Japan International Cooperation Agency

Ministry of Agriculture and Cooperatives

THE PROJECT FOR FLOOD COUNTERMEASURES FOR THAILAND AGRICULTURAL SECTOR IN THE KINGDOM OF THAILAND

FINAL REPORT

Appendix III: Community Case Studies

July 2013

SANYU CONSULTANTS INC.

NIPPON KOEI CO., LTD.

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Community Case Study

Tambon Chum Saeng Songkram, Bang Rakam District
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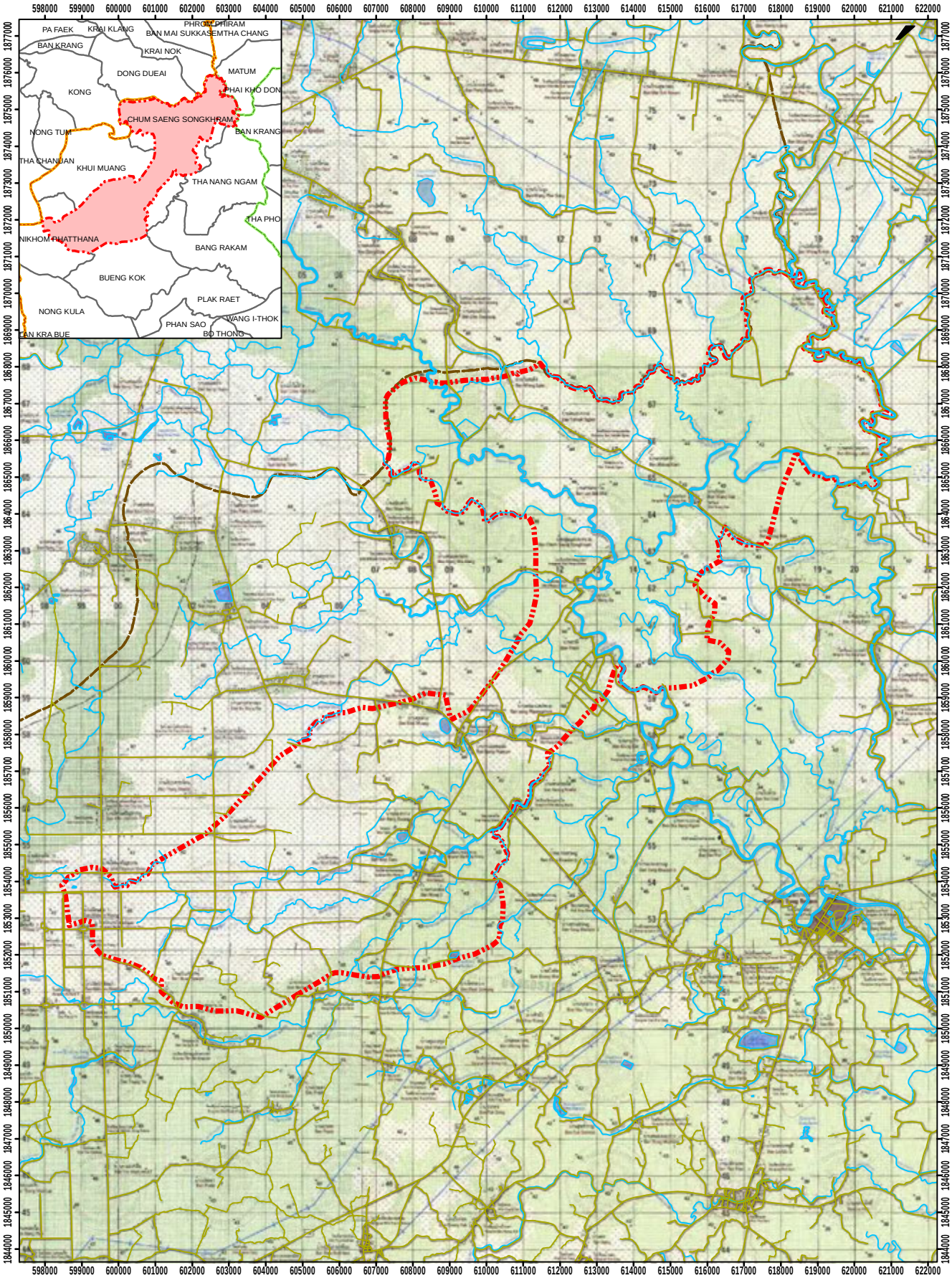


Legend

- Provincial Boundary
- Tambon Chun Saeng Songkhram
- Water body
- River
- Road

Note Data Source:
Tambon Boundary of
Chun Saeng Songkhram: TAO
Neibouring Tambon Boundary: GISTDA
Other data: RID

Scale 1:100,000 (1 0.5 0 1 2 3 4 km)

Date July 2013

Project for
Flood Countermeasures
for
Thailand Agricultural Sector

JICA

Topographic Map in Tambon Chum Saen Songkhram, Amphoe Bang Rakam, Phitsanulok Province

1. General Information of Chum Saeng Sonkram Sub-district

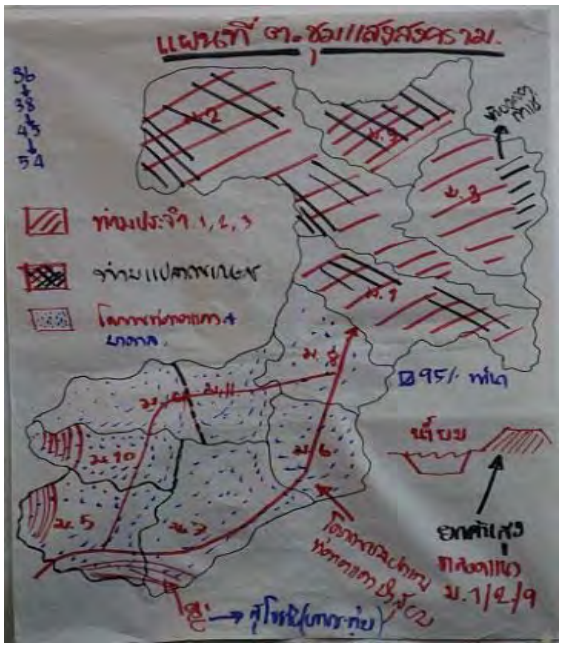
History of Chum Saeng Songkhram Sub-district

Chum Saeng Songkhram Sub-district is an old community situated in the administrative area of Bang Rakam District, Phitsanulok Province. It is approximately 12 kilometers far from Bang Rakam District. The terrain is a slope towards the south-west direction. Most of the habitats have agricultural profession.

