

Knowledge Management at the Village Level: How Thai Rice Farmers Incorporate Technologies to Improve Production Systems

Jude William R. Genilo

The shift from agricultural to industrial and from industrial to knowledge societies has affected the ways farmers run their small-scale field activities in Central Thailand. To remain competitive, rice farmers need to continuously incorporate innovations and upgrade their technologies to sustain operations. These innovations and technologies may be seen in practically all aspects of the rice production process – from seed selection to fertilization, from seed raising and growth to irrigation, from crop protection to harvesting, threshing and drying.

The study basically aims to explore the plausibility of rice farming villages as “learning organizations” and within these villages, the viability of forming “communities of practice.” In so doing, it investigates how the rice farming village under study organizes, shares, moves and gains information on rice farming. The study was conducted in Baan Sap Som Boon, Nonglue Subdistrict, Muang District, Chainat Province. The study uses a qualitative, exploratory and descriptive design. It uses both primary and secondary data and an ethnographic study approach. Research method and techniques consist of review of materials, interview with key persons and farmers in the community, interview with government personnel and field observations. Data generation was conducted from October 2004 to July 2005 in Chainat Province, Thailand.

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Introduction

Thailand is the world’s largest rice exporter with a 30.5 percent share of the total market. In 2003, the International Rice Research Institute (IRRI) reported that Thailand exported 8,395,000 tons of milled rice—exporting more than double of its closest competitors with Vietnam (3,813,000 tons), United States (3,784,500 tons), India

(3,401,900 tons) and China (2,597,200 tons). For the said cereal alone in 2003, Thailand earned a total of US\$ 1,828.48 million. Thailand’s export of milled rice has risen by 12.6 percent from 2002 to 2003 – its earnings increasing by US\$ 196.52 million. Rice production in Thailand has likewise remained competitive. In April 2002, the Manila Times reported that the cost of production per hectare of Thai farmers amounted to only US\$ 568

– much lower than farmers in Indonesia, US\$ 598; Vietnam, US\$ 610; and China US\$ 653. The bulk of expenses were on labor costs, followed by fertilizers, machine rental, seeds and pesticides. From 2002 to 2003, rough rice production in Thailand increased by 1,184,000 tons. During the past ten years, rough rice production in the country grew by an average of 4.7 percent per year.

Decreasing Resource Allocation

Ironically, Thai government statistics indicate a decreasing resource allocation for rice production in the country's rice granary – the Central Region. In its 2003 Agricultural Census, the National Statistics Office (NSO) revealed a smaller land area devoted to rice production, lower usage of fertilizers and pesticides, scarcity of rural labor and a decreased dependence on agriculture. The Central Region's land holdings occupy an area of 21.6 million rai (3.45 million hectares). From 1998 to 2003, the land area devoted to rice decreased by 12.2 percent. Moreover, during the same period, the number of land holdings using chemical fertilizers decreased by 17.2 percent while those utilizing organic materials increased by 63.6 percent. The number of land holdings treated with pesticides decreased by 11.6 percent while those not treated with pesticides increased by 37.4 percent.

In terms of rural labor, the NSO reported a gradual decrease in the family size of landholders – 4.0 in 1993, 3.9 in 1998 and 3.6 in 2003. Likewise, the NSO revealed that the number of holdings employing agricultural workers decreased by 17.5 percent from 1998 to 2003. There has also been a decrease in dependence on agriculture among landholders. The number of those engaged solely on agricultural work has decreased by 16.9 percent from 1993 to 1998 and again by 19.4 percent from 1998 to 2003.

On the other hand, those not engaged in agricultural work in the holding increased by 43.3 percent from 1998 to 2003. Consequently, agricultural work in the holding as the only source of household income has decreased by 7.1 percent from 1993 to 1998 and by 40.9 percent from 1998 to 2003. Household income is derived not only from agricultural work in the land holding but also from being an agricultural worker and from non-agriculture sources.

Knowledge as an Important Resource

In light of this, it is apparent that Thai rice production and exports continue to soar in spite of decreased resource allocation – land, labor and other inputs. What accounts then for these increases? Several scholars point to the most valuable resource for the 21st century, i.e., knowledge. Awad and Ghaziri (2004) argue that “In today's business world, the heartbeat of the firm depends on the constant revamping of systems to remain competitive. To be successful, business firms must redefine and question their current knowledge stored in corporate databases, while creating new practices to fit the business environment.” The shift from agricultural to industrial and from industrial to knowledge societies has affected the ways farmers run their small-scale field activities in Central Thailand. To remain competitive, rice farmers need to continuously incorporate innovations and upgrade their technologies to sustain operations. These innovations and technologies may be seen in practically all aspects of the rice production process – from seed selection to fertilization, from seed raising and growth to irrigation, from crop protection to harvesting, threshing and drying.

In an interview, Dr. Kwanchai Gomez, Executive Director of the Thai Rice Foundation, explained the relationship between scientists and rice farmers in

Thailand. According to her, “researchers in Thailand work in tandem with rice farmers. There are 27 experiment stations throughout Thailand. Researchers do not work in isolation. Then, communicating rice technologies is not a problem in Thailand since farmers are receptive to these. Farmers are not stupid. They want to learn. Farmers in Thailand have access to technologies and are receptive to these or actively search for these technologies because they want to increase yield.” In such a situation, the Thai Rice Foundation feeds information on rice technologies to television and radio stations on a regular basis. Knowledge on farming technologies, however, also comes from the farmers themselves. In an interview, Agriculture Specialist Paragorn Buditwong of the Office of Agricultural Research and Development in Khon Kaen Province, underscored that “the office supports traditional and local knowledge of farmers. Farmers know what to do when rains are delayed due to traditional knowledge. We would like to emphasize improving the quality of life of the farmer, not increasing yield alone. In participatory technology development, farmers agree to having their fields included as experiment fields. Then, together with the researchers and extension workers, they study on how to reduce cost of farm inputs.”

Villages as Learning Organizations

Easterby-Smith and Lyles (2003) view “learning organizations” as entities, which have the capacity to learn effectively and prosper. According to them, the concept emerged towards the end of the 1980s largely on the basis of the work of British Authors Garrat and Pedler. However, de Geus’s paper published in the Harvard Business Review brought wider attention to the concept and Senge’s 1990 book became the foundational work for the concept – becoming the key source for academics as well as an inspiration for practitioners. Senge (1990) defines a

learning organization “as a place where people continually expand their capacity of creating results they really want, where patterns of thinking are broadened and nurtured, where collective aspiration is free and where people are continually learning to learn.”

