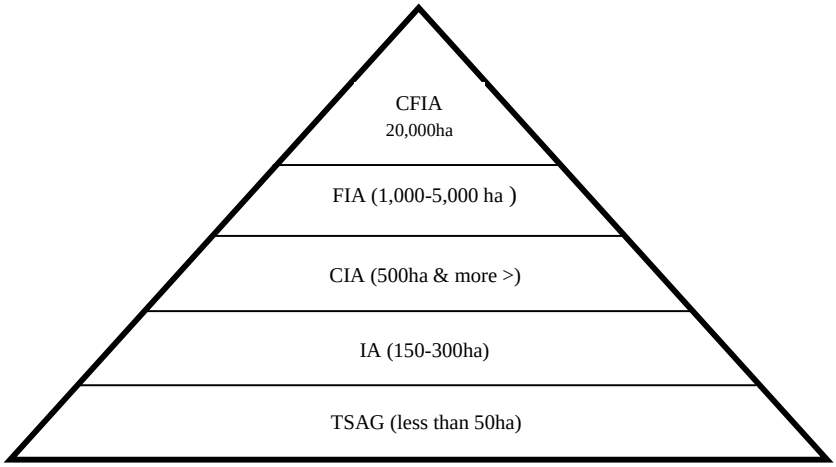
1) Present condition of the Irrigation Development in the Philippines

Irrigation development in the Philippines is vested upon the National Irrigation Administration (NIA) by Republic Act No. 3601, amended by Presidential Decree 552, further strengthen by Presidential 1702.

The estimated total irrigable area in the country is about 3.12 million hectares, where 1.54 million hectares is the irrigation service area and the 1.58 million hectares is the remaining potential area to be developed. Irrigation service area is comprised of three type of operational scheme; National Irrigation System (NIS), Communal Irrigation System (CIS), and Private Irrigation System (PIS) with an area of 767,000 hectares, 558,300 hectares, and 217,300 hectares, respectively.

NIS's is about 49% of the irrigation area developed. Its operation is completely under the management of the NIA including the maintenance of the irrigation facilities. A mutual partnership through participatory scheme in operation and maintenance was developed under the contract schemes involving Irrigators Associations (IA). Lately, this mutual partnership was brought to another level by management sharing through irrigation management transfer (IMT) program. In the IMT program, IAs are capacitated to manage by level on the irrigation facilities starting from farm level to lateral canals on activities like ISF collection, irrigation water supply management, preparation of list of irrigated and planted areas, and cropping calendars, among others. The IAs is consist of different level of organizational structures dependent to size of irrigated area, namely; turnout service area group (TSAG), IA, council of IA (CIA), federation of IA (FIA) , and confederation of IA (CFIA) as shown in Figure 1.0 IA Structure.

Figure 1.0 IA Structure



For CIS's, about 36% of irrigation area was developed, the development is assisted by the Department of Agriculture (DA), Local Government Unit (LGU), and NIA for technical, institutional, and financial aspect. This is managed by IAs and totally independent in operation and maintenance, except for major rehabilitation i.e. diversion dam. For PIS, about 15% of irrigation area developed, this is a privately operated and maintained small scale irrigation system owned by private individual or institution. This is either a diversion, check, inlet or pump method of extracting source of irrigation water supply.

Institutional development is among the task of the NIA, an institutional development unit is tasked to organized and strengthened irrigators association. Currently, there are 6,659 total of organized IAs with 830,913 total members, and divided into following; NIS has 2,832 IAs with 513,002 actual members and CIS has 3,827 IAs with 317,911 actual members.

2) Irrigation Service Fee (ISF)

Under the Republic Act 3601, "An Act Creating the National Irrigation Administration", this authorized the agency "to collect from the users of each irrigation system constructed by it such fees as may be necessary to finance the continuous operation of the system.."

Irrigation Service Fee (ISF) collection is the main source of revenue of the NIA for its operation and maintenance expenses, the irrigated rice farmers are obliged to pay irrigation service fee for the utilization of irrigation facilities. The ISF varies on type of irrigation scheme provided in the area (e.g. diversion, reservoir, and pump). Basis of ISF collection is shown in Table 1.0.

Table 1.0 Basis of ISF Collection

Scheme of Operation	Crops	Wet Season	Dry Season	Total
		(sacks/ha)	(sacks/ha)	(sacks/ha/year)
1. Diversion	Rice	2.0	3.0	5.0
	Other Crops	60% Rate of Palay	60% Rate of Palay	
	Fishpond	Cash equivalent to 5sacks	Cash equivalent to 5sacks	10
2. Reservoir/ Storage	Rice	2.5	3.0	5.5
	Other Crops	60% Rate of Palay	60% Rate of Palay	
	Fishpond	Cash equivalent to 5sacks	Cash equivalent to 5sacks	10
3. Pump	Rice	2.0-10.0	2.75-12.0	4.75-22.0
	Other Crops	60% Rate of Dry Palay	60% Rate of Dry Palay	
	Fishpond	Cash equivalent to 5sacks	Cash equivalent to 5sacks	10.0
For 3rd Cropping, the rate is 1 Sack per Hectare.				

3) Rationalization Plan and Irrigation Management Transfer

Executive Order No. 366 directs the implementation of the rationalization plan to streamline the bureaucracy in the government agencies in order to improve the quality and efficiency of government service. The rationalization plan was approved under Executive Order No.718 S2008, authorizing the phased implementation of the rationalization and the availment of the incentive package. Transition plan was formulated for five (5) year to ensure smooth transition of the rationalized structure. This scheme was synchronized by targeting several irrigations systems to be rehabilitated and planned to transfer annually to the Irrigators Association (IA) under participatory development.

To ensure sustainability of the rationalization and irrigation management transfer (IMT) through participatory approach, NIA obtained funding support from the World Bank for the Participatory Irrigation Development Program (PIDP). In the tentative list, there are about 3,019 positions made available for new organizational structure and about 1,107 positions subject for phase out.

The NIA continuously prioritized the rehabilitation of the national irrigation system (NIS) because of its large areas in support to the IMT Program. Most of the NIS has defective and deteriorated facilities, some irrigations systems never undergone rehabilitation since it operated a decade ago. In Y2009, the Asian Development Bank (ADB) and the Japan International Cooperation Agency (JICA) had joined its interest to assist the Government of the Philippines in funding the major rehabilitations works for selected NIS under Irrigation System Operation Efficiency Improvement Project (ISOEIP) and National Irrigation System Rehabilitation and Improvement Project (formerly Sector Loan for Rehabilitation and Improvement Project), respectively.

IA's are adequately capacitated through series of trainings and workshops. The JICA, contributed to the strengthening and capacity building of the IA under the Technical Assistance Stage 2 (TCP2) in the country in support to IMT Program. IMT Program consists of different level called model as shown in Table 2.0.

Table 2.0 IMT Model, NIA and IA Responsibilities

IMT Model	NIA Responsibilities	IA Responsibilities
Model-1	♦ Manages the entire system ♦ Compensate IA for canal maintenance ♦ Provide share to IA from ISF collection under agreed sharing arrangements.	♦ Maintains specific length of canals like cutting grasses on canal embankments, removal of debris from structure inlets and remedial measures to prevent overtopping of canals. ♦ Operation activities such as discharge or water level monitoring on specific points of the system ♦ Preparation and submission of LIPA to NIA ♦ Distribution of ISF bills, campaign for payment and assist in collection of ISF.
Model-2	♦ Manages the main system from headwork to the main canal up to the main gates of lateral canal. ♦ Compensate IA for canal maintenance ♦ Provide share to IA from ISF collection subject to negotiation with the IA based on the concept of fair sharing of burden and benefits.	♦ Manages the laterals, sub-laterals and terminal facilities. ♦ Undertake minor repair, maintenance, O&M planning and monitoring. ♦ Equitable distribution of water from the lateral headgate to the different turnouts. ♦ Preparation and submission of LIPA to NIA ♦ Preparation of individual ISF bill and collection of ISF ♦ Establishment and maintenance of Irrigation Fee Register (IFR) of individual farm lot.
Model-3	♦ Manages the headworks and portion of the main canal down to the junction of the first lateral (usually named lateral A). ♦ Compensate IA for canal maintenance. ♦ Provide share to IA for ISF collection subject to negotiation with the IA based on the concept of fair sharing of burden and benefits.	♦ Equitable distribution of water of the main canal down to the different laterals and sub-lateral head-gates and all turnout inlets. ♦ All maintenance works on the irrigation facilities under the coverage ♦ Preparation and submission of LIPA to NIA. ♦ Preparation of individual ISF bills and collection of ISF. ♦ Establishment and maintenance of IFR.