Chum Saeng Songkhram Sub-district is an ancient community. It is believed that the area once used to be the army maneuver and location of the army in the past. They used Yom River as the main route. Communities scattered all over along two banks of Yom River. Chum Saeng Songkhram Sub-district has been called for former name of Bang Rakam District since B.E.2448 (A.D.1905) before the enacted on 24 April, B.E. 2460 (A.D.1917). Therefore, Chum Saeng District later had been changed to Bang Rakam District and degraded to Sub-district up to the present.

Boundaries:

To the north connected to:	Dong Duay Sub-district of Krong Krai Las District Sukhothai Province
To the south connected to:	Ta Nang Ngam Sub-district, Bang Rakam District, Phitsanulok Province
To the east connected to:	Bueng Kok Sub-district, Bang Rakam District Phitsanulok Province
To the west connected to:	Nikhom Pattana Sub-district and Kui Muang Sub-district, Bang Kratum District, Phitsanulok Province



Map 1 Map of Chum Saeng Songkhram Sub-district

1. PRA Report

Governmental Administration

Divided into 11 villages as follows:

Moo 1 Ban Bang Ba
Moo 2 Ban Chum Saeng Songkhram
Moo 3 Ban Wang Rae
Moo 4 Ban Nong Pa Yom
Moo 5 Ban Wat Taen
Moo 6 Ban Huang Kradai
Moo 7 Ban Nong Aor
Moo 8 Ban Nong Paeng Puay
Moo 9 Ban Ta Baek Ngam
Moo 10 Ban Klong Luak
Moo 11 Ban Fak Klong

Number of Population

Table 1 Number of Population

Village No. and Name	Male	Female	Total	Households
Moo 1 Ban Bang Ba	356	346	702	218
Moo 2 Ban Chum Saeng Songkhram	296	285	581	176
Moo 3 Ban Wang Rae	338	368	706	215
Moo 4 Ban Nong Pa Yom	343	347	690	221
Moo 5 Ban Wat Taen	439	475	914	280
Moo 6 Ban Huang Kradai	329	344	673	196
Moo 7 Ban Nong Aor	604	600	1,204	361
Moo 8 Ban Nong Paeng Puay	233	265	498	149
Moo 9 Ban Ta Baek Ngam	339	331	670	223
Moo 10 Ban Klong Luak	263	300	563	182
Moo 11 Ban Fak Klong	235	273	508	149
Total	**3,775**	**3,934**	**7,709**	**2,370**

As of February, 2011 from Nakhon Pa Mak Sub-district Administrative Organization

Topography

Topography of the area is the river basin sloping into the south-west direction and is divided into two parts. Part 1 is the river basin situated above the Yom River. There are some rivers flowing through the area such as Ket Canal, Klam Canal, Taluk E-Laen Canal and Puang Sa Dao Canal, etc. They are the catchment canals receiving water from Yom River and drainage canals for some certain seasons. So, it is quite affected by the flood faster than the other side of the bank and this area can drain slower as well. However, it is the fertilized area.

Part 2 is a bit higher land than the first part that lies above the upper area of Yom River. All canals irrigating there are not always have sufficient water through a year. It is necessary to receive water via the copper pipes sent from Kamphaeng Petch Province. Therefore, this area is drier than the upper area.

Religion and Beliefs

The majority of Thai people believe in Buddhism. There are temples all over the area and the traditions and cultures of the community have been inherited up to these days.

Occupation

The majority of the people in the community have agricultural profession planting rice (direct sowing and parachuting). Some raise animals especially the Thai Bang Kaeo Dog which is famous of Phitsanulok Province. They raise this breed of dogs as additional work. During the flood season, people will capture fishes for income generating and compensating the income from rice cultivation.

Transportation

For transportation, there are one main road and many small streets which are concrete, asphalt and gravel in total number of 60 streets.

Land Holding

Total Land Holding	75,243.75 Rais

2. Physical, Biological and Socio-Economic Features

Physical Features

Geographic feature of Chum Saeng Songkhram Sub-district is plain lowland sploping to the southwest direction, having Yom River flowing through by the southwest, small cutting of the central and the south of it with a number of canals such as Klong Yai (Yai Canal), Klong Paeng Puai, Klong Nong Pa Yom, Klong Luek, Klong Hangkradai, Klong Nong Jic, Klong Mai Luang and others. In the rainy season, it usually brings flood; in contrast, severe drought occurs during the dry season.

Regarding the weather, Monsoon traditionally comes from South China Sea and Indian Ocean. There are 3 seasons consisted: Hot season is from February to April having approximately 32 degree Celsius, Rainy season starts in May until October with an average annual rainfall of 1,375 mm., and Cold season begins in November and ends in January with an average temperature of 19 degree Celsius.

Map 2 Phitsanulok Province

Natural Water Resources

Yom River is originally from tropically rain forest with steep and complicating hills of Pee Pan Nam and Dan Lao Mountain Range which locate in Chiang Rai, Payao and Prae with approximate length of 700 kilometers having a stream flowing through highland of Prae, Sukhothai, Phitsanulok and Pichit which meets Nan River at Chum Saeng Songkhram District , Nakhon sawan Province before joining Ping River at Paknampho, Muang District, Nakonsawan Province.

Ket Canal and Klam Canals are natural canals connecting Kong Krai Las District, Sukhothai Province and Bang Rakam District, Phitsanulok. It is in Yom river low which connects Wang Rae Canal, Bang Kaeo Canal and Yom River in Chum Saeng Songkhram Sub-district.

Figure 1 Klam Canal

Wang Rae Canal is a canal connecting Yom River and Meim Canal (or called Old Yom River.) Irrigation Building of the Wang Rae Drainage Project is used as a Water Management Control Point.