Using the social construction perspective, DeFillippi and Ornstein (2003) explained that organizational learning takes place socially. “Learning is embedded in the relationships and interactions between people. Learning is thus social and is grounded in the concrete situations in which people participate with others.” Elkjaer (2003) added that “learning is not restricted to taking place inside individuals’ minds but as processes of participation and interaction. In other words, learning takes place among and through other people. Learning is a relational activity, not an individual process of thought. This view changes the locus of the learning process from that of the mind of the individual to the participation patterns of individual members of organizations in which learning takes place.” In this sense, learning is regarded as a ubiquitous part of human activity. It is an integral part of the practice in everyday organizational life and work. Given this, Elkjaer implies a “situated curriculum, which denotes the pattern of learning opportunities available to newcomers in their encounters with a specific community inside a specific organization. Learning is that which enables actors to modify their relations to others while contributing to the shared activity.”

When it comes to learning, rural villages exhibit a similar context with organizations given the relational nature of rice farming activities. Genilo (2004), in a study of a Philippine rice farming community, observed that “communities engage in activities that are basically social in nature. The family still constitutes the core of farm labor, hence, farmers could not be separated from their families and relatives, and because farmers share the same resources (such as irrigation, machinery, laborers and other facilities), they

could not be separated from their neighbors and other community members. Farmers know that transplanting and harvesting at the same time would stretch the community's resources. Aside from sharing resources, farmers rely on each other to improve crop yields. They make sure that they plant and harvest in cadence with other farmers as a crop protection measure. They exchange seeds and labor with other farmers. Given the social nature of rice farming, farmers make decisions in consideration of others." According to Genilo, "Farmers learn rice farming since they were kids. They constantly experiment with various farm inputs, methods and techniques, using traditional and modern varieties, continuously matching variety to soil, studying variety characteristics, their resistance to pests, etc. Farmers said their parents and relatives were the original sources of their farming knowledge. They watched them work their fields, observing how grains were grown and harvested. Later, they took on the work themselves and learned their secrets. They eventually became part of family labor and when their parents and relatives got older or could no longer work, they took on the responsibility of managing the farms." Farmers also learn from co-operatives, opinion leaders, other farmers and dealers of agricultural inputs.

Knowledge Management at the Village Level

Having established that farming communities exhibit a context similar to organizations when it comes to learning, it is necessary to investigate how learning takes place – through the processes of knowledge creation, retention, transfer, etc. Studying such learning processes would produce insights and prescriptions for improving rice production systems. Vera and Crossan (2004) point to some definitions of knowledge management as "the explicit control and

management of knowledge within an organization aimed at achieving the company's objectives," "the formal management of knowledge for facilitating the creation, access, and reuse of knowledge, typically using advanced technology," "the process of creating, capturing, and using knowledge to enhance organizational performance" and the "ability of organizations to manage, store, value and distribute knowledge." Awad and Ghaziri (2004) elaborated "knowledge management is the process of capturing and making use of a firm's collective expertise anywhere in the business – on paper, in documents, in databases (called explicit knowledge), or in people's heads (called tacit knowledge). It is the fuel or raw material for innovation – the only competitive advantage that can sustain a company in an unpredictable business environment."

As applied to rural villages, development planners and academicians in the 1990s began to seriously examine local knowledge and practice systems. They viewed such knowledge systems as evolving and dynamic rather than as static and conservative. Georing, Norberg-Hodge and Page (1993) explained: "Traditional farmers engage in constant experimentation and adaptation to fit local situations. Research in West Africa has shown that small farmers – not agricultural experts trained in the industrial system – are largely responsible for most of the innovations in agriculture in the region during the last decade. These farmers continue to rely on their own systems of experimentation, rather than placing their trust in 'experts,' most of whom are working from theoretical models or on information provided by fertilizer or pesticide manufacturers." Bauer, et al., (1998), meanwhile, underscored the importance of the knowledge perspective in agriculture. For them, "Farmers are also researchers, teachers and consultants. We can, and must learn, from them before we can teach and advise them. The knowledge system approach

is accordingly based on the principle that the potential for future growth, especially in agriculture, lies in making better use of local knowledge, chiefly by exploiting synergies, with more effective coordination and communication between all groups involved via networks and dialogue.”

Given this backdrop, the study turns to the Thailand experience for answers. Thailand has consistently been the world’s top rice exporter for the past several decades given its comparative production advantage and declining domestic per capita consumption. Rice likewise remains as the country’s principal crop, accounting for 29 percent of total crop value added and one-half of total cultivated land. Studying and observing one of its top rice producing villages may provide insights on how technologies are assessed or given meaning, how knowledge and practices on rice farming are constructed and the role of communication in facilitating these processes.

Study Objectives, Framework and Methodology

The study basically aims to explore the plausibility of rice farming villages as “learning organizations.” In so doing, it investigates how a rice farming village under study gains, organizes, shares and moves information and knowledge on rice farming. The study uses a framework the four-step process of KM cycle – gathering, organizing, refining and disseminating – described by Awad and Ghaziri. The gathering phase deals with knowledge captured by the village – whether from within or outside the community. After the gathering phase, captured data or information should be organized in a way that can be retrieved and used to generate useful knowledge. One can use indexing, clustering, cataloguing, filtering, codifying and other methods to do the organizing. After organizing the information,

it should be refined to fit the local situation – whether the new knowledge conforms to the community’s main assumptions and whether new knowledge drastically alters existing knowledge and practices. After the refining phase, knowledge should be disseminated or transferred. This includes making knowledge available to farmers – whether through formal, informal and/or mediated networks.

The study uses a qualitative, exploratory and descriptive design. It uses both primary and secondary data and an ethnographic approach. Research method and techniques consists of review of materials, depth interviews with 9 community leaders and 20 farmers, interviews with 9 government officials concerned with agriculture, and observation of meetings and other rice farming activities in the village.

Village Profile

The study was conducted in the village of Sap Som Boon, Nonglue Subdistrict, Muang District, Chainat Province. Chainat province is one of the 26 provinces comprising Thailand’s central region. The Chao Phraya River runs through the province. In the past, Chainat was an important province used several times as a base to confront the Burmese army. Every time, the Burmese were defeated, thus originating the name of Chainat which means a “*place of victory*.” Chainat occupies an area of 2,469 square kilometers and is administratively divided into six districts: Amphoe Muang Chainat, Amphoe Hankha, Amphoe Manorom, Amphoe Sankhaburi, Amphoe Sapphaya, Amphoe Wat Sing, and two minor districts: King Amphoe Nong Mamong and King Amphoe Noen Kham.

Based on the Agricultural Statistics of Thailand Crop Year 2002/03, Chainat is the second top rice-producing province with 552,118 tons for major season and 470,407 tons for second season. In terms of yield, Chainat has 611 kilograms per rai or 97.76

per hectare (major season) and 760 kilograms per rai or 121.6 per hectare (second season). Chainat depends heavily on the cereal. Around 77.2 percent of landholdings in the province are devoted to rice paddies. Chainat likewise has a bigger average farm size (30.67 rai or 4.9 hectares) as compared to other central region provinces.