IMT Model	NIA Responsibilities	IA Responsibilities
Mode-4	♦ Completely transfer the management of the entire system including the headworks. ♦ Responsible for monitoring and evaluation, collection of seasonal or annual payments from IA. ♦ Provide technical assistance as maybe required by the IA.	♦ Manages the entire system and becomes responsible for all O&M activities. ♦ Setup its own ISF rates provided such rates shall be sufficient to cover its O&M costs and payment of each obligation to NIA. ♦ Prepare its own improvement and modernization program. ♦ Pay to NIA a technical assistance fee for the cost of supervision and amortization cost in the major repair and maintenance of the system.

Existing Issues, Problems, and Constraints:

The confronting issue in the irrigation development in the Philippines is the low irrigation service fee (ISF) collection. Prior to IMT, the NIA and IAs participatory approach management partnership is bounded by contract agreement. The ISF collection remittance scheme is brought to regional office level only. Under this remittance scheme, the IA's are promptly compensated in its management contribution of the irrigation system. The NIA changes its policy on the remittance scheme naming "ONE BASKET POLICY", means all ISF collection shall be forwarded to Central Office. One of the reasons for this implementation is to support other irrigation systems or regional offices for their O&M. However, two years ago, the "one basket scheme" was already retracted back to its original scheme, which the former scheme borne more negative effect than the original scheme. With the effect of the Rationalization and implementation of the Irrigation Management Transfer (IMT), this obligatory return to the original policy of holding the big percentage of ISF Collection at Regional Office for their disposal particularly for PS and MOOE. Further, this is supported by under the MC 47 S2008 "IMT Policy and Implementing Guidelines" and NIA Board of Directors Resolution No.7497-08 S2008.

A need to improve the ISF Collection Efficiency is a high priority from the government. The ISF is the main source of fund to cover the operation and maintenance cost such as personal services (PS) and maintenance operation and other expenses (MOOE). In the ten (10) year data as shown in Table 3.0, the collection efficiency is about 55% and the ISF income is not enough to shell out the expenses incurred for combined PS and MOOE.

Table 3.0 Actual Irrigated, Benefitted, Income, Expenses and Net Income

No	Year	Service Area	Two Croppings Service	Actual Irrigated (W&D)	Benefited Area (W&D)	INCOME	EXPENSES	INCOME-EXPENSES
						ISF	PS+MOOE	
		('000 ha)	('000 ha)	('000 ha)	('000 ha)	(million pesos)	(million pesos)	(million pesos)
1	2000	689	1378	950	848	393.19	1,800.78	-1,407.59
2	2001	689	1378	979	891	455.11	1,618.35	-1,163.24
3	2002	689	1378	953	860	626.11	1,925.95	-1,299.84
4	2003	690	1380	954	854	661.64	1,948.08	-1,286.44
5	2004	690	1380	966	898	740.95	1,555.09	-814.14
6	2005	696	1392	973	905	755.77	1,754.04	-998.27
7	2006	705	1410	965	864	773.51	1,962.01	-1,188.50
8	2007	706	1412	970	906	789.84	2,013.82	-1,223.98
9	2008	729	1458	1089	986	892.14	3,129.01	-2,236.87
10	2009	746	1492	1137	929	1,105.92	2,696.10	-1,590.18

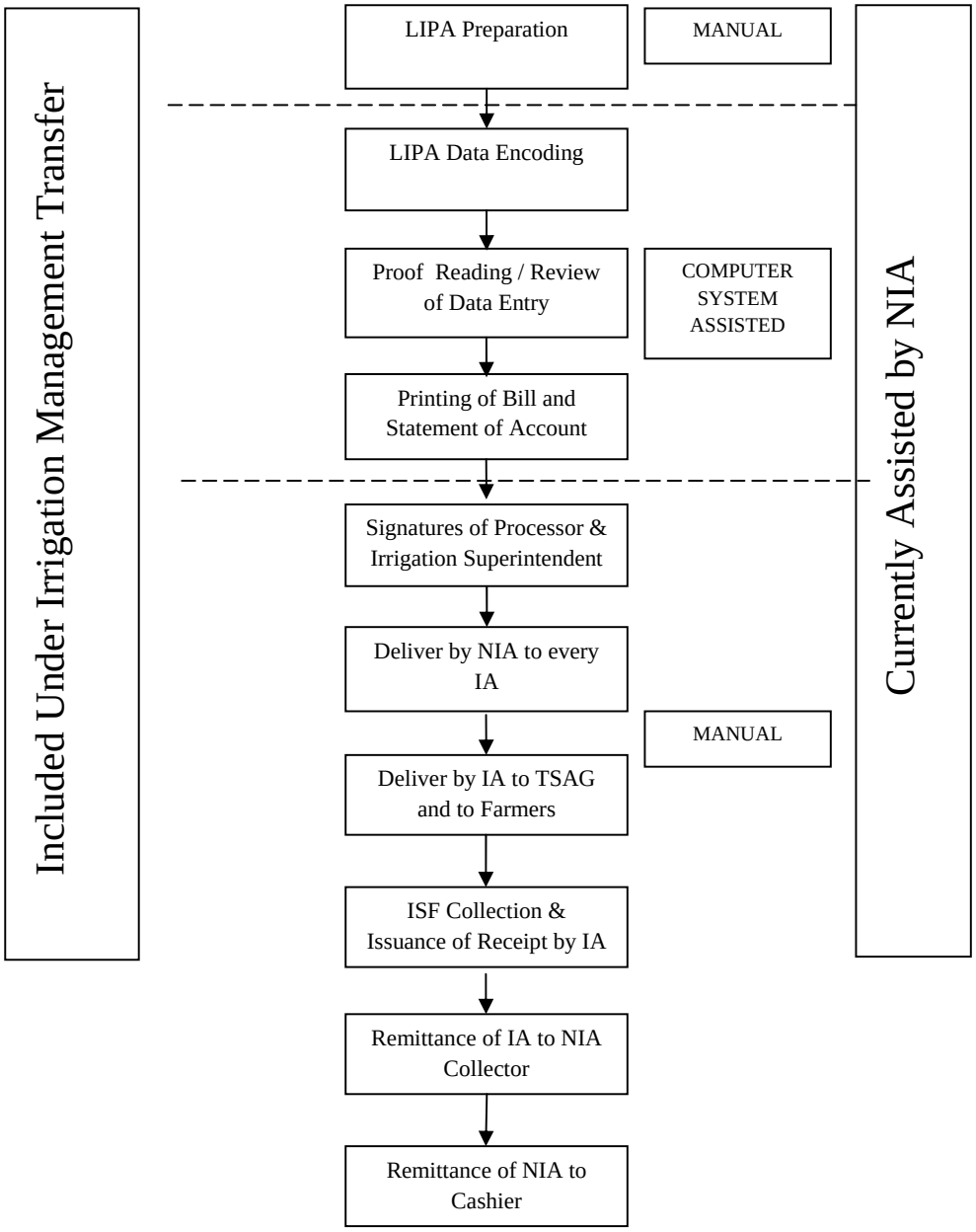
Sources: NIA Corporate Plan for 2000-2009 (NIA Annual Report)

MOOE- Maintenance, Operation, and Other Expenses

Others-Equipment Rental, Management Fee, CIS, and Pump Amortization

At present, despite of the IMT transition plan and extensive training, majority of the IA's are still on the learning process. The billing preparation and collection system for the ISF is regularly prepared at the irrigation system office except for the preparation of LIPA. For IA's at IMT-Model 2, the accuracy of data entry is not guaranteed, due to computer literacy difficulty. The inaccuracy in data entry would make the work double in checking and reviewing of encoded data, this was manifested in one of the irrigation system visited during the ICT survey. For now, generally, NIS is assisting the IA's in the billing process. In the collection system, distribution of the billing and collections are still assisted and monitored by NIS representative on some IA's with unsatisfactory performance. The billing and collection system is basically defined in Figure 2.0.

Figure 2.0 Flow Chart of ISF Billing Process



In survey to selected NIS's, Porac-Gumain IS, Upper Pampanga River Integrated IS, Tigman-Hinagyaman-Inarihan IS, and Rinconada Integrated IS, some of the reasons affecting the low ISF collection efficiency and non-payment of ISF are illustrated in Table 4.0.