Figure 2 Wang Rae Canal

Klong (Canal) is a waterway or a canal by either natural form or manmade to connect a river or sea. Chum Saeng Songkhram Sub-district has a number of canals flowing through the central and the south of it. There are canals in Chum Saeng Songkhram Sub-district divided by community as follows:

Moo 1 Baan Bang Bah : Klong Nong Kwaw, Klong Laem Sakae, Klong Ae ah
Moo 2 Baan Chum Saeng Songkhram: Klong Wang Samsam, Klong Ta Gnern
Moo 3 Baan Wang Rae: Klong Wang Rae, Klong Wang Nai, Klong Sa Dao, Klong Ai-Darb
Moo 4 Baan Nong Payom: Klong Pangpuai, Klong Plab Songnang
Moo 5 Baan Wat Tan: Klong Pangpuai, Klong Luek, Klong Nongjik
Moo 6 Baan Huang Kradai: Klong Huang Kradai
Moo 7 Baan Nong Aor: Klong Mai Luang, Klong Prapai, Klong Nongjik, Klong E-Hok, Klong Baan Nongyao
Moo 8 Baan Nong Pangpuai: Klong KrungKrak , Klong Nong Noi
Moo 9 Baan Tabakngam: Klong Klam, Klong Talu E-Tan
Moo 10 Baan Klong Luek: Klong Pangpuai, Klong Luek

Nong (Swamp/ Pond) is the shallow water resource with a little slope of shore and without a deep waterline. Most of it is lowlands likely to have flood and no drainage way. During rainy season, a land turns a widely big wetland but changes to be shallow due to a reduction in water quantity during dry season. This brings about a growth of annual crops covering around the area.

Natural Pond of Chum Saeng Songkhram divided by community as follows:

Moo 1 Baan Bang Bah: Nong Kwaw, Nong Songhong, Nong Rakam
Moo 2 Baan Chum Saeng Songkhram: Nong Yai, Nong Yao, Nong Samian, Nong Wangsamsam
Moo 3 Baan Wang Rae: Nong Jok
Moo 4 Baan Nong Payom: Nong Ta-in, Nong Payom, Nong Tong, Nong Yao
Moo 7 Baan Nong Aor: Nong Yao
Moo 8 Baan Nong Pangpuai: Nong Pangpuai
Moo 9 Baan Tabakngam: Nong Pakbung

Fai (Barrier Weir) is a type of irrigations built at a beginning of a stream blocking waterway in order to irrigate and lead the overflow water up to its bar. barrier weir works as a station collecting water to reach its proper level that's enough for the flowing into canals as needed regarding a use in growing season. For more than needed, water is crossing over the bar and collected for the use during the dry season. A construction of barrier weirs in Chum Saeng Songkhram Sub-district is set as the following:

1. Klong Nong Kwaw	Moo 1 Baan Bang Bah (group of Baan Nong Kwaw)
2. Klong Wang Samsam	Moo 2 Baan Chum Saeng Songkhram
3. Klong Wat Tan	Moo 5 Baan Wat Tan (behind Tan temple)
4. Klong Huang Kradai	Moo 6 Baan Huang Kradai
5. Klong Huang Kradai	Moo 6 Baan Huang Kradai (at a border of Moo 7)
6. Klong Pangpuai	Moo 8 Baan Nong Pangpuai
7. Klong Lek	Moo 10 Baan Klong Luek
8. Fai Yang	Moo 1 Baan Bang Bah (Pissanukok Irrigation Project, Royal Irrigation Department)

Electric Pumping and Distribution System

There are three stations of EPDS as follows

1. Electric Pumping and Distribution System of Village Moo 1 Baan Bang Bah (West wing)
2. Electric Pumping and Distribution System of Village Moo 1 Baan Bang Bah (East wing)
3. Electric Pumping and Distribution System of Village Moo 9 Baan Tabaek Ngam

Water distribution by EPDS at Moo 1 Baan Bang Bah which is the floating canal (Bang Bah-Nong Payom)

3 Electricity Pumping Projects in Village Moo 9 Ban Tabaek Ngam

Electric Pumping and Distribution System of Moo 9 is built a sink out taking water to a concrete canal so called Klong Dard

30 Groundwater Stations (Boh Ba Darn)

Nam Ba Darn (Groundwater) is a part of underground water which is a zone of saturation, including underground stream. Generally, it means all underground water except internal water which is in a zone of saturation (Geology Dictionary, B.E.2530)

19 Stations of Water Supplies in the Communities

Community Water tap standardized following the Department of Water Resources' criteria (edited from Department of Health's) in Chum Saeng Sub-district provides quality clear water for all in Sub-district except in Nong Kwaeo as a finding of turbid water with red dregs (small water supplies).

- Description: a concrete tank with medium power generation (100-250 households)
- Water Resource: surface water and underground water
- Filtering system: developed to be standardized in a rough filter, contaminant filter, color and smell bleaching and chemicals for elimination of microbes.
- Strong point: most following a standard
- Development: should allocate budget for construction or attach with other water tap techniques to reduce construction methods

Roads

There are 10 concrete roads, 10 macadamized roads and 10 non-asphalt roads. Concrete and macadamized roads are concerned as most importance for transportation and accessibility between Sub-district and villages while non-asphalt roads are likely used as a way leading to farms.

Concrete roads of Wat Tan (Soi 1) - non-asphalt road of Moo 4, Baan Huang Kradai – Baan Nong Pangpuai, Baan Huang Kradai – Baan Nong Aor, Baan Nong Aor – Baan Bueng Kad, Baan Huang Kradai – Baan Klong Luek, Baan Nong Yang (Soi 1,2,3,4,5)

Macadamized roads: Baan Nong Payom – Baan Tabakngam, Baan Nong Payom – Klong Luek, Baan Huang Kradai – Baan Nong Pangpuai, Baan Hang Kradai 2, Baan Nong Aor – Baan Wat Tan, Baan Nong Aor – Baan Pattananikom, Baan Nong Jik (Soi 1) Baan Nong Payom – Baan Tabakngam, Baan Fak Klong – Baan Nong Payom – Baan Krungkrak

Natural resources and environments

Public areas of the sub-district have 1,392 Rai. 5 Rai is used for a construction of Health Park of Nong Payom. Most of the area is divided as a public pond while the remains are public use in Moo 2 , 3, 7, a location of Wat Tan School, Wat Tabakngam School, Cemetery in Moo 3, Hang Kradai Cemetery and Pangpuai Cemetery.

Community Location

Houses are built along road sides and river and canals. For people living nearby river and canals, they locate their houses on high land while those settling down as a grouping a big group live near where temples, schools and health centers are included.

Figure 3 Regular flooded areas, flooded farms, drought areas gaining water from the Copper Pipe Project and big/frequently drilled areas for underground water

1. PRA Report

Causes of flood

Due to heavy rain in the north on June 25, 2011, the depression “Hai-Mah” having center in Laos or around 180 kilometers north of Nong Khai Province was moving west 15 kilometers per hour and weakening to low pressure. On 26 June 2011, the low pressure of Hai-Mah was covering Nan Province resulting in the north having heavy to extremely heavy rain in large area. This caused flash flood and the rushing down in Mae Hongsorn, Chiang Rai, Chiang Nai, Lam Phun, Lam Pang, Payao, Nan, Prae, Uttaradit, Tak, Sukothai, Phitsanulok, and Petchaboon.