Sap Som Boon is located around 20 kilometers west of the town center of the Muang District. The village has a total area of 1,960 rai (313.6 hectares), of which 81.6 percent is devoted for agricultural uses. Of the 1,600 rai (256 hectares) allotted for agricultural purposes, 94 percent is planted to rice and 6 percent to fruit trees. The village has a surface water area of 100 rai (16 hectares). The subdistrict of Nonglue is composed of 15 villages and Baan Sap Som Boon is one of the newest. Before, the community was part of the village of Nongkea. Sap Som Boon has a total population of 125 households or 541 people – 250 (46.2 percent) males and 291 (53.7 percent) females. It has an average family size of 4.23.

The study has 20 farmer respondents from Sap Som Boon – 16 males and 4 females. Their ages range from 33 to 70 years old with a mean age of 52. All respondents are Buddhists and are married with zero to four children. More than half of them, however, have two children. As to educational attainment, 15 respondents have reached level 4 while four have reached level 6. Only one respondent finished level 9. Most respondents have stayed in the village for more than two decades. Eight respondents were born and have stayed in the village for their entire life. Almost all respondents believe that life is more satisfying in the village. They describe their village to be rich in water and their fields convenient to farm since these are near their houses. Some respondents perceive the soil in the village to be richer in nutrients as compared to other villages. They would only leave their village if they lose their land or if a natural catastrophe occurs.

The farms of respondents range from 7 to 83 rai (1.12 to 13.28 hectares). More than half of respondents plant only rice in the fields while the rest also plant some fruit trees such as mango, longan, jackfruit, plum, coconut, banana and pomelo. A few respondents have corn as a second crop. Of the 20 respondents, 12 plant rice three times a year, four plant five times in two years and four plant twice a year. Three-fourths use only chemical agents, four mix chemicals with organic agents and one utilizes only organic compounds. With regards to water sources, eleven farmers have access to both ground water (well) and the irrigation canal, six have only ground water (well), two have only the irrigation canal and one has access to ground water (well), irrigation canal and the river. Twelve farmer respondents utilize both the irrigation canal and ground water (well) since the former can water only a portion of their fields – from 10 to 80 percent. Nine respondents own the land they till, eight both own a portion and rent a portion of the land they till and three wholly rent the land they till. Two land owners have mortgaged their property to the bank.

All farmer respondents no longer use a water buffalo. Instead, they own one to three tractors with brand names Kubota, Mitsubishi and Yanmar and with horsepower ranging from 8 to 21. All respondents have an irrigation/water pump with brands Honda, Kubota and Mitsubishi. They likewise own small tools such as hoes, spades, scythes, back sprayers (for insect pests), grass cutters, long knives, crowbars, shovels and others. Six farmer respondents take care of some kind livestock – ducks, fish, chickens and pigs. Six respondents have off-farm income generating activities. These include making joss sticks, money lending, selling farm inputs and construction. Four respondents hire themselves out as farm laborers during harvests and for spraying insecticides. The rest earn money wholly from farm activities – rice, fruits, corn, fish and livestock.

Table 1. Description of Cliques of Farmer Respondents

Cliques	Size	Brief Description
Health Volunteers' Group	8	This group is composed of health volunteers in the village. Group members have become attached to one another; engaging in informal activities as well. Noppon heads the group.
Hom Mali Group	6	Jasmine rice is a photosensitive crop normally grown in Thailand's Northeast Region. Farmers in the village, however, chose to test growing jasmine rice in portions of their rice field. Group members exchange notes regarding their experiments and organize themselves to source seeds from the Northeast Region.
Lamong's Group	12	At least three times a week, group members gather at Lampong's home to have a drink and discuss a wide range of topics – farming, religion, budgeting, village activities and life in general. Group members are motivated to increase productivity through the use of chemical fertilizers and pesticides.
Money Saver's Group	8	This group organized themselves as an informal money saving club. Each month, members contribute a certain sum of money and every month, members take turns receiving the said sum of money contributed. This way, members have a huge sum of money to spend or save.
Nipol's Group	12	This group has at its heart the village headman. Group members hang out in the village headman's shop. They discuss a wide range of topics including local and national news.
Organic Group	5	This group is quite small – composed of advocates of organic farming. Group members support each other in their objective of growing organic rice. They discuss the latest technologies in organic farming and learn from each other.
Sawing's Group	10	This group, headed by Sawing, is based more on friendship rather than an objective or special interest. The group is composed of Sawing's neighbors and close friends who have known each other since childhood.

Table 1. (Continue)

Cliques	Size	Brief Description
Senior Citizen's Group	20	This group, as its name suggest, is composed of the elderly citizens of the village. The group commands respect among villagers due to the wisdom and knowledge of group members. Group members consider it an honor to be part of the group.
Village Fund Group	6	A Village Fund was created to help villagers who are in need. Villagers can borrow money from the fund and pay back with interest. Committee members handling the fund have become attached to one other and have engaged in informal activities. Group members usually talk about ways of increasing one's income.

Table 2. Opinion Leaders, Field Knowledgeable and Advice Sought

Leader	Field	Advice Sought by Farmers
Adun	Organic/ Modern Farming	Seed production, fertilizers and farm labor coordination.
Lampong	Modern/ Organic Farming	Seed production, land preparation, irrigation, crop inspection and marketing.
Noppon	Organic/ Modern Farming	Seed selection, organic fertilizers, field inspection and farm labor coordination
Sawing	Organic/ Modern Farming	Rice seed selection, rice variety selection, pesticide and fertilization.

Gathering Knowledge

Sap Som Boon has an elaborate and well-developed community-based communication system – whether informal, formal and mediated – which are used for gathering information and knowledge. Informal communication networks are loose groupings of farmers who band together due to personal relationships, commonalities and special interests. Formal networks, as opposed, are organized and registered organizations established to accomplish certain objectives. The said objectives may or may not be

agriculture-related (albeit the study focuses on agriculture-related formal networks). Formal networks may have informal counterparts, especially when group members become attached to one another and undertake activities (mainly informal) other than those prescribed by the said organization. Mediated networks, for this study, include mass media and new media (internet/computer). Farmers utilize mediated networks to source and access agriculture-related information and knowledge.

Informal Communication Networks. From the interviews with 20 farmers

respondents and 4 opinion leaders, 9 informal communication networks have been identified in the village. These networks are organized due to personal relationships among members such as Lampong's group, Nipol's group and Sawing's group. They may likewise be established due to common/special interests of members such as growing jasmine rice (hom mali) and using organic farming methods. They may also be extensions of formal communication networks – the members of which having formed certain attachments and undertake informal activities – such as the health volunteers and village fund committee. In addition, senior citizens in the village have formed their own loose grouping. Informal communication networks identified have a range of 5 to 20 members. These members meet as often almost everyday or only once a month. Table 1 provides a brief description of each informal network. Some informal networks have recognized leaders such as Lampong, Nipol, Noppon and Sawing. But, there other networks who consider everyone in the group as equals such as Senior Citizens' Group, Hom Mali Group and Organic Group.