Table 4.0 Challenges Affecting ISF Low Collection Efficiency and Non-Payment

No	PARTICULARS	CHALLENGES
1	SERVICE AREA / FIRM UP SERVICE AREA (FUSA)	a) Gap in area between service area due to flooding, drought, water scarcity, defective construction implementation, other usage of water source
		b) Uncertainty of area due to land conversion
		c) Some additional areas may be reported, partially reported, and not reported
2	LIST OF IRRIGATED & PLANTED AREA (LIPA)	a) Portion of irrigation facilities are under rehabilitation,
		b) Some irrigation facilities are under repair,
		c) Immediate damaged irrigation facilities ,
		d) No technical basis on measurement of irrigated and planted areas or measurement of areas rely on farmers' hired contractors for farming activities using ropes/string/survey chain
		e) Lack of irrigation water, No basis on declaration of scarcity of water
		f) Measurement of irrigated and planted areas relied on farmers declaration
3	BILLED AREA	a) Crop Failure b) Pests Infestation c) Natural Calamity (Flood, Drought, Typhoon, Heavy Rain, Strong Wind)
4	HARVESTED AREA	
5	BENEFITTED AREA	
6	ACTUAL ISF COLLECTED AREA	a) Lack of motivation among NIS Collectors
		b) Non-location of farmers during collection
		c) Inconvenience of time and high fuel expense incurred by collector
		d) Weather condition affects collection
		e) Collectors are "On-Leave" either on family or business matters
		f) Delay in delivery of bills
		g) Political leaders advocating non-payment of water
		h) Attitude and willingness of farmers to pay ISF
		h) IAs displeasure due to delay of payment of incentives
7	UNCOLLECTED ISF AREA/ BACK ACCOUNTS	a) Farmers not satisfied on NIA Services
		b) Farmers priorities payment on debt or owed financial responsibilities from Traders or informal lenders with high interest rates
		c) Tenant farmers declare bankrupt
		d) Late or partial payment due to delayed payment by traders
		e) Farmer is waiting for good prices after the harvest
		f) Non-remittance of ISF-Collector to NIA.
		g) Delayed remittances of ISF-Collector to NIA
		h) Cannot afford to pay due to Small Land Holdings and Low Production
		i) Farmers located at canal tail-end difficulty in receiving irrigation water

The result of the survey shows that disparity between the irrigated paddy rice area and ISF collection is attributed to "man-made" and "environment or act of nature" interventions. Summarized indentified challenges affecting the low ISF collection is attributed to a) accuracy of the declared irrigation service area or the firmed-up service area, b) accuracy of declared list of irrigated and planted area, c) transparency in

irrigation service fee collection, d) convenience in ISF collection and remittances, e) economic sustainability of farming, f) efficiency in irrigation water delivery and utilization, and g) attitude of farmers.

Project Outline:

Mobile phone is widely used in the Philippines. According to statistics, mobile phone subscribers are about 79.9 million. One reason that attracts people to acquire mobile phone unit is the affordability of the unit and the airtime load, which low-income earners can still avail. Besides, wireless network facilities production cost is lower than the fixed-line network and available in short span of time.

Private telecommunication for mobile phones in the Philippines is dominated by four (4) carriers, namely; Smart Communications, Globe Telecom, Sun Cellular, and Red Mobile (Y2005). The speed of the wireless mobile phone varies in the market, namely; second 2nd generation (2G) or the Group Special Mobile (GSM) operating at 400-1900MHz is using both text messages and voice call. An evolution of 2G (2.5G) follows by deployment of the high speed circuit switched data (HSCSD), GPRS, and EDGE operating at maximum capacity range of 38-472Kbps using text messages and voice call. Third generation (3G) is operating at 1929MHz-2170MHz, using text messages, voice call, camera, and A-GPS.

In the survey, similar information and communication technology is flooding the market using the mobile phone as medium to avail convenience, expediency, economy in exchange of counterproductive activities. Sending text messages to families, relatives, and friends are the primary traffic using airtime load, followed by voice call and other usage of the mobile phone. E-commerce is gradually picking demand in the market, for example, sending allowances to children studying in faraway places within the country. Though systems varies depending on the service provider, basically mode of these mobile payment are categorized into two ways : a) To direct remittance from user's account at commercial bank, b) using virtual money (electric money) to make transaction between cell phone user and bank account holder in which cell phone user can exchange money to eclectic money at retailer shop, to send to bank account holder.

By using function/services of mobile payment method above to the ISF collection, it will contribute to the improvement of ISF collection efficiency especially farmers in remote area far from NIA/IA Office. During the field survey made in Porac-Gumain NIS and UPRIIS, it was found out that 57% of farmers usually pay ISF at their home (waiting to Collector to visit), whole 43% of farmers go to NIA/IA Office to pay ISF. Among this 43% farmers, 14% of farmers pay more than 50 Pesos for transportation to go to NIA/IA Office. By minimizing there payments by introducing mobile payment, the project will contribute on the motivation of farmers on ISF payment, for the improvement of collection efficiency in the end.

The conveniences of using the mobile phone can also be transformed into an opportunity for the NIA Management and IA Offices. Generally, there are two (2) types of attitude of clients need /person, first is the good payer and the second is the falter payer. On the positive side, NIA and IA do not give much effort and time to collect from good payer-farmer. Instead, a mobile phone can be very useful and convenient to remind and collect payment of the ISF. To this effect, the NIA and IA have sufficient time to devote and persuade the falter payer-farmer to pay ISF.

It is true that some farmers may have tendency to be reluctant to use ICT gadget such as mobile phone (especially in elder generation), therefore the project will offer incentive to mobile phone payer by

broadcasting through SMS various information which will contribute to rice production, such as the situation of canals and water delivery, schedule of water delivery, weather forecast, cropping calendar, time and venue of IA Assembly, etc. By such, the project will enhance utilization of Mobile phone for ISF payment purpose.

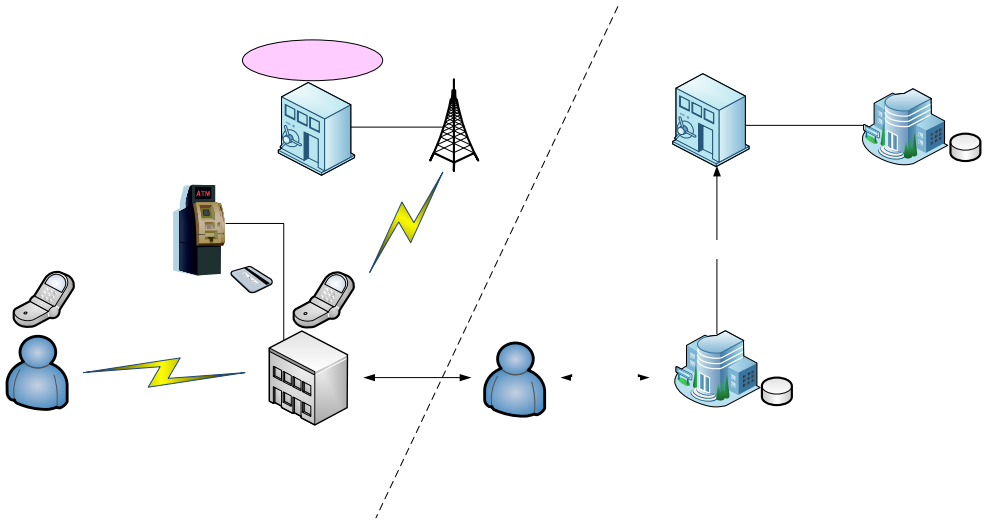
During field survey, NIA collectors expressed their opinions that problem of ISF billing is not on preparation of bills, but on physical delivery of bills which takes time and transportation cost. Therefore, billing amount can be included to the SMS information conveyed to farmers stated above. By this, farmers are informed on their ISF amount to be paid even before the physical delivery of bill (in paper) and prepare cash for the payment, which also contribute to the improvement of collection efficiency of ISF.

This e-commerce or e-trading can be adopted in the irrigation system operation in way contribute to increase in the ISF Collection or Revenue. This may trigger encouragement to farmers as tool in rice farming management by connecting to rice technology environment for the increase rice production despite of small land holdings, hence can afford paying ISF. Furthermore, transaction using Mobile Phone can also create sense of financial management at household level, which will lead to the payment for other public services as well as payment for agricultural insurance and micro-finance.