The flood in the area of Chum Saengkram was caused by Yom River flowing over the shore, and water flowing rapidly into canals mostly in Moo 1 and 2. The water was crossing roads and going through pipes under the roads. The flood was actually from Klong Mem or Old Yom River to Klong Wang Rae, coming from a canal connecting Kamphaeng Petch and Sukothai. In some years, a lot water coming from Kamphaeng Petch brings flood to high land as well and water in Yom River separates to both riverbanks.

A long period of flood is caused by water in Yom River supporting the wetland unable to drain. It’s usually flood in Moo 1,2,3, and 9 every year as having plain in pan swamp. Flood occurs repeatedly more or less depending on quantity of water. Regular flood in farming areas are resulted in Moo 1, 2, 9 , while only around Klong Bang Rae Moo 3 is influenced.

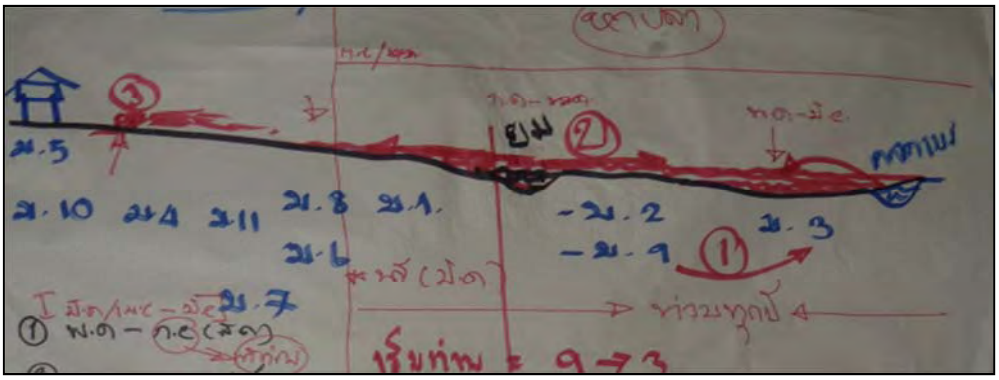


Figure 4 Cross-section of regular and repeated flooding areas in sub-district showing a slope of the area

Division of Sub-districts by geography

Chum Saeng Songkhram Sub-district is divided into 2 sides by its geography: upper side and lower side. Villages Moo 4,5,6,7,8,10 and 11 are in upper land, while the lower one contains villages Moo 1, 2, 3 and 6. The upper land likely has a shortage of water in dry season. The lower land in contrast meets flood every year.

Trouble with Drought

During drought season, villages Moo 1, 2, 3 and 9 gain water from Narasuan Dam draining water into Klong Mem, Klong Mae Rahan and Klong Wang Rae then going to Yom River. Upper land villages Moo 5,6,7,8,10 and 11 has lot of ground drilling for underground water as lack of river and canals. Although they receive water from the Copper Pipe Project, a quantity of water is still inadequate. Thus, farmers need underground water. Regular level of underground water is about 9 Wa(18 meters) but turns 12 Wa (24 meters) in dry season. It's sometimes 50-60 Wa (120 meters) as average depth. Farmers using a pumping machine waste more money than electric pump because of inadequate power. Copper Pipe Project is the irrigation project of Ping River, Kampangpet draining water into Klong Prapaim Klong Huang Kradai and Klong Krungkrak . Water only reaches the head water but the end.

Suggestions

Significant problems in this sub-district are flood in lower land and drought in upper land

Flood Concerns

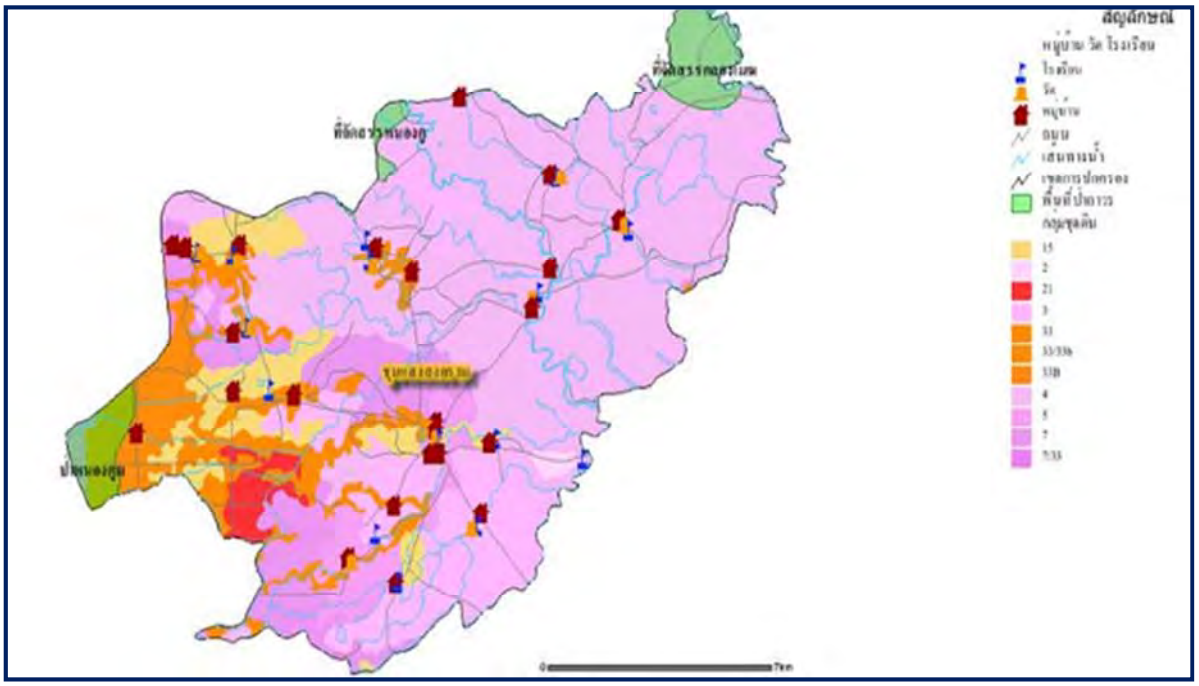
Building ditches along the riverbanks of Yom River in Chum Saeng Songkhram Sub-district is suggested. Having canals dredged up is conducted for drainage. The soil from canals could be reused as a ditch. Somewhere might need a door to block the draining water. Government sector informs the flood issues before time regarding way to solve problems. Klong Ket and Klong Klam need to be scraped as they were really shallow and caused a flood in the area resulting in extremely damaged rice fields. Royal Irrigation Department, Ministry of Agriculture and Cooperatives under the Action Plan

on urgent flooding Relief has dredged natural canals especially Klong Ket and Klong Klam Moo 9 , Chum Saeng Songkhram, Bang Rakam District, Phitsanulok Province, to drain water from the left of Yom River, including to reserve for dry season in terms of utilizing, consuming and farming up to 1,200,000 cubic meters