Although several opinion leaders have been identified by farmer respondents, only four were said to be opinion leaders on agriculture. Table 2 lists these opinion leaders, their field of expertise and the advice usually sought by farmers. Basically, all four opinion leaders have expertise in both organic and modern farming methods – which gives some indication of the rice farming paradigms close to the heart of farmers in the village. Farmers consult them regarding both chemical fertilizers and organic fertilizers – composting and biological liquid fertilizers. They likewise consult them about chemical organic pesticides. Opinion leaders likewise believe that they are knowledgeable and influential in fields other than farming. Sawing claims that farmers regularly consult him about the Rice Mother (Mae Posop) and livelihood. Adun, Lampong and Noppon say they are

influential regarding law and order, religion, oral traditions and livelihood.

Regarding rice farming, all four opinion leaders claim to have expertise on seed production, sowing, land preparation, fertilization, irrigation, crop protection and harvesting. Adun and Noppon are especially consulted on farm labor coordination for direct sowing and harvesting. Lampong is consulted about marketing of rice and about irrigation.

All four opinion leaders, however, are regularly consulted about rice seeds – production, selection and/or acquisition. This merely indicates that seeds are very important to farmers in the village. They also ask the characteristics of rice varieties (resistance to particular pests, for example), seed storage and mutation.

Farmer respondents and opinion leaders have linkages to both formal and informal groups outside of their village. Table 3 lists the names of members and opinion leaders with these outside linkages, enumerates the said outside linkages and describes the rice farming information obtained. In this sense, informal communication networks in the village access rice farming knowledge from both informal and formal groups elsewhere – thereby updating existing information on rice farming. It should be noted that some farmer respondents regularly visit the rice research station. However, the reason is not to update knowledge but to purchase certified seeds – the advice of one opinion leader. Most farmer respondents have likewise participated in the activities of agricultural extension agencies, particularly when extension workers visit the village to provide consultation or to conduct a meeting/seminar. However, this occurs only once or twice a year. The staff of the Rice Seed Center likewise goes to the village to purchase seeds from farmers. Since most farmer respondents have access to these extension workers, rice seed center representatives and research station, these outside links were no longer included in Table 3.

Table 3. Outside Links of Farmer Respondents and Opinion Leaders

Respondent	Outside Links	Information Obtained
Adun	Royal Irrigation Administration, Fertilizer Company	Water Scheduling, fertilizers and pesticides.
Bunchu	Chainat Cooperative Association	Loans, certified seeds, seed production, agricultural input prices, rice prices, etc.
Lampong	Extension Officers, Royal Irrigation Administration, Technology Instruction Center, Rice Seeds Center	How to deal with floods, aphids, rice varieties, seed production, irrigation and extension office activities.
Naypathun	Farmers in Other Villages	Any topic on rice farming
Noppon	Chainat Cooperative Association	Loans, certified seeds, agricultural input prices, rice prices, etc.
Sawing	Royal Irrigation Administration, Rural Elderly Entrepreneurship Development Association	Water scheduling, organic fertilizer and pesticide production.
Somchay	Salespersons of Agricultural Products	Fertilizers, pesticides and weed killers.
Surochai	Rural Elderly Entrepreneurship Development Association, Organic Farming Group in Other Provinces	Organic fertilizer, land preparation, milling, packaging and pesticide production.

Table 4. Channels Opinion Leaders Use to Update Rice Farming Knowledge

Channels	Description
Research Station	Leaders visit the research station to seek information on diseases, insects, rice seed production, planting methods, rice seed supply and rice varieties.
Extension Workers	Leaders participate in office calls, farm/home visits, demonstration farms, trainings, meetings and classes. They learn about rice varieties, seed production, crop protection, land preparation and fertilization.
Other Opinion Leaders	Opinion leaders consult each other regarding actual field experiments/results and best practices on pesticide use, rice seed selection, land preparation, planting methods, water management, new machineries, rice varieties, farm labor coordination and rice seed storage.
Mass Media	Leaders utilize radio, television and, to some extent, newspapers to seek information about rice varieties, crop protection, rice plant inspection, integrated agriculture, water supply, weather conditions and rice prices.
Farmers' Organizations	Leaders attend seminars on seed production, sourcing farm inputs, marketing, organic farming and water management.

More than informal group members, opinion leaders consciously update their knowledge on rice farming. Table 4 shows the channels through which leaders update their knowledge and describes what knowledge gets updates. The channels are research stations, extension workers, other opinion leaders, mass media and farmers' organizations. Opinion leaders, however, point out that they do not simply relay the information they obtain from these channels. To quote Sawing: "I do not teach the technology right away. I do trial and error in my own field. Once I test it to be successful, I discuss it with others." Opinion leaders obtain a variety of rice farming information from these channels. Research stations provide information on rice seeds—production, varieties, supply, planting methods, etc. Extension workers give a wider range of information to include seeds, crop protection,

fertilization and land preparation. Other opinion leaders share on-the-ground experiences and experiences – best practices and lessons learned. Farmers' organizations mainly look into problems expressed by its membership like seeds, marketing, water, source of farm inputs and organic methods (since some farmers complained of health issues relating to the use of chemical agents). Mass media affirms the best practices and lesson learned of farmers. It likewise proposes new ideas to opinion leaders. The role of mass media, as part of mediated networks, would be elaborated later on towards the end of the section.

Formal Communication Networks. Farmer respondents have identified 4 non-agriculture related formal networks and 5 agriculture related formal networks in the village. These non-agriculture related networks include Senior Citizens Group,

Village Fund Committee, Village Health Committee and Village Education Committee. Table 5 shows the agriculture related networks – Village Council, Irrigators’ Group, Baan Nongsai Farmers’ Group, Chainat Cooperative Association and Bank for Agriculture and Agricultural Cooperatives.

The formal communication networks relating to agriculture are of two types – community-based and province-based. The community-based networks are the Village Community, Irrigators’ Group and Baan Nongsai Farmers’ Group. Since most residents in the village are farmers – and most land in the village is devoted to rice farming – the Village Council takes it upon itself to look after the welfare of rice farmers – its main constituents. The Irrigators’ Group, on the other hand, is only for farmers serviced by the irrigation canal. Several farmers in the village have no access to the irrigation canal and source water from a well. The Baan Nongsai Farmers’ Group was

established for credit and marketing purposes but has expanded to transferring technologies on organic farming after members complained of the ill effects of using chemical agents. The Group, however, also has members in three to four neighboring villages so its operations are still concentrated in a limited area. The two province-based formal communication networks are the Chainat Cooperative Association and the Bank for Agriculture and Agricultural Cooperatives. Both organizations have credit as their main reasons for being. However, the former has expanded its services to include seed certification, rice milling and warehousing. The latter, on the other hand, accredits farmers’ groups and businesses to engage in activities with its members such as selling farm inputs, milling and warehousing. Almost all farmer respondents belong to the Bank for Agriculture and Agricultural Cooperatives while five respondents mentioned being members of the Chainat Cooperative Association.