However, it shall be noted that improvement of the irrigation efficiency in delivery of water relative to scarcity of water sources will be considered equally important. Nevertheless, this is taken care by the rehabilitation program by NIA's own effort or through foreign assisted projects such as NISRIP, ISOEIP, and PIDP.

This proposed project is to complement and coherent to the Department of Agriculture ICT Program on the establishment the Unified and Enterprise Geospatial Information System (UEGIS) under the office of Information Technology Center for Agricultural and Fisheries (ITCAF).

Conceptual Figure of Project Set-up:



Implementing Agency:

The implementing agency is the National Irrigation Administration (NIA). The NIA is a government owned and controlled corporation (GOCC) and its operation is in accordance to RA 3601. Integral to its existence is the collection of irrigation service fee to cover the personal services, and maintenance, operation, and other expenses.

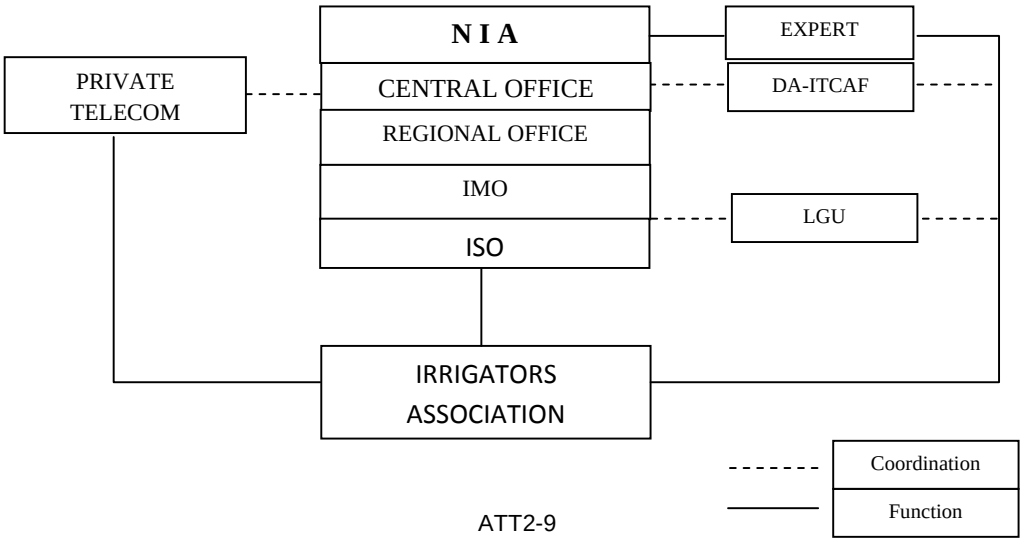
Participating Agency:

The participating agencies include Department of Agriculture (DA), DA Information Technology Center for Agriculture and Fisheries (ITCAF), Private Telecommunications, and Local Government Units. The agricultural sector in the Philippines is under the DA as mandated by law.

Task of Each Implementing/Participating Agency:

Agency	Task of Each Participating Agency
National Irrigation Administration	• As implementing agency, take overall responsibility of the Project • Take necessary coordination works with other agencies
Department of Agriculture	• To provide necessary assistance to NIA and IA • To implement the Agriculture and Fisheries Modernization Act (AFMA Law)
DA-Information Technology Center for Agriculture and Fisheries (ITCAF)	• Formulate plans and strategies to keep IT resources updated, • To ensure that LGUs and Users have the access to National Information Network (NIN) • To Implement UEGIS
Private Telecommunication Provider	• To provide SMS Communication Facilities such that ICT is accessible by farmers/IA's • To provide training to trainors for the use of "mobile phone" in e-payment using e-money for e-wallet. • To provide accreditation of e-money providers
Local Government Unit (LGU)	• Support the development basic services in coordination with National Government (e.g. irrigation, information services) as mandated in Local Government Code. • Maintain peace and order

Project Organization Chart:



Advantage of ICT Applications:

In general, the advantages of the ICT applications in irrigation development and operation are the ease in accessibility of data, report, and information inside the databank/database, which is essential in irrigation management decision making. The databank/database will help the IA Federation an effortless and user's friendly access of information from their respective area of responsibilities. Among the advantages of using ICT in the irrigation development and operation are;

- Provide wide dimensions for research and development (R&D),
- Provide virtual real-time in transmission information/data (e.g. ISF processing),
- Provide virtual flexible, extensive, organized, and centralized data bank of agricultural information for better management,
- Provide expeditious agri-business transactions (e.g. ISF billing information and remittances),
- Provide transparency of information to the public,
- Provide global linkages,
- Provide virtual accuracy in geodetic ground survey using Global Navigation Satellite System (GNSS) an Global Positioning Unit.

Time Frame:

Stage	Items	Milestone	Period								Tasked Agency		Remarks
			Year 1				Year 2						
			1st Qtr	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr	2nd Qtr.	3rd Qtr.	4th Qtr.	Main	Sub	
Preparation	Preparatory Study	Understandings on the Situation of ISF Collection									NIA	DA	
	Needs assessment on ISF-CE Constraint	Data for Site Selection									NIA	DA, LGU	
	Selection of Sites for Pilot Implementation	Pilot Implementation Plan									NIA	DA, LGU	
Training	Training on Trainors	Training on mobile banking									NIA	Private Firm, DA-ICTAF	
	Training on IA members	Familializatoin on new payment method									NIA	DA, DA-ITCAF, LGU	
Set-up	Accreditation of Selected IA as retailer of Electric Money	Set-up									NIA	Privatre Telecom-Firm	
	Public Relation Activities (Campaign)	To inform IA members the advantage of new payment method									NIA	Privatre Telecom-Firm	
Implementation	Pilot Implementation	Operationalizaion of new payment system and feedback									NIA	all other agencies	
Expansion	Evaluation of Pilot Project	Ovservation on ISF-CE improvement									NIA	all other agencies	
	Strategization for Implementation Nationwide	Strategic plan suitable for each NIS									NIA	DA	
Private Sector	Seminar and trainings	Financial management of mobile payment											
ODA	Assignment of Expert(s)	Guidande for Financial management of LID											
	In Country Training Program	Introduction of Financial management of LID											

Expected Effect/Outcome/Impact:

The effect or impact on the utilization of mobile phone and in irrigation system operation and maintenances has domino effect on the irrigation services provided by the NIA to the end users/client of irrigation services or the farmers/IAs. The expected effect or impacts would be to;

- Contribute in the increase of irrigation service fee revenue,
- Data management on ISF payment,
- Contribute in the literacy of ICT application in irrigation,
- Improve the database in irrigation system management,
- Contribute in the accuracy and transparency in irrigation system management,
- Contribute in the acceleration of IMT Program

Expected Number of Beneficiaries:

The expected beneficiaries for the increase in ISF collection are the farmers and the NIA employees under the IMT program. In the irrigated rice farms, actual number of registered IA farmers for NIS is 499,898. Added to this is the total number of personnel for the whole NIA with an estimated number of 6,268 as of December 2010.

Necessary Inputs:

The basic inputs necessary are the resources required for the smooth implementation of the projects. In the aspect of the Irrigators Association (IAs), is the willingness and commitment to partake in this Project.

The commitment of the Private Telecommunication (PT) is very much essential to the success of the project. During the series of meetings with PT, public support is part of their corporate strategy provided this would not entail cost on their part other than its technical manpower deployment support.

On the NIA side, as the project lead implementing agency, proper coordination to participating agency (LGUs, DA/DA-ITCAF) is very necessary to attain the perfect timing of the project implementation schedule. Experts and Consultants are equally important on the implementation for the transfer of the technology and training that will be extended as far as the ICT Program is concern.

The estimated person's involved and corresponding man-months from participating agencies are calculated as single team or component for a pilot demonstration area. At present, selection of number and location pilot demonstration area depends on the result of the evaluation of this proposed project. The table next page shows the estimated participants and the number of man-months for each involved agencies. (for counterpart cost from Philippine side only).