Drought Concerns

Water way system in the Copper Pipe Project would be developed as the upper land villages gain water from the project. Natural water resources such a pond and swamp get dredged to widen and deepen themselves for a more capacity. This could be done in natural canals and pond in farms. Fai is constructed around Yom River and other canals to reserve. Setting irrigation system and forming a group of consumers are to help effectiveness of use and development of electric distribution which helps reduce cost-effectiveness.

Soil Series of Chum Saeng Songkhram Sub-district



Map 3 Soil Series of Chum Saeng Songkhram Sub-district consisting of Soil Series 2, 3, 4 ,5, 7, 7/33, 15 ,21, 33, 33B and 33b

Soil Series 2

Soil texture is clay. The upper layer is gray or dark gray. The lower layer is gray dotted with brown or red. This soil series is mostly found in the river basin in the Central Region. The inundation is deep approximately 20-50 cms. last for 3-5 months. If the soil is influenced by the sea water, the yellow Jarosite substance will be found. For the depth dimension, it is a deep soil with poor drainage capacity,

naturally fertilized with the moderate pH between 4.5-5.5. Samples are Ayutthaya, Bang Khen, Bang Nam Preaw, Chum saeng, Bang Pa In and Maha Bho soil Series.

Soil Series 3

Soil Series 3 is deep soil. Soil texture is clay. Top soil is black whereas the lower soil is light gray with dotted yellow and brown or red. It is found most around the lowlands or flat landform with poor to rather poor drainage capacity and naturally abundant. The pH is about 7-8. Mostly is used in planting rice, rarely found problem in the land use. But if the terrain is too low, there is often trouble with the flood during the rainy season.

Soil Series 4

Soil Series 4 is clay. Top soil is black or dark gray. Lower soil is light brown or brown or gray-olive green, with dotted brown-yellow, yellow or dark brown. Sometimes the lumps of concrete or chemical substances such as Zinc and Manganese might be found at the lower soil. This soil has rather poor to poor drainage capacity. It is mostly found at the flat landform or lowlands, with medium level of natural abundance, the pH values of 6-8. At present, it is widely used in planting rice. In some areas they make beds for planting vegetables and fruits.

Soil Series 5

Soil Series 5, the soil texture is deep soil, top soil is dark gray, lower soil id light brown or gray, with dotted brown and yellow or red throughout the layer. It was created by the river sediments at the alluvial plan areas. The terrain is the low lands or the flat landform with poor drainage. It is often found the lumps of chemicals such as Zinc and Manganese accumulative mixed in the soil and lumps of concrete may be found at the deep lower soil. This soil has rather low to medium levels of natural abundance with the pH values of 6-8. At present, the soil is used for planting rice. If the water resources available, it may be used for planting dry crops and vegetables.

Soil Series 7

Soil Series 7 texture is clay, brown-gray with dotted brown, yellow or red mixed throughout the soil layer. It was created by the river sediments with the characteristics of deep soil with rather poor drainage. Mostly found at the flat or relatively flat landform with medium level of natural abundance and the pH values of 5.5-7.5. Nowadays, it is used for rice cultivation. If the irrigation and management are efficient, then farmers can plants rice twice times a year.

Soil Series 15

Soil Series 15 texture is silt loam, gray or gray-pink or gray-yellow with dotted dark brown, yellow or red in the lower soil. In some areas might be found the accumulative chemicals such as Zinc and

Manganese. It was formed by the river sediments, found mostly at the flat or nearly flat landforms, very deep soil with nearly poor or poor drainage, low natural abundance with the pH values of 5.5-8.0. Nowadays, is used for planting rice, dry crops or fruits but often trouble with the flooding immersion during the rainy season. Problem found in this soil series is that the low natural abundance.

Soil Series 21

Soil Series 21 texture is silt loam, brown-gray or light brown-gray with dotted gray, brown or yellow-brown through the whole layer. It is formed by the river sediments, found mostly at the flat or nearly flat landforms, very deep soil with moderate to nearly poor drainage, moderate natural abundance with the pH values of 5.5-7.0. Nowadays, is used for planting rice in the rainy season and dry crops in the dry season. Problem found in this soil series is that the risk of water shortage in the dry season.

Soil Series 33

Soil Series 33 is very deep soil with well to moderately well drainage. Soil texture is fine silty or silt loamy, brown or brown-red in the very deep lower soil, it may be found the dotted gray and brown as well as the Mica or lumps of concrete, was formed by the river sediments at the old river levee's alluvial fan, or the plain alluvium, moderate abundance and pH 7.8-8.5 approximately. At present, it is used for planting dry crops, corns, sugar canes, cotton and tobacco plants.

Soil Series 33B

Soil Series 33B is very deep soil, well to moderately well drainage. Soil texture is fine silty or fine loamy, brown or brown-red in the deep lower soil, dotted gray and brown soil may be found as well, including the Mica and lumps of concrete. This soil series was formed by the river sediments at the old river levee's alluvial fan, or the plain alluvium, moderate abundance and pH 7.0-8.5. Soil unit is the 5-12 percent slopes. Its soil unit is not suitable for rice planting but there are earthen dikes for rice planting anyway.

Soil Series 33b

Soil Series 33b is very deep soil, well to moderately well drainage. Soil texture is fine silty or fine loamy, brown or brown-red. In the deep lower soil, dotted gray and brown soil may be found as well, including the Mica and lumps of concrete. This soil series was formed by the river sediments at the old river levee's alluvial fan, or the plain alluvium, moderate abundance and pH 7.0-8.5. Soil unit is not suitable for rice planting but there are earthen dikes for rice planting anyway.