Table 5. Agriculture-Related Formal Networks in or with links to the Community

Network	Brief Description
Village Council	Since most of the residents of the village are farmers, the Village Council has as one of its main concerns – the welfare and interests of farmers. Hence, the Village Council links with government agencies to undertake programs and projects for farmers.
Irrigators’ Group	The newly established irrigators’ group in the village is divided into three zones. The group, organized by the Royal Irrigation Administration, is tasked to ensure water access and distribution among its members.
Baan Nongsai Farmer’s Group	The organization was established in 2002 initially as a lending cooperative for farmers in Ban Nong Sai and surrounding villages. Later, given members’ complaints regarding the health hazards of chemical pesticides and fertilizers, the group advocated for organic farming. It provides the following services – lending, milling, warehousing, trucking, trading, organic pesticide/ fertilizer production and packaging development.

Table 5. (Continue)

Network	Brief Description
Chainat Cooperative Association	The province-wide organization was established in 1980 by farmers who did not own their land and lacked capital to engage in farming. Today, it has a membership of 2,807 farmers and a total capital of more than 213 million baht (US\$5.6 million) ¹⁴ . It offers lending, milling and warehousing services. It also sells farm inputs and certified seeds to members.
Bank for Agriculture and Agricultural Cooperatives	The publicly-owned Bank is mainly engaged in lending money to farmers in the province as capital for agricultural production. It has, however, supported cooperatives and farmers' group to service its members in terms of milling, warehousing and provision of agricultural supplies.

Table 6. Formal Networks in the Community, Communication Means and Outside Links

Formal Networks	Communication Means	Outside Links
Village Council	Audio tower, monthly meetings, trainings and seminars.	Extension Officers, Royal Irrigation Administration
Irrigators' Group	Meetings.	Royal Irrigation Administration
Baan Nongsai Farmer's Group	Meetings, visits, seminars and trainings.	Rural Elderly Entrepreneurship Development Association, organic farming groups in other provinces.
Chainat Cooperative Association	Letters, documents, announcements, telephone, meetings, general assemblies, trainings, lectures and seminars. Cooperative has local leaders in farming villages.	Farmers Groups and Cooperatives in Chainat Province.
Bank for Agriculture and Agricultural Cooperatives	Newsletters, announcements, leaflets, letters, visits, trainings, seminars, meetings, radio and television. Members are organized into groups/zones with a group leader to facilitate communication.	Farmers Groups and Cooperatives in Chainat Province.

Table 6 illustrates the main communication mechanisms and outside links of these formal communication networks. The community-based networks utilize meetings,

seminars and trainings. The Village Council, in particular, has an audio tower system or public address system which consists of speakers set up in 10 different points in the

village and the control system (microphone, amplifier, tuner, etc.) located in the Village Headman's house. The Village Headman uses the audio tower system to announce meetings, make brief announcements, explain government directives, relay radio programs on agriculture, etc. The province-based formal networks make use of a more extensive mechanism to include newsletters, personal letters, documents and radio announcements. They have divided its membership into groups and each group has a leader. For example, for the village, the

Chainat Cooperative Association has delegated as area representatives Bunchu and Noppon. The formal networks have general assemblies and/or regular meetings. Formal networks obtain information and knowledge on agriculture from their outside linkages.

Mediated Communication Networks.

This subsection describes the media environment, media consumption and media utilization profile of farmer respondents. Tables 7, 8 and 9 illustrate the print, broadcast and audio-visual/new media profile of farmer respondents. As compared to broadcast, the

Table 7. Print Media Environment, Consumption and Utilization of Farmer Respondents

Section	Brief Description
Media Environment	More than half of farmer respondents (11) get to read newspapers – Thai Rath, Daily News, Nantachai and Ban Mueng – whether national or provincial. A few farmers buy books on agriculture.
Media Consumption	Farmer respondents get to read newspapers quite seldom – mostly of them reading twice a month. They get to read newspapers when they go to town, market, bank, stores and the Village Headman's home. Those who buy books refer to these from time to time.
Media Utilization	Farmer respondents read newspapers to get updated regarding provincial and national news and to check the lottery results. Those who buy books want to be updated with the latest farming technologies.

Table 8. Broadcast Media Environment, Consumption and Utilization of Farmer Respondents

Section	Brief Description
Media Environment	More than half of farmer respondents (11) have one, two or three radio sets. In comparison, all farmer respondents (20) have one, two or three television sets. Two farmers even have 29-inch colored sets.
Media Consumption	Most farmers, with radio sets, listen one to four hours everyday – in the early morning and/or in the evening. Most farmers watch television for one to six hours everyday. There is one farmer who listens and/or watches television only three times a week.
Media Utilization	Farmers who listen to radio do so to hear relaxing music, be updated with local or national news, and/or obtain information about farming. Farmers view news, drama, boxing and agricultural programs. One watches movies on television to relax.

Table 9. Audio-Visual and New Media Environment, Consumption and Utilization of Farmer Respondents

Section	Brief Description
Media Environment	Several farmers have mobile telephones (12), VCD players (9), personal computers (2) and CD players (1).
Media Consumption	Farmers use their mobile telephones everyday for business and personal reasons. They utilize VCD players once a week although one uses it everyday. Farmers with personal computers and a CD player use it everyday.
Media Utilization	Farmers use VCD players to watch movies – preferring comedies more than any genre. Personal computers are for the use of school children. The CD is for listening to music.

print media environment is not well entrenched in the community. Although more than half of respondents have access to newspapers, they get to read these newspapers seldomly. This is because farmer respondents do not buy newspapers – preferring to read someone else’s newspaper whether the Village Headman or the newspaper in the store, market, bank, etc. Farmer respondents basically read these newspapers to find out the latest news (national or provincial) and check the lottery results. It should be noted, however, that there are two farmer respondents who buy books on agriculture since they want to upgrade their knowledge and experiment on farming techniques or technologies.

Regarding the broadcast media profile, all farmer respondents have television sets while only more than half have radio sets. Moreover, several respondents have more than one television set with two respondents investing in 29-inch colored television sets. This indicates the importance farmers give to television. They listen to radio from one to four hours a day and watch television from one to six hours a day. Both radio and television are used for relaxation,

entertainment, news updates and learn information about agriculture. With regards to audio-visual and new media, several farmers have purchased VCD players to watch movies (especially comedies) and mobile telephones for communication. Two farmers have personal computers. However, the personal computers are not for obtaining information on agriculture. They are for the formal education of their children – to make assignments, encode reports, consult encyclopedia, etc. One respondent has a CD player to listen to music.

Table 10 shows the communication networks farmer respondents utilize to obtain information and knowledge on rice farming technologies. The matrix lists the channels as well as the information obtained. In other words, there is an elaborate and well-developed communication network in the village – whether informal, formal and mediated – which farmers utilize to access information on a variety of rice farming topics. These topics include apparently the entire process from seed production/acquisition, sowing, land preparation, fertilization, irrigation, crop protection, harvesting, drying, marketing, etc.