No.	Name of Participating Agency	Estimated Participants Involved	Estimated Man-Months	Estimated Cost
		man	man-months	pesos
1	NIA	4	75	1,600,000
2	DA-ITCAF	1	24	960,000
3	LGU	1	15	180,000
4	IAs Officer	5	105	250,000
	IA Member	20	420	120,000
5	Private Telecommunication	1-Team	Depending on Training Duration	Free
Total		31	639	Php3,110,000

In the above estimates, it is assumed that the training of trainors will be on stay-in basis at the located at nearest Training Center within or near to the Irrigation System. While training o farmers will be done on the day only. A representative from NIA Central and DA-ITCAAF will be involved for the whole duration of the project joining representatives from Regional Office, Irrigation Management Office, and from the Irrigation System Office. The estimated cost includes round trip plane tickets and per-diems for representatives from NIA-CO and DA-ITCAAF, meals, Training Center Rental, Fuels.

Necessity of the Amendment of Existing Laws/Regulations, Change on Government Set-up:

The government has provided enough laws and regulations related to the implementations of the information and communications technology, among others are a) Agriculture and Fisheries Modernization Act, b) Promoting the Deployment and Use of Internet Protocol Version-6, c) Electronic Commerce Act. On the side of the implementing agency, NIA shall upgrade and sustain the development of ICT towards the modernization of the irrigation development as mandated in the AFMA. The implementation of the proposed project will not require amendments on any of these laws and regulations, and not necessarily to change any institutional set-up, since proposed project will change only the method of ICT payment but not change the present-set-up on billing and collection of ISF.

Possible Areas (Component) on which Participation of Private Sector are Expected:

The project aims to increase collection efficiency by utilizing various services which is being provided by the private telecommunication companies (such as information distribution simultaneously to many subscribers through text message, mobile payment and mobile banking services). Private telecommunication companies can directly participate to the Project by offering free services, and be able to make profit from the increase of subscribers, communication charge and remittance charge, and/or to contribute to their social reputation by the implementation as CSR.

Mode of Private Sector's Participation its Implementing Method:

While offering existing services to this project, telecommunication company can also enhance their participation by the development of special application for the Project once they confirms the profitability and feasibility on the participation to the Project.

Possible Areas (Component) on which Japan's ODA are Expected:

For the proposed project, participation of private telecommunication company shall be involved on the training and promotion of ICT to farmers. In this model, portion of project which requires Japan's ODA may be limited to technical assistance but not to the equipment supply, construction of facilities, considering the fact that ICT in the proposed project can be made by acquiring existing services on mobile phone. The, possible assistance under Japan's ODA will be on the technical assistance, by dispatching Japanese Experts on the financial management of IA by utilizing Japan's long history on the management of Land Improvement District (LID) to enhance improvement and enhance of ISF collection including mobile payment method, as well as to provide trainings for IA in Japan to share experience in IA management.

Scheme (system) under Japan's ODA which the Proposed Project may apply:

The possible scheme of Official Development Assistance (ODA) of Japan will be technical cooperation project (TCP) including dispatch of Japanese Expert(s) and training, as stated above. This TCP can be either independently implemented or become of component in Yen Loan Technical Assistance for physical rehabilitation project, to contribute to increase of ISF collection to support operation and maintenance of irrigation facilities to be rehabilitated therein.

Furthermore, the proposed project can be also implemented in National Irrigation Systems nationwide which was constructed under Japan's Yen Loan in the past, since required technologies are already existing (mobile phone, and the nature of the project is not location specific. By improving operation and maintenance of these Japanese-funded irrigation systems through the improvement of ISF collection with such ICT-based effort, it will contribute to the efficient utilization of Japan's past assistances in irrigation sector.

Expected issues/problems upon the implementation of the Project and its possible solutions:

One constraint upon the implementation of the project is the timing of the project implementation to the favourable weather condition and cropping season of the irrigation system particularly on the ISF collection stage. Another problem is the occurrence of the calamity in the selected project area/pilot area. Though the weather condition unpredictable due to "climate change", it is still recommended to implement the project during dry season because of its higher degree of possibility on good weather.

Peace and order in some regional area in the Philippine is not stable or conducive for the project implementation, hence this can be excluded in the selection process.

Other Proposed Projects (under the ICT Study) which can be combined and its Effect:

ICT assisted transaction in farm level by using Mobile Phone can also create sense of financial management at household level. Such effect will also contribute to increase number of farmers and farmland insured, by easier interface between insurer (PCIC, private insurance company) and farmer beneficiaries.

Project Design Matrix:

Project Title: **Improving Accuracy and Transparency in Irrigation Service Fee (ISF) Collection Using Mobile Phone**
Duration: **24 Months**
Target Group: **Irrigators Associations (IAs)**
Target Areas: **Luzon, Visayan, and Mindanao**

Ver 1.0 (23 Feb. 2012)

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Overall Goal			
Contribute to the improvement of the Irrigation Service Fee Collection Efficiency (ISF-CE) in all National Irrigation Systems (NISs) using ICT in support to the Irrigation Management Transfer (IMT) Program	By year _____, Improvement of the ISF Collection Efficiency by ___%	ISF Collection Efficiency Report	
Project Purpose			
a) To be able contribute to the improvement of ISF Collection Efficiency in selected NISs using the Mobile Banking/Mobile Money Scheme in payment of ISF at the IAs as Pilot Demonstration Area	By year _____, an improvement of the ISF Collection Efficiency by ___% at the IAs as Pilot Demonstration Area of about ____ hectares.	• Progress Report, • Monitoring and Evaluation, • Project Completion Report • ISF Remittances by Farmers to IA	Sustained Proper collaboration between NIA as Implementing Agencies and DA-ITCAF, LGU, Private Telecommunication as Participating Agencies, and IAs as Partners in the IMT Program
Outputs			
a) Training of Trainers is made on transfer of technology in the usage of mobile phone for mobile banking and mobile money, b) Accreditation of IA is made as E-Money Issuer (EMI) or Retailer of E-Money c) Campaign Activities are made to inform IA Members the advantage of using the Mobile Money/Mobile Banking as vehicle for ISF Bill Payment. d) Training of IA Members for the familiarization on the application of mobile phone for mobile banking and mobile money scheme of ISF payment is ready to be made by trained trainer.	(Per 1 NIS) a)Trained Trainers; • 3-NIA Institutional Development Officer (CO,RIO,IMO) • 1-ISF Billing Officer (IS) • 2- Collector (IS) • 5-IAs Officer & Collector (President, Cashier, & Collector) b) Accredit one(1) IA c) Conduct Public Relation Campaign to IA Members about 20 Farmers d) Training of about 20 IA Members	• Progress Report, • Monitoring and Evaluation	No major typhoon damage, pest and diseases arise in Pilot Impmenentation NISs.

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Activities	**Inputs**		
a) Conduct preparatory study in order to have better understanding on the situation of the ISF collection, b) A need of assessment on ISF Collection Efficiency Constraints and Issues c) To formulate criteria on the section of sites for pilot demonstration area for implementation d) Implement Pilot project in selected pilot area. e) Conduct Seminar and Workshop on Hands-on Application of Mobile Phone, Financial Management, Entrepreneurial Awareness in Mobile Banking/Mobile Money Services f) Introduce experiences of financial management on LID of Japan	GoJ a) Provide Technical Assistance by assigning Experts for Guidance in Land Improvement District (LID) as experienced in Japan b) Provide Training on Introduction of Financial Management of Land Improvement District (LID) as experienced in Japan	GoP <NIA> a) Provide counterpart personnel b) Office space, Admin.cost <Private Telecommunication firm> -Trainer	Sustained Proper collaboration between NIA as Implementing Agencies and DA-ITCAF, LGU, Private Telecommunication as Participating Agencies, and IAs as Partners in the IMT Program **Pre-condition:** No major changes in IMT policy of NIA

Attachment-3 Proposal on Priority Project (Agricultural Insurance)

PROJECT PROPOSAL

(Agricultural Insurance)

Sub-Sector: Agricultural Insurance

Proposed Project: Development of Index Based Insurance Policy Framework

Present Condition:

Agriculture is very much vulnerable to the unpredictability of nature. With agricultural production representing the major livelihood of many resource-constrained farmers, the impact of natural disasters and other agricultural risks cannot be taken lightly. Other agribusinesses and commercial farms that operate with higher capital and better technology on better lands are also not spared from the same risks. The need to safeguard the interests and investments of local farmers and industry players is therefore of paramount importance.

In line with this, the Philippine government has come up with a range of risk management programs for farmers and other agricultural stakeholders such as price stabilization measures, typhoon and/or drought relief, livestock and feed subsidies, fertilizer and other input subsidies as well as subsidized crop insurance schemes. Crop insurance is a risk management mechanism designed to even out agricultural risks and blunt the consequences of natural disasters to make losses, especially to the marginalized farmers, more bearable.