1. PRA Report

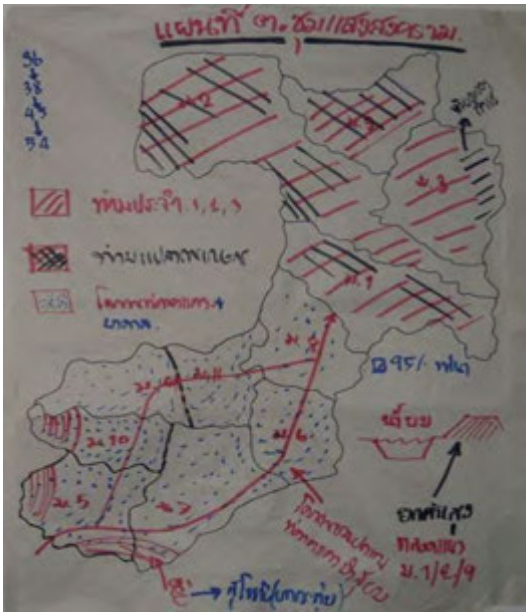
Biological Features

Economic Crops

Chum Saeng Songkhram Sub-district, Bang Rakam District, Phitsanulok province occupies the total area of 70,163 Rais, which is agricultural area of 60,855 Rais. Terrain is the lowland river basin and sloping to the southwest. The Yom River flows through the central part of the sub-district, including canals and natural water resources flowing through the central and southern parts as well. Most of the population has agricultural occupation. Economic crops are rice, as the major crop, sugar canes to supply the factory, and the standing timbers which mostly grow in the northern part of the sub-district.

Most of the agricultural areas are the lowland and are suit for plant cultivation. Farmers can do twice times of the dry season rice but they could not plant the wet season rice as there is a regular flooding in every year. So farmers intend not to do the wet season rice planting to avoid damages from flood. In the areas where the Yom River flows through will be accompanying with the electricity pumping stations which are located in villages Moo 1 and 9. Natural water resources are also all over the agricultural areas. Moreover, farmers also built the artesian wells for additional supply. Most of the areas in the southern part with the Yom River passing throw can do twice times of the dry season rice cultivation. However, Sub-district is still facing the water shortage for agriculture as all of the water resources in the area cannot store water throughout the whole year long.

The areas of Chum Saeng Songkhram Sub-district can be divided into two parts based on the flow direction of the Yom River. This is influencing to the farming ways of each parts differently as to the conditions of the water resources flowing through the area, the available water, including the underground water as well. Not only the farming ways are different, but also the flood, drought affecting the agricultural products. During the flooding period, the water inundates too long as to the terrain is the lowland especially in the areas of villages Moo 1, 2, 3 and 9 that always have longer inundation than other areas during the flood 2011. The inundation lasted for six months since the water entering into the area in May. After the flood reduced, farmers in this area started to plant rice. But later they would encounter the problems since the seed sowing. The cold weather will affect the growth of the rice. And the water issue is also a problem. Most of the agricultural areas rely on the artesian wells built in their own lands. In conclusion, main problems are about the regular flooding into the areas and water shortage after the water reduced.



Map 4 Chum Saeng Songkhram sub-district, Bang Rakam District, Phitsanulok Province

1. PRA Report

From the field study and meetings with the community of Chum Saeng Songkhram Sub-district, Bang Rakam District, Phitsanulok Province, it revealed that most of the areas of Chum Saeng Songkhram Sub-district are affected by the regular flooding in every year especially the areas close to the Yom River that will have long inundation. This damages the agricultural products of this area. It happens over and over till farmers have to adjust themselves in earning their living as well as the planting schedule. So, farmers do twice times of dry season rice cultivation but not the wet season rice as their crops often damaged by the flood. During the flooding period farmers will also capture fishes to sell and to process for the merchant middlemen who will come into the community to buy fishes. This activity helps the farmers to earn extra income while cannot do agriculture.

From the map, it is shown that the villages and agricultural areas are regularly inundated and affected by flood mostly are the areas situated close to the Yom River and in the lower part of the sub-district, in villages Moo 1, 2, 3 and 9. From the map of the use of water for agriculture, the southern part mostly uses water from the Yom River and Nong Kaw Canal. The electricity pumping stations are set in villages Moo 1 and 9, pumping water from Yom River to agricultural areas. For the upper part of the sub-district mostly uses water from the artesian wells and the copper pipe project. However, the water is still insufficient for the agricultural area. There is also another problem with the electricity power which is the two-phase-system that affects the pumping of water for agriculture and household appliances to have the brownout very often. In the areas that have digging the artesian wells will have to use the fuel instead of the electricity and that causes higher production costs.

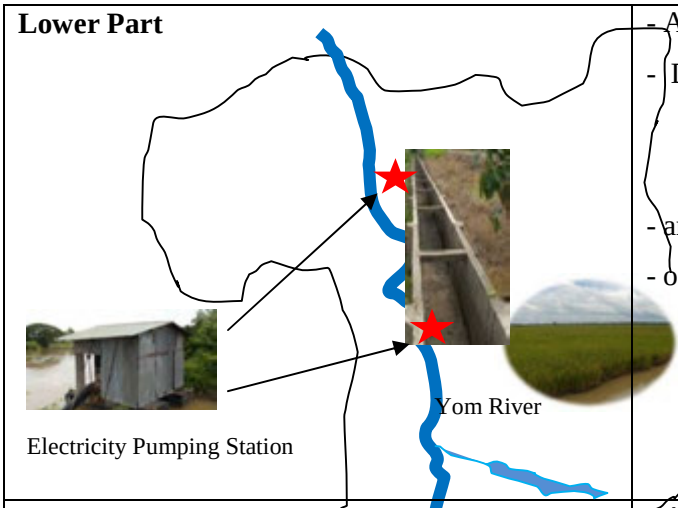
Figure 5 Artesian Wells in Chum Saeng Songkhram Sub-district

Constructing the artesian wells for agriculture in the area of the sub-district is one of the adaptation done by drawing the undergrounded water to use for agricultural purposes. But have to face the problem about the low electricity power. Once using the fuel, it will result in high production costs. Water from the artesian wells will be reduced during the dry season while farmers still in need to draw more underground water to use.