Table 10. Networks Farmer Respondents Use to Obtain Information/ Knowledge on Farming Technologies

Network	Channels	Information/ Knowledge Obtained
Informal	Word of mouth, informal gatherings and informal consultations.	Fertilizers, pesticides, weed killers, land preparation and rice varieties.
Formal	Seminars, training, meetings, demonstration farms, audio tower, visits to research stations and farm/home visits.	Biological fertilizers, seed production, rice varieties, land preparation, diseases, insects and irrigation.
Mediated	Handouts, books, radio and television.	Rice prices, weather condition, floods, new products and new techniques.

Organizing Knowledge

Sap Som Boon uses both traditional and modern means in organizing knowledge. In this sense, knowledge management does not necessarily mean using advanced technology as presumed in several KM literature. At the

village level, residents use the means at their disposal to organize knowledge. Opinion leaders use a variety of mechanisms to organize – classify, store and retrieve – the information and knowledge they obtain from various sources.

Table 11. Information Organization Mechanisms Utilized by Informal Networks

Mechanism	Description
Use of Memory	Two opinion leaders simply rely on their memory and do not keep any document to remember information, issues and technologies discussed during meetings.
Document Storage	Two opinion leaders store documents they receive from extension officers and other agencies they come into contact with. One leader even takes notes in a logbook to interpret or understand further the information received. Some informal network members keep documents received during meetings and/or visits by extension officers and agricultural researchers.
Document Classification	The documents are classified using their own system. These two opinion leaders have developed their classification system on their own – they did not have any training.
Document Retrieval	When needed, these two opinion leaders retrieve their stored documents and/or consult their notes.

Table 12. Information Organization Mechanisms Utilized by Formal Networks

Mechanism	Description
Use of Memory	The Village Council does not take notes relating to its meetings. They basically rely on their memory to recall information and technologies. Usually, when a problem arises in the village, they simply refer the affected farmers to extension workers or to government officials who attended a village meeting.
Computers	The Chainat Cooperative Association, Baan Nongsai Farmers' Group and the Bank of Agriculture utilize a computer to record the profile of its members – including address, loaned amount, loan payments, farm area, productivity, etc.
Document Storage, Classification and Retrieval	The Baan Nongsai Farmers' Group keeps documents about rice farming techniques, which it classifies into organic, chemical and for group dissemination. The Chainat Cooperative Association keeps paper documents regarding its members' profile. It does not have enough computers to accumulate a database of all its members.

To a large extent, the mechanisms utilized reflect the background/profile of each opinion leader. For example, Sawing and Lampong merely rely on their memory organize and store information. Sawing (55 years old) and Lampong (43 years old) only finished in terms of educational attainment Level 5 and Level 4, respectively. Adun (46 years old) and Noppon (33 years old) have developed a more complex information organization system – as shown in Table 11. Adun has reached Level 7 while Noppon graduated from college. Adun is also self-taught – being the sales manager of a fertilizer company. All four opinion leaders, however, have commonalities. All leaders serve in various formal networks in the village – some having two or more formal networks. They likewise share socio-cultural characteristics – Buddhists, married and having two to three children.

Formal communication networks have devised different ways of information organization. The Village Council members

still rely on their memory. They do not take notes or keep minutes of the meetings. The province-based networks and the Baan Nongsai Farmers' Group keep computerized records about each member, especially because they provide loans and need to monitor payment of their loans. The Chainat Cooperative Association also keeps paper documents on its members. With regards to farming technologies, it is only the Baan Nongsai Farmers' Group that stores documents on farming techniques. Members of this network are interested in learning organic methods of farming.

Refining Knowledge

In refining, Sap Som Boon villagers determine how to fit the information and knowledge gathered and organized into their existing situation. In doing so, they look at whether these new knowledge and information complement their perspectives

on rice farming. It should be noted that the village under study has always been engaged in rice farming. Farmer respondents point to the fact that they are merely continuing what their ancestors did and that they inherited their land and skills in farming from their ancestors. This section is divided into main definitions on rice farming and subsequent definitions on rice farming. The main definitions include those about rice farming in general and on types of rice farming methods. Subsequent definitions include those on specific rice farming activities.

Main Definitions on Rice Farming.

Table 13 provides the positive and negative definitions of farmer respondents on rice farming and rice farmers. For farmer respondents, rice farming is a source of food, a legacy given by forebears and a good money making venture. However, rice farming is hard work and needs skills to undertake. Worse, farmers have no control over rice prices – making the business venture

somewhat risky. Regarding rice farmers, they scoff at the conception that rice farmers are poor – pointing at their ability to build large houses, maintain their properties, buy new appliances/vehicles and send their children to school. They described themselves as industrious and independent who always learn and train. They also see themselves as proud because they continue the culture of past generations, feed the populace and are the backbone of the nation. They can also choose what to eat – they do not eat rice grown using chemical agents and/or rice of a variety other than jasmine rice (hom mali). However, they admit that farmers have low status in society, have low education, are not glamorous and have no time to travel. Farmers, they believe, are always exhausted and tired from work.

Farmer respondents likewise defined different kinds of rice farming paradigms – organic, modern and traditional. There are basically two points of view regarding organic

Table 13. Farmer Respondents’ Definition of Rice Farming/Farmers

	Positive	Negative
Rice Farming	<p>Source of food. Don't need to buy rice since they produce it themselves.</p> <p>It is a legacy given to them by their forebears.</p> <p>Good money making venture.</p>	<p>Hard work and requires skill. Fields need looking after.</p> <p>Rice prices depend of market factors and are beyond the farmers' control.</p> <p>Risky business venture.</p>
Rice Farmers	<p>Industrious – always learning and training.</p> <p>Not poor. Farmers being poor is a misconception.</p> <p>Have their own time and do not have a boss. Independent.</p> <p>Proud since they are continuing the culture of past generations and are feeding the population. Backbone of Thailand.</p> <p>Can choose what to eat. They eat the best varieties and those organically grown.</p>	<p>Low status in society.</p> <p>Always tired and exhausted from work.</p> <p>Job is not glamorous. Hands and feet are covered with mud.</p> <p>Does not allow them to go to different places. Work continuously.</p> <p>Do not have high education.</p>

farming. Most farmer respondents see organic farming as producing yield just enough to sustain oneself and one's family. Income derived from this method is not enough to meet the education needs of their children. So, they argue, this can only be done by farmers who own land and who have grown children. On the bright side, organic farming improves soil quality. The second view regarding organic farming is that it is a profitable business venture. Organic products fetch higher prices because consumers nowadays are more health conscious. Some farmer respondents see it in the same light but do not like the idea that they are doing something different from other farmers. Hence, they do not practice organic farming. At any rate, rice crops produced through organic means are the ones eaten by farmers in the community. Farmers purchase the rice grown organically by their neighbors.