In recent year, people are paying attention to an innovative idea in a risk management mechanism: Index Based Insurance. A number of pilot programs on this new idea have been implemented. Potential benefits of index based insurance are huge; reducing the risk of moral hazard and adverse selection. Operational cost of insurance can also be reduced since there is not necessary to assess the field. Farmers are able to get payout quick after extreme weather event happens.

In fact, the Philippine Government is promoting this innovative insurance scheme as one of the tools to mitigate climate change risk. The Philippines Crop Insurance Cooperation (PCIC) plays a key role of promoting index based insurance. The PCIC has collaborated with the ILO and developed Weather Index Based Insurance (WIBI) under the Climate Change Adaptation Project in Agusan del Norte. In addition, the PCIC has developed another type of index based insurance called Area Yield Based Insurance (ARBY) under the collaboration with the GIZ.

They have already implemented pilot testing for both WIBI and ARBY products. They are planning to expand target area of index based insurance. In addition, the World Bank is planning to develop new index based insurance product under the Philippines Climate Change Adaptation Project (PhilCCAP). The purpose of this project is to develop new index based insurance and encourage private sector to engage in the market of index based insurance.

Not only the PCIC and international donors, but also private insurance companies have developed their own index based insurance products. For example, Malayan Insurance Company implemented pilot testing of typhoon and

drought index based insurance in 2009. CLIMBS Live and General Life Insurance Cooperative has also launched index based insurance named "Weather Protect Product".

Challenges:

On the other hand, developing and promoting index based insurance products are not easy. Index based insurance has also many issues and concerns. One of the concerns is regulations and operational environment for this new type of insurance.

In the Philippines, the Insurance Commission (IC) is to supervise and evaluate the effectiveness and viability of the insurance product being proposed. However, the IC does not have specific regulations and guidelines in terms of index based insurance. Although the IC welcomes this new type of insurance and supports the move for the development of insurance to protect especially the poor from natural calamities and perils, the IC's jurisdiction is unclear.

Furthermore, the PCIC is not under the IC because they are under the Department of Agriculture. This means insurance product provided by the PCIC is not necessary to get approval from the IC; whereas, private companies must get approval when they develop new insurance product. Variety types of index based insurances should be developed by both the PCIC and private sector; hence, they should follow the same standard and guidelines based on the appropriate legal structure.

Moreover, the Government gives premium subsidies for crop insurance. This might be one of the constraints to expand index based insurance because crop insurance has price advantages compared to other insurance products. Therefore, premium subsidy is also concerning regarding introducing index based insurance.

Starting up cost of index based insurance is also one of the major challenges. Before launching products, the product design team has to do market research, baseline survey, and profiling farmers and geographical characters. After the initial surveys, the team has to analyze historical weather data, identify target farms and crops, set indices, and calculate premium rate. All these product development processes take a lot of time and cost a lot and also need many experts from different sectors.

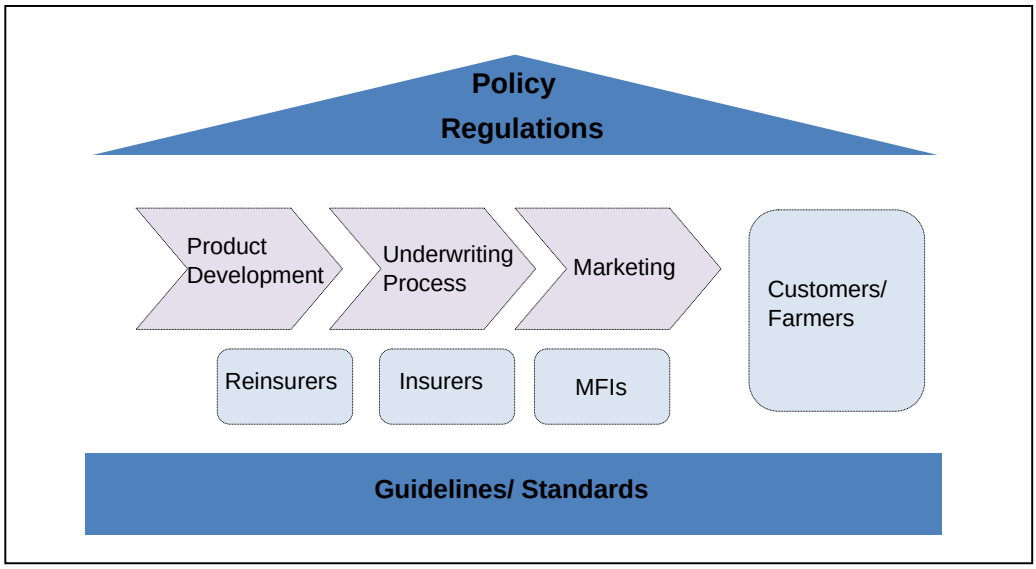
Lack of farmers' awareness of insurance is also a problem. In fact, most insurance providers and the PCIC pointed out that one of the hardest parts of pilot implementation was marketing index based insurance products. It is difficult for farmers to introduce new things and change their old customs because most farmers, especially in rural areas, they are conservative, and are not willing to take a risk. It is necessary for all the stakeholders including the PCIC, Microfinance Institutions, and farmers to understand why index based insurance is important and how it works.

Project Outline:

The objective of this project is to develop Index Based Insurance Policy Framework. The purpose f the Policy Framework is to create enabling operational environment for index based insurance. This Policy Framework will

cover product development process, marketing activities, and all other activities regarding index based insurance. Specifically, the framework will consist of guidelines, standardized product development process, and agricultural insurance literacy program. Private sector, international donors, and PCIC will be able to develop and expand their index based insurance products based on the same Policy Framework. As such, their activities will be synergized under the Framework and facilitated further development of index based insurance.

Concept of the Policy Framework:



The Index Based Insurance Policy Framework will provide specific regulations and guidelines, standardized product development process, and agriculture insurance literacy program. These specific outputs will be achieved by improving stakeholder's capability of index based insurance, strengthening institutional arrangement, developing and pilot testing new index based insurance, establishing agriculture insurance literacy program.

Specific Activities:

Specific regulation and guidelines will be formulated by reviewing the current policy, regulations, and guidelines. In this process, governmental subsidy scheme is also reviewed. After reviewing the current situation, draft regulations and guidelines will come up. These processes will be conducted by the Technical Working Group which will consist of a wide range of stakeholders from private sector to international donors. Capacity building training for stakeholders such as members of the Insurance Commission, the PCIC, and underwriters from private sector will also be conducted during this process.

Main activities are;

- Reviewing regulations and guidelines related to index based insurance
- Strengthening capabilities of the implementing agencies of the Framework including capacity building training in other countries

- Strengthening legal structure for index based insurance
- Creating regulations and guidelines for index based insurance
- Reformulating Governmental premium subsidy scheme including existing crop insurance

Development process of index based insurance will be standardized by implementing pilot test for new index based insurance. Regarding product develop, it is possible to collaborate with private sector. Experts from private companies will be able to join the product development process. After pilot testing, development process will be standardized so that index based insurance will be replicated by private sector and other donors. In addition, regulations and guidelines will also be reviewed through pilot implementation.

Main activities are;

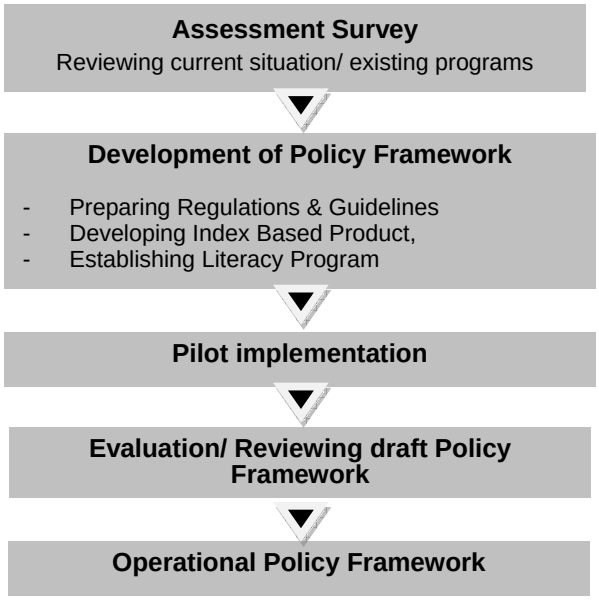
- Conducting preparatory survey
- Selecting target area and beneficiaries
- Developing index based product
- Standardized development process of index based insurance

Agriculture insurance literacy program will be established. The purpose of the literacy program is to enhance farmers' awareness of insurance and understanding the importance of agriculture insurance. The main character of this literacy program is to collaborate with existing agricultural extension services. For example, some of the programs will be provided via Nutrient Manager Rice Program provided by IRRI. As such, the program is not temporal campaign, but establish permanent literacy program. Main target of agriculture insurance literacy program will be agricultural extension workers, officers in microfinance institutions, and farmers.