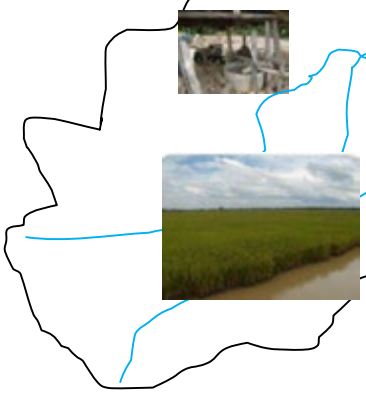
Figure 6 Electricity Water Pumping station **Figure 7 Irrigation Canal**

The overall picture of the lower part of the sub-district, there are the electricity pumping station situated and with the irrigation system such as the canals, farmers pump water from Yom River. Whereas the southern part is still in shortage of water, insufficient for agriculture. Farmers have to dig the artesian wells to draw water for their agriculture in the areas where the water cannot be provided.

Project of Dredging the Water Resources of Chum Saeng Songkhram Sub-district after the Flood 2011



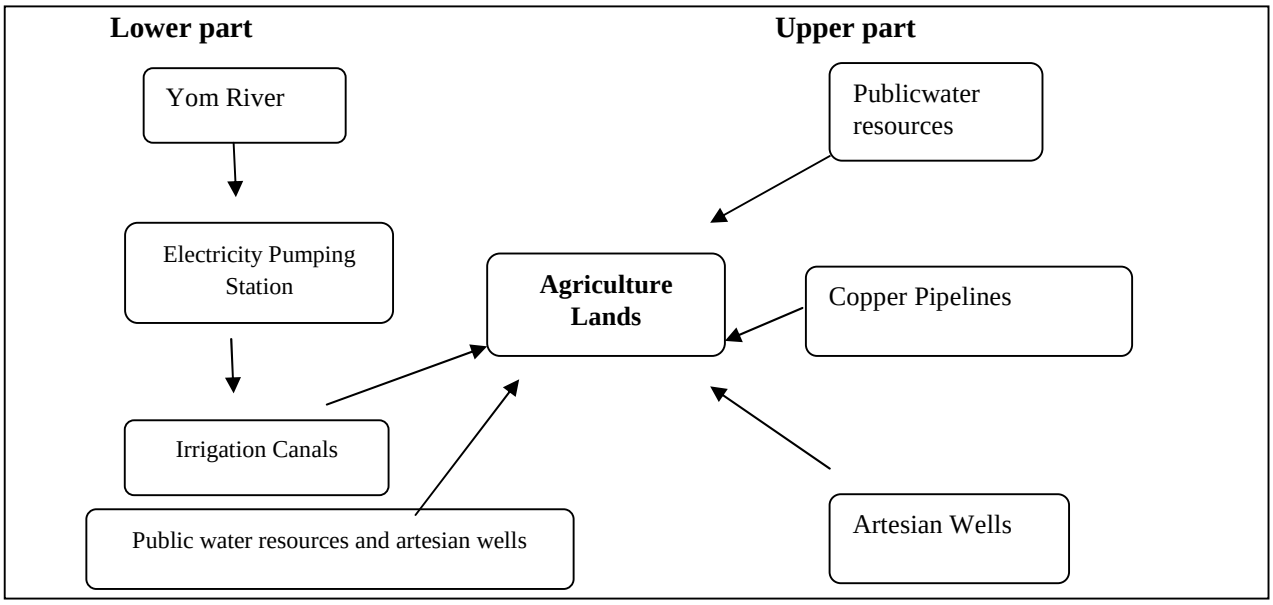
- Areas of villages Moo 1 , 2 , 3 and 9
- Dry season rice 2 rounds
  - Yield: 80 – 90 buckets/ rai
  - Water Use: artesian wells + Yom River
- areas: growing rice
- occupation: rice farming, fish capturing, worker



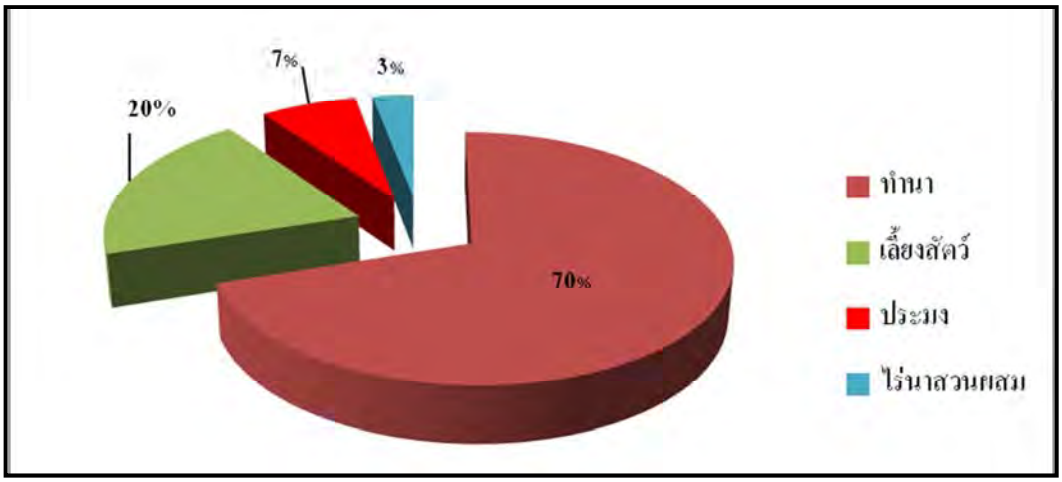
- Areas of villages Moo 4 , 5 , 6 ,7 ,8 , 10 and 11
  - Dry season rice 2 rounds
  - yield: 80 – 90 buckets/ rai
  - water use: artesian wells + copper pipeline
  - crops: rice, sugar cane, eucalyptus, banana
  - occupation: rice farming, worker, animal raising

Source : Information from the community meeting of Chum Saeng Songkhram Sub-district

Map 5 Chum Saeng Songkhram Sub-district, Bang Rakam District, Phitsanulok Province



Flowchart 1 Models of the Use of Water for Agriculture of Chum Saeng Songkhram Sub-district



[Translation]

Rice production

Animal raising

Fishery

Integrated Agriculture

Chart 1 Proportion of Agricultural Occupation of Chum Saeng Songkhram Sub-district

Occupation of the residents of Chum Saeng Songkhram Sub-district, Bang Rakam District, Phitsanulok Province mostly are in agricultural occupation as the terrain is suit for agriculture especially for rice cultivation. There are Yom River passing through the southern area, two electricity pump stations and many natural water resources all over the area. Most of the areas can do twice times of dry season rice cultivation. Wet season rice cultivation is not unable to conduct due to inundation as usual. The minor occupation is animal raising, mostly pigs as they are easy to raise and can be sold at good prices. So, farmers in the upper part of the su-district prefer to raise pigs for extra income apart from rice cultivation particularly in village Moo 6 – Ban Huang Kradai Village.