On the other hand, most farmer respondents view favorably modern farming. They describe it as fast and highly mechanized. They can plant up to three times a year and at the time they want. Hence, they can get their investment back immediately and have reduced labor costs. However, since they need a lot of farm inputs such as fertilizers and pesticides, they have to raise capital to engage in modern rice farming. They likewise note that modern farming has made the soil depleted of nutrients since the land has no time to rest and since they consume large amounts of chemical fertilizers. A few farmers have complained about the effects of using chemical agents on their health and therefore, have viewed modern farming negatively and have shifted to organic farming. Regarding traditional farming, farmer respondents unanimously agree that it does not need much capital since traditional varieties have adapted to the environment. They do not need much, if at all, fertilizers and pesticides. However, in traditional farming, varieties take a long time to grow and have low yield. In addition,

a lot of labor is needed since each process is done manually. As a result, farmer respondents do not find it a lucrative business.

As one farmer put it, "We do not have much rice to sell with traditional farming."

Subsequent Definitions on Rice Farming. This subsection covers farmer respondents definitions on specific rice farming activities – such as seed production, seed raising and growth, sowing and planting, land preparation, fertilization, irrigation, crop protection, harvesting and post harvest. Tables 14 and 15 show farmer respondents definition regarding seeds – its production and raising. In Matrix 14, farmer respondents argue about the pros and cons of producing one's own seeds and buying certified seeds from somewhere else. In Matrix 15, farmer respondents acknowledge the advantages of raising seedlings. However, they see greater advantages in not undertaking this process – saving on time and labor. In this manner, farmers assess the information and knowledge they had gathered and organized – fitting these into their existing situations.

Hence, farmer respondent look favorably at direct sowing. As they describe it, direct sowing is faster and easier than transplanting. They say that it produces acceptable (read: not better) results as transplanting. They likewise caution about the numerous disadvantages of direct sowing, which may also be costly in some aspects (certified seeds costs) and economical in other respects (reduced labor costs). Farmer respondents then weigh traditional, modern and organic means of land preparation, fertilization, irrigation and crop protection. They look favorably at modern methods since mechanization has made the job faster and easier. Moreover, the use of chemical agents ensures crop growth and protection. Modern infrastructure, meanwhile, has ensured crop irrigation. On the other hand, they view modern means as having disastrous effects on soil quality and people's health. They likewise speak of the expense relating to

modern methods. For these reasons, some farmer respondents view organic methods positively, especially in terms of fertilization and crop protection. Other farmers simply explore ways of reducing the use of farm

inputs like just spraying when they detect the presence of a disease or pests at unacceptable levels. Traditional farming is no longer seen as an option in these said steps in rice farming. They look at it as “old fashioned” and “against progress.”

Table 14. Farmer Respondents’ Definition of Seed Production

Positive	Negative
<p>If you produce your own seeds, you save money since you do not need to buy.</p> <p>If you do not produce good quality planting seeds, you can always buy certified seeds at the research station or the store.</p> <p>Given the importance of seed production, farmers regularly exchange opinions and consult each other regarding this.</p>	<p>The process of seed production is quite complicated and farmers are not confident doing this. It has many steps such as drying, handling and storing.</p> <p>It is difficult to consistently produce good quality planting seeds.</p> <p>Some farmers do not have time to undertake seed production. So, some feel that it is useless to have studied it.</p>

Table 15. Farmer Respondents’ Definition of Seed Raising and Growth

Positive	Negative
<p>Raising your own seedlings is fine because it ensures a good yield. Rice plants have a head start in growing in relation to weeds.</p> <p>It is not necessarily more expensive to raise your own seedlings as compared to buying certified seeds. Certified seeds are very expensive.</p>	<p>It is not convenient. You look after a seedbed. You check for pests like snails and for diseases. Farmers do not practice this anymore.</p> <p>Since demand for labor is higher than supply, you cannot undertake seed raising and transplanting anymore.</p>

Table 16. Farmer Respondents’ Definition of Sowing and Planting Methods

Positive	Negative
<p>Direct sowing is faster and easier than transplanting. It requires lesser laborers and is therefore more economical.</p> <p>In direct sowing, you need not look after a seedbed. Do not worry about pests.</p> <p>Direct sowing also produces acceptable results – as acceptable as transplanting.</p>	<p>You need to know the right amount of seeds to sow. If it gets too crowded in the field, the results will not be good. You need to be alert regarding the weather. If it will rain hard, do not sow because the seeds will not sprout properly. You need to beware of snails in the sowing process because they like to eat sprouted seeds.</p> <p>The cost is quite high because many farmers use certified seeds. In transplanting, you may also need to buy certified seeds.</p>

Farmer respondents only see modern means as the way harvesting, threshing, drying and post-harvest activities should be undertaken. They no longer think on whether to use traditional methods. So, they contract a harvester to mechanically harvest their crops and sell immediately to a rice mill, cooperative and/or merchant who will undertake threshing, drying, milling, packing, warehousing and other post harvest activities.

However, farmer respondents still see the need to conduct storing for organically grown rice and/or jasmine rice (hom mali), which would be for their personal consumption. Regarding rice straw, farmer respondents are engaged in debate on whether to burn these or use these for fertilizers. Using rice straw as animal feed is no longer an option since there are no water buffaloes or cattle in the area.

Table 17. Farmer Respondents' Definition of Land Preparation

Positive	Negative
<p>With machines, the job has become fast, easy and convenient. The buffalo is slow and tiring.</p> <p>Land preparation is critical in ensuring a good yield. The longer you prepare your land, the better. It leads to good crop yield.</p>	<p>Machines may be fast but it is also costly. Some farmers have to rent it.</p> <p>You need to allot time for land preparation to do it properly. Do not rush it. You need to be sure that it will be easy to water the crops.</p>

Table 18. Farmer Respondents' Definition of Fertilization

Positive	Negative
<p>Chemical fertilizers make the crops grow faster and well. They also ensure a high crop yield.</p> <p>There are a variety of fertilizers to choose from nowadays. We now have biological fertilizers as well.</p>	<p>The soil nowadays is of poor quality due to chemical fertilizer use and increased farming intensity. Farmers need to find ways to improve it.</p> <p>Chemical fertilizers are expensive. Farmers need to reduce cost.</p>

Table 19. Farmer Respondents' Definition of Irrigation

Positive	Negative
<p>The village is blessed with water sources. It has an irrigation system and has natural water sources – ground water and the river. That is why the village produces a lot of rice crops.</p>	<p>The irrigation system does not provide enough water year round.</p> <p>Ground water is expensive to tap given fuel costs.</p>

Table 20. Farmer Respondents' Definition of Crop Protection

Positive	Negative
Chemical pesticides ensure that crops are protected. It is essential to use pesticides to have a good harvest.	Chemical pesticides are expensive and can affect one's health.
Prevention is still better. Spray pesticides as a preventive measure.	To save on cost, just spray when you detect the presence of a disease or pest at unacceptable levels.