Main activities are;

- Conducting preparatory survey
- Arranging collaboration with other organizations
- Developing literacy program
- Capacity building of extension workers and farmers

Activities Flow:



Pilot Implementation Site:

The proposed area for study, development and pilot testing of this project is Region 4 consisting the provinces of Cavite, Laguna, Batangas, Rizal, Quezon, Mindoro, Marinduque, Romblon and Palawan. Region 4 is the largest region in the Philippines in terms of size, area and population. Agriculture represents around 50% of the total economy of the region. Region 4, being near to the National Capital Region, is accessible for almost all of the participating agencies under this project; and thus, it will be easy for any institutional arrangements especially on data gathering, research and development.

Further, there is an abundant and rich-source data and information in the region that can be used in the development of index-based insurance. Region 4 has the most suitable condition for developing index-based insurance, as the region is experiencing the 4 different types of climatic conditions at varying topographical surroundings. Therefore, defining different parameters, conditions, and scenarios will be extensive contributing to the development of different models, policies and guidelines for the development of index-based insurance.

Implementing Agencies:

Philippines Crop Insurance Cooperation (PCIC): PCIC shall be the main implementing agency for this project and will play a key of coordinating and promoting this project. In particular, they have already experiences in index-based insurance, and may have on-going project implemented by other donors such as the ILO, GIZ, and the World Bank. Thus, they will be able to lead development of new index based product. Also, coordination with other donors is important to succeed the formulation of the Policy Framework. As such, they will also coordinate with other institutions, activities, and products to make them look at the right direction.

In addition, they distribute index based insurance and their accredited underwriters will take underwriting process at the pilot implementing stage. Also, they will have trial partnerships with private companies regarding promoting index based insurance. Since they have different kinds of insurance services, they also can try to find the right product mix. For example, they will be able to sell weather index based insurance with pests and diseases cover insurance or other non-life insurance products.

Although they are not under the Insurance Commission, the PCIC should operate this new type of insurance based on the common guidelines with others. Thus, the PCIC will join the development process of the guidelines with the IC, and the IC will share the product development process with PCIC. Therefore, both IC and the PCIC will be part of the overall Project Oversight Committee (POC) headead by JICA Team.

Participating Agencies:

Insurance Commission (IC): The IC, being a regulatory government agency for the private insurance sector, shall also be part of the Project Oversight Committee and its main role is to assist and provide guidance in the formulation of policies and implementing rules and regulations. IC shall review the processes from product development, to underwriting, up to the marketing of index-based insurance; and shall review the inherent risk

involve in every step or stage of the whole process. IC's participation on this project is very important to enable the active participation of the private sector in the provision of index-based insurance schemes that are safe and sound; and that, the end consumers are protected and secured.

Philippine Insurers and Reinsurers Association (PIRA): The PIRA, an umbrella organization representing the non-life insurance companies in the Philippines, will assist in the formulation of policies and operating guidelines during the pilot testing and marketing of index-based insurance; being the acknowledged expert in the insurance industry. PIRA shall help in the design, forecasting and responding to issues that may arise by the private sector during pilot testing; and anticipates opportunities for better collaboration and implementation.

Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA): PAGASA plays the lead role in providing weather information, both historical and actual, in pilot areas under this project. PAGASA shall assist in the crafting and developing of weather indices during the assessment up to the product development process. During piloting, PAGASA shall monitor and check weather data and information and will provide the certification necessary in the event of a payout. This project will utilize PAGASA's Unified Meteorological Information System published on the web. PAGASA, using its existing infrastructures and weather stations, will work with other government agencies in terms of installing additional weather stations, if necessary; and in terms of training or capacitating LGUs or even MFIs in data gathering, analyzing and forecasting weather data into information readily available for public use.

International Rice Research Institute (IRRI): The IRR has developed a Nutrient Manager Rice program, which is a mobile and web application decision-making application for farmers to help them in determining the appropriate amount, type of fertilizer and timing of fertilizer application for rice crops. This system can be a valuable input for the development of index-based insurance products. Further, IRRI can provide some of its rice technologies and inputs as possible contributory in determining area yield-based index insurance schemes. Thus, IRRI shall provide the technical expertise in developing the indices to be used for rice crops; and in the implementation of the pilot testing.

Bureau of Soils and Water Management (BSWM): The BSWM, a staff agency under the Department of Agriculture tasked to established agromet stations in highly vulnerable areas to generate location specific weather projections and serve as early warning system for local farming and fishing communities, shall provide the necessary assessments on existing irrigation systems, soil and water resources against the vulnerability maps in Region 4. Data from these assessments shall be used in the development of indices for index-based insurance.

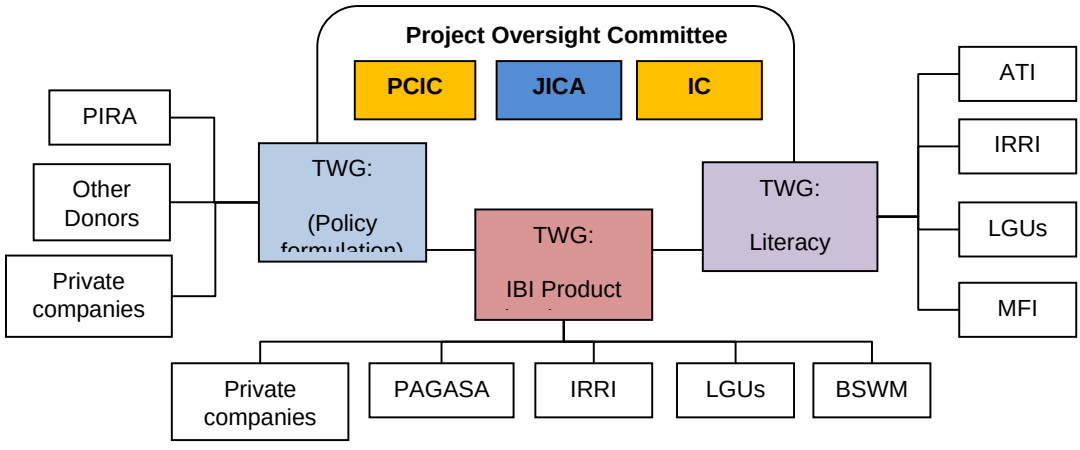
Bureau of Agricultural Statistics (BAS): The BAS, also a staff agency of the Department of Agriculture mandated to serve as the central information source of all official agricultural statistics, plays a big role in term of developing the indices on index-based insurance, both the historical and the actual, on different crops. BAS, together with other agencies, will develop data gathering and economic research activities and tools. BAS will assist the other players in accessing and analyzing the right products, market information and technologies.

Agricultural Training Institute (ATI): The ATI, an attached agency under Department of Agriculture mandated to coordinate diversified agricultural extension delivery systems for the local government and other stakeholders will formulate different extension tools and technologies such as "E-Extension" services under this project that will make the flow of information efficient and effective. Delivery of farm risk management literacy program seems to be connected with e-extension; as such, ATI through its established e-extension networks could play a big role in designing awareness, advocacy and literacy programs for farmers and fisherfolks so that they will be able to understand the index-based insurance fully.

Local Government Units (LGUs): The LGUs, specifically the Municipal Agricultural Offices (MAO) of the Municipalities or Towns, will also be one of the participating stakeholders in this project. LGUs shall work with PCIC and other MFIs in delivering information on index-based insurance and on risk management literacy programs to the intended beneficiaries in the pilot areas. LGUs shall serve as the coordinating body on the field. They will also partly do a monitoring of the pilot implementation.