Table 21. Farmer Respondents' Definition of Harvesting, Drying and Threshing

Positive	Negative
You need to harvest at the right time. You need to count paddy age correctly.	The use of machines has resulted in a lot of wastage. A lot of grains fall down.
Machines have made the processes of harvesting, drying and threshing fast, easy and convenient. You don't need a lot of laborers.	There is a need to contract the harvester and make reservations ahead of time. So, you need to know when to harvest. You also need to hire laborers.

Table 22. Farmer Respondents' Definition of Post Harvest Activities

Positive	Negative
Burning rice straw makes it easy to prepare your field for the next batch.	Burning straw rice deprives a farmer of a good source of fertilizers. It also causes pollution.
Farmers can sell their crops immediately after harvest – so they do not engage in drying, milling and storage anymore.	Farmers can fetch a higher price for dried or milled rice. But, they do not have time to do these as they need to prepare for the next batch.

Disseminating Knowledge

After refining knowledge based on their existing perspectives on rice farming, Sap Som Boon residents proceed with disseminating knowledge and information. The dissemination of information and knowledge may be undertaken through informal and formal communication networks in the community. Table 23 illustrates the main information sharing mechanisms of informal networks in the village. These are

basically consultations, word of mouth and lending of reading materials. Opinion leaders receive reading materials from research station, extension offices, etc. on a regular basis. It should be noted that not only opinion leaders share information, clique members exchange information to one another – especially regarding the results of their experiments and experiences. Links, on the other hand, exchange information with members of other cliques. This is how information and knowledge on rice farming

informally passes from one person to another in the village.

There are different ways these formal networks announce their meetings. As shown in Matrix 24, the Village Council uses the audio tower system while the other community-based formal networks use word of mouth, zone system and personal visits. The province-based formal networks use group leaders/system, media and telephones (especially for emergency meetings). One problem all formal networks face is poor attendance. Farmer respondents usually claim that they are too busy to attend meetings, especially since they plant three times a year or five times in two years. To motivate farmers to attend meetings, the Chainat Cooperative Association gives incentives such as reduced interest payment and lower medical fees. The Bank for Agriculture and Agricultural Cooperatives prefer small group area

meetings to encourage members to attend meetings. All formal networks agree that members must not be forced to attend meetings and that they must not fine members who fail to attend meetings. They believe that the effect of such a policy would be negative more than positive. A few farmer respondents, however, have complained that the meetings of community-based formal networks are infrequent and irregular. Worse, the meetings are not coordinated properly. Some mentioned that the audio tower system frequently breaks down so the system is unreliable. More often than not, they could not make out what is being said or nothing comes out at all. Regarding the Irrigators' Association, several farmer respondents mentioned that they do not know of the organization's existence, which is understandable since it has been re-organized quite recently.

Table 23. Information Sharing Mechanisms Utilized by Informal Networks

Networks	Mechanism	Information Shared on Rice Farmings
Clique Members	Word of Mouth	Information on their experiments (trial and error) on combating pests, maintaining soil fertility, using of new rice varieties, etc. This includes good rice farming practices, resulting in abundant yield.
Links	Word of Mouth	Information on new technologies developed by research institutions, prices, farm inputs (such as fertilizers, pesticides, etc.), weather conditions, farm implements and other related matters. Information regarding goings-on in the community.
	Lending of Reading Materials	Information obtained from their attendance to seminars (for example, new rice varieties and fertilizer usage) and visits to research stations.
Opinion Leader	Consultations	Information imparted is based on the problem faced by the farmer – presence of certain diseases, producing seeds, pesticide to use, etc.
	Lending of Reading Materials	Information obtained from attendance to seminars of extension offices and visits to the rice research station.
	Word of Mouth	Information on the accomplishments, plans and activities of the formal networks.

Table 24. Mechanisms Utilized by Formal Networks to Announce Meetings

Networks	Mechanism	Information Shared on Rice Farmings
Village Council	Audio Tower	The Village Headman announces the monthly meetings over the audio tower. The system consists of speakers located in ten different parts of the village and a central control mechanism, which is located in the Village Headman's home.
Irrigators' Group	Word of Mouth Zone System	The irrigators' association in the village is divided into three zones – Zone 1 (East), Zone 2 (Central) and Zone 3 (West). Each zone has a leader who announces through word of mouth and conducts his/her own meeting.
Ban Nong Sai Farmer's Group	Word of Mouth Personal Visits	Leaders of this farmers' group go to the houses of their members to announce a meeting and its agenda. Since its members live in a few and in neighboring villages, this is not a problem.
Chainat Cooperative Association	Group Leaders Telephone	The association has two local leaders in the village. These leaders act as the links of the association to the village. They announce meetings, collect payments, arrange services and undertake other functions in behalf of the association. Those members with telephones are given a ring.
Bank for Agriculture and Agricultural Cooperatives	Group System Broadcast and Print Media Telephone	Farmers usually are grouped into 10 and with a designated leader. The leader announces to his members the meeting and its agenda. The Bank also communicates through radio, community television and print announcements. Telephones are utilized for emergency meetings.

Conclusions

From the discussions on the Thailand case, rice farming villages as “learning organizations” appear to be plausible. The village of Sap Som Boon place great importance in knowledge as a resource to remain competitive in rice production. For these villagers, rice farming is a money making venture or a business activity. Hence, they undertake various activities to harness their knowledge resource through the

processes of gathering, organizing, refining and disseminating. In gathering, villagers have made inroads in obtaining information and knowledge on rice farming from internal and external sources – mainly through the use of informal, formal and mediated communication networks. While villagers are highly successful in gathering knowledge, they need improvement in organizing it. Much of the knowledge gathered remains implicit or tacit – stored in memories and seen in actual practices. A lot of knowledge

is not made explicit in documents and databases. However, it should be noted that information on organic farming is rather explicit – as one formal network has actively worked on this.

In refining knowledge, villagers assess and/or evaluate various information and knowledge – fitting these into their existing situations. Hence, they look at various rice farming innovations and technologies in the light of various rice farming activities – seed raising to irrigation, land preparation to

harvesting, crop protection to post-harvest. In disseminating knowledge, villagers once again utilize their various communication networks. Farmers ensure participation from other since rice farming is a social activity. It only becomes plausible and successful with the cooperation of other farmers. In short, rice farming villages like other learning organizations manage their knowledge – they acquire it, develop it, assess it, organize it, sort it, disseminate it, share it, debate on it, make sense of it, test it, modify it and/or drop it.

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About the Authors

Jude William Genilo (jgenilo@yahoo.com) earned his Doctor of Philosophy in Communication from the University of the Philippines - Diliman. He was a recipient of the ASIA Fellows Awards for 2004-2005-allowing him to be a research fellow at Kasetsart University in Bangkok, Thailand. In May 2005, he was given an award by the United Nations Foundation and International Communication Association for presenting a research proposal aimed at improving the UN's Communication Programme. He is currently the Programme Director of the Graduate School of the London School of Public Relations, Jakarta.