Microfinance Institutions (MFIs): The MFIs that include cooperatives, rural banks and other agricultural input providers who are within the pilot area will be chosen by the Project Oversight Committee. MFIs main role is to market and promote the index-based insurance to their members and clients. They could also perform underwriting process and do a product mix where they can bundle the index-based insurance with their existing credit and deposit products.

Project Organization Chart:



*TWG: Technical Working Group

*IBI: Index Based Insurance

Time Frame: 2.5 years (30 months)

Items	Period									
	Year 1				Year 2				Year 3	
	1st Qtr	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr	2nd Qtr.
Phase 1										
Preparatory Study										
Overall planning										
Action Plan for product development										
Situation Anlaysis										
Stakeholders Analysis										
Establishing the implementation working group										
Selection of Pilot Project										
Formulation of draft Policy Framework										
Development of index based insurance and insurance literacy program										
Formulation of the implementation plan of the Pilot Project										
Phase 2										
Implementation and Monitoring of the Pilot Project										
Evaluation of the Pilot implementation										
Revision of Draft Policy Framework										
Preparation of Operational Policy Framework										

Expected Outcome/ Impact:

1) Formulating the Enabling Environment for Index Based Insurance

One of the expected outcomes of this project is to formulate the enabling environment for index based insurance. Regulations and Guidelines will come up after the project, all the stakeholder will be able to operate under the same Framework.

Also, the Framework will encourage private sector to invest in the area of index based insurance, and support their operation technically and politically. International insurance companies and reinsurers will also be able to operate more easily in the Philippines in terms of index based insurance.

The project will also promote scaling-up of on-going projects and existing index based insurance by sharing the information and synchronizing promotion of index based insurance. In addition, strengthening capacity of the PCIC, IC, and other underwriters will be achieved through capacity building trainings.

2) Standardized Development Process of Index Based Insurance

One of the expected outcomes is to increase index based insurance product. Private companies are able to reduce product development cost when once product development process is standardized. In addition, they also will be able to transfer their risks more easily to reinsurers. This is because standardized process will guarantee product quality and transparency so that reinsurers will be able to absorb more risks.

Index based insurance coverage area will also increase by increasing insurers and the number of products. Accessibility of index based insurance will increase, and penetration rate of insurance will also increase. Farmers will reduce farming risk through insurance services.

3) Establishing Agriculture Insurance Program

Farm risk management literacy will be improved by establishing literacy program. Farmers will be able to get the information about insurance more easily, and their understanding of insurance will increase.

Capability of Agricultural extension workers, Local Government Units, and other related institutions will be enhanced in terms of farm risk management. Also, relationship between insurance industry and a wide range of agricultural institutions will be strengthened. Insurance services will be integrated in one of the aspects of agricultural value chains.

Necessary Inputs:

- Japanese Side:

1) Six (6) Japanese experts;
    a) Team Leader/ Agriculture Insurance
    b) Weather Index Insurance
    c) Microfinance
    d) Rural society and economy
    e) Agriculture
    f) Agricultural value chain
    g) Project coordinator

    The experts will be responsible for assisting the Project Office and each working group as well as Philippines' counterparts.

2) Funds for developing index based insurance, conducting pilot implementation, developing agriculture insurance literacy program, and other implements for the Project.

3) Funds for office running expenses, conducting workshops/ seminars/ public consultations inclusive of lodging, subsistence allowance and transportation, and study tours.

4) Training of Filipino officers in Japan or other countries for agriculture insurance, index based insurance, etc.

- Philippine Side:

1) Counterpart staff from the Philippine Crop Insurance Cooperation (PCIC) and the Insurance Commission (IC)

2) Office space with working tables, office furniture, telephone line, etc.

3) All data available such as agricultural statistics, insurance data, financial data of the PCIC, research papers on index based insurance, etc.

Possible areas (portion) which participation of private sector are expected:

Private insurance companies will be able to join the product development process. In addition, local insurance companies contribute to creating operational guidelines for index based insurance. Through their participation, technical transfer regarding product development will also be able to be achieved, and they can replicate development scheme easily. In other words, one of the main roles of private sector is to establish business model for index based insurance in the Philippines.

Furthermore, some of private companies such as international insurance companies and reinsurers will be able to play a role of reinsurers of the product. They can also transfer international standard guidelines and technology regarding product development to the Philippines.

Mode of participation by private sector and its implementing method:

Mode of participation will be considered in variety of ways. One of them is to participate in the Project team as an expert from private companies. Also, they will join the Technical Working Group and share the progress of the project and their expertise.

Another way is Private Public Partnership. The JICA will have a partnership with a private insurance company which is interested in index based insurance. New index based insurance product will be developed together with the private company, and then the Project will provide enabling business environment so that the private company will operate smoothly after the project.

In addition, the Base of Pyramid (BOP) will be applicable. If a private insurance company which already has ideas of new index based insurance, the company will be able to try out through the project. In this case, the project should hold the public audition to select a private company.

Possible areas (portion) wherein Japan's ODA are expected:

Japan has experienced many types of natural disasters. Based on these experiences, Japan has one of the leading countries for disaster risk management. Japan has developed advanced policies and technologies for disaster risk reduction. Therefore, Japan can contribute to risk mitigation mechanism including insurance schemes. Japanese

knowledge and expertise are applicable for development of the Index based insurance Policy Framework in the Philippines.

One possible area is to develop guidelines and indices. Capacity building in the area of developing insurance product will be conducted by Japanese experts. In addition, regarding insurance literacy, Japan can provide their knowledge and expertise. In fact, Insurance School of Japan (ISJ) has been provided various insurance training courses for people in developing countries since 1972. Japanese experiences and facilities in insurance training will also be utilized for the project. Besides, Japan's ODA can assist marketing of index based insurance products. Japan's ODA has been implemented a lot of projects in the Philippines; thus, ODA can create positive effect of synergy with other projects, and this will encourage private sector to engage in the market of index based insurance.

Scheme (system) under Japan's ODA and its implementing method:

Technical Cooperation Project and Development Study can be considered as possible scheme of JICA's ODA. Japanese experts assigned to support the project activities organized with Philippines counterparts. The possible areas of expertise are: weather index based insurance, microfinance, agriculture, and agricultural value chain analysis. The Experts are expected to conduct assessment survey, coordinate stakeholders, develop regulations and operational guidelines for index based insurance, and establish agriculture insurance literacy program.

Also, the BOP scheme will also be integrated in TCP scheme. In the portion of product development, private companies which have ideas or product of index based insurance will be able to implement pilot testing in this project. Private companies will be selected through JICA's BOP scheme.

In addition, it is possible to separate formulation of guidelines and regulations from this project, and dispatch Japanese expert to assist these formulations.

Furthermore, this project covers wide activities of index based insurance. As such, other insurance projects, "Project for Scaling up of Index Based Insurance in the Philippines" and "Study for Application of Index Based Insurance in the Philippines", can be integrated in this project as a comprehensive index based insurance project.

Expected Issues/ Problems/ Possible Solutions:

1. Failure or delay institutional arrangement

One of the main concerns is about institutional arrangement since the Project involves a wide range of stakeholder from different sectors. In addition, different stakeholders are involved in a different way. It might take time to set up each working group for reviewing and creating guidelines, developing and standardizing index based insurance process, and establishing agriculture insurance literacy program. Therefore, key to the success is to take certain time for institutional arrangement. Also, Governmental strong initiative is important for the Project implementation.

2. Coordination the conflicting interests of different agencies and sectors concerning

This is particularly concerned setting up new guidelines, regulations, and premium subsidy scheme. For example, the PCIC is not under the Insurance Commission, and they use governmental premium subsidies. Also, the PCIC exempts from paying tax since they are the governmental agency. On the other hand, private sector is in different operational environment from the PCIC. Thus, coordinating different interests between different agencies is important.

3. Limited time for Pilot implementation

Pilot implementation period will be for one year; two seasons. This time limitation could be one of the constraints for product testing. In other words, availability of the pilot implementation results might be limited. The PCIC has already done some of the index based insurance products; thus, the Policy Framework should be reflected by not only the result of this project, but also activities other agencies have done so far.

4. Coordination with other Agricultural Services

Regarding farm risk management program, it will be collaborated with the ATI, IRRI, and other agricultural institutions. The purpose of the collaboration is to spread the literacy program to local government officers, agricultural extension workers, cooperatives, and farmers. However, they provide various agricultural services in various ways. If media interface is different, it is difficult to integrate for different interfaces. Establishing common platform of all the agricultural services is one of the possible measures.