Villagers also do fishery in the areas close to Yom River. They find fishes in Yom River and have adjusted ways of fish capturing during the flood. They capture fishes to sell and to process. There is also the sufficient economy or integrating agriculture or organic agriculture conducted in this area but still not popular due to the problems about insect pests and plant diseases in wide area, including the brown plant hoppers. Most problem often found is about the weedy rice that influencing to the yields and higher production costs in getting rid of such problem. Some farmers solve the weedy rice problem by using the parachuting method.

Table 2 Wet – Dry Season Rice Planting Schedule of Chum Saeng Songkhram Sub-district, Bang Rakam District, Phitsanulok Province

Type of Product	Variety	Month												Yield (per Rai)
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Dry season rice 1	Phitsanulok Kor Khor.29 /31 Supan Buri	harvest →											Planting →	80-90 buckets
Dry season rice 2	Phitsanulok Kor khor.29 /31 Supan Buri				Planting →		Harvest →		FLOOD					80-90 buckets

First round of the dry season rice cultivation of farmers in Chum Saeng Songkhram Sub-district will be started by plowing, making mud soil and sowing seeds in December. However, it also depends on the readiness of each farmer to start this. For the rice varieties used, farmers prefer the Phitsanulok Kor Khor. 29/31 and Suphan Buri. Farmers in southern part receive water from available water in Yom River in which having the electricity pump stations situated in, Klam Canal, Ket Canal and artesian wells in farmers' lands. For the upper part of the sub-district, farmers rely on water from the natural resources and artesian wells in their lands. The average yield of dry season rice is approximately 80-90 bucket per Rai.

For the first round of dry season rice cultivation in Chum Saeng Songkhram Sub-district, farmers start after the flood gone. In villages Moo 4, 7 and 8, water will dry out faster than in other areas. Villages Moo 3 and 9 are the villages that water will be dried out the last. After cultivation, farmers will face the problem of cold weather that will affect to the yields. The weather causes slow growth of rice, plant diseases and insect pests and that also affect to the high production cost but low yields as well as the problem about the schedule of planting is not related to the government's Mortgage Scheme.

For the second round of dry season rice cultivation in Chum Saeng Songkhram Sub-district, farmers start after the harvest of the first round. Activities begin from plowing, making mud soil and seed sowing in April. Rice seeds are from the wet season rice consisting of Phitsanulok Kor Khor. 41/51 and Suphan Buri varieties. Mostly are the same varieties used in the dry season. For the second round of the dry season rice cultivation, farmers will pump water available in Yom River, Klam Canal, Ket Canal, natural swamps and artesian wells in their lands. In the upper part of the sub-district, farmers

mainly use water from the artesian wells. In the area of this sub-district, farmers need to find more water allocation into the areas throughout the second round of dry season rice cultivation. While awaiting to harvest the rice in this second round, farmers have to pump water out of the agricultural areas due to flood starts to enter the areas especially in the southern part where flood will take place first before others. Farmers have to harvest before it time or so called 'green rice'. That causes low yields while the production cost is high. in addition, the harvest season also not related to the schedule of the government's Mortgage Scheme.

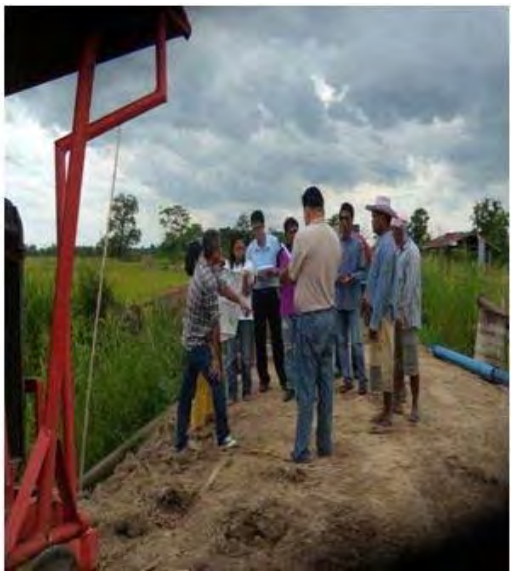


Figure 8 Planning on water management for the Sub-district

Table 3 Average Rice Production Cost for Dry Season Rice 1/ 2 of Chum Saeng Songkhram Sub

No.	Descriptions	Cost (baht)
1.	Soil preparation	500
2.	Seeds	600
3.	Seed sowing	50
4.	Chemical fertilizers	1,500
5.	Electricity (Bo Tok)	600
6.	Pesticides / insecticides	500
7.	Harvest cost	500
8.	Transportation	100
9.	Oil, fuel	1,200
	TOTAL	5,550
	Yield / Rai	
	900 kg. × 12 baht	10,800
	10,800 baht - 5,550 baht	5,250

Source : Information from the farmer Groups and Community Leaders

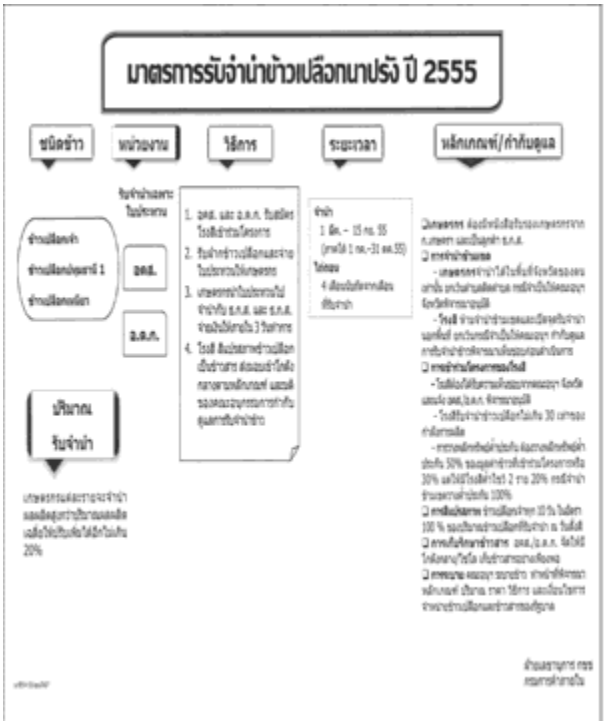
The average production cost for dry season rice cultivation ½ of Chum Saeng Songkhram Sub-district is approximately 5,550 baht/ Rai. Production materials are expensive because farmers use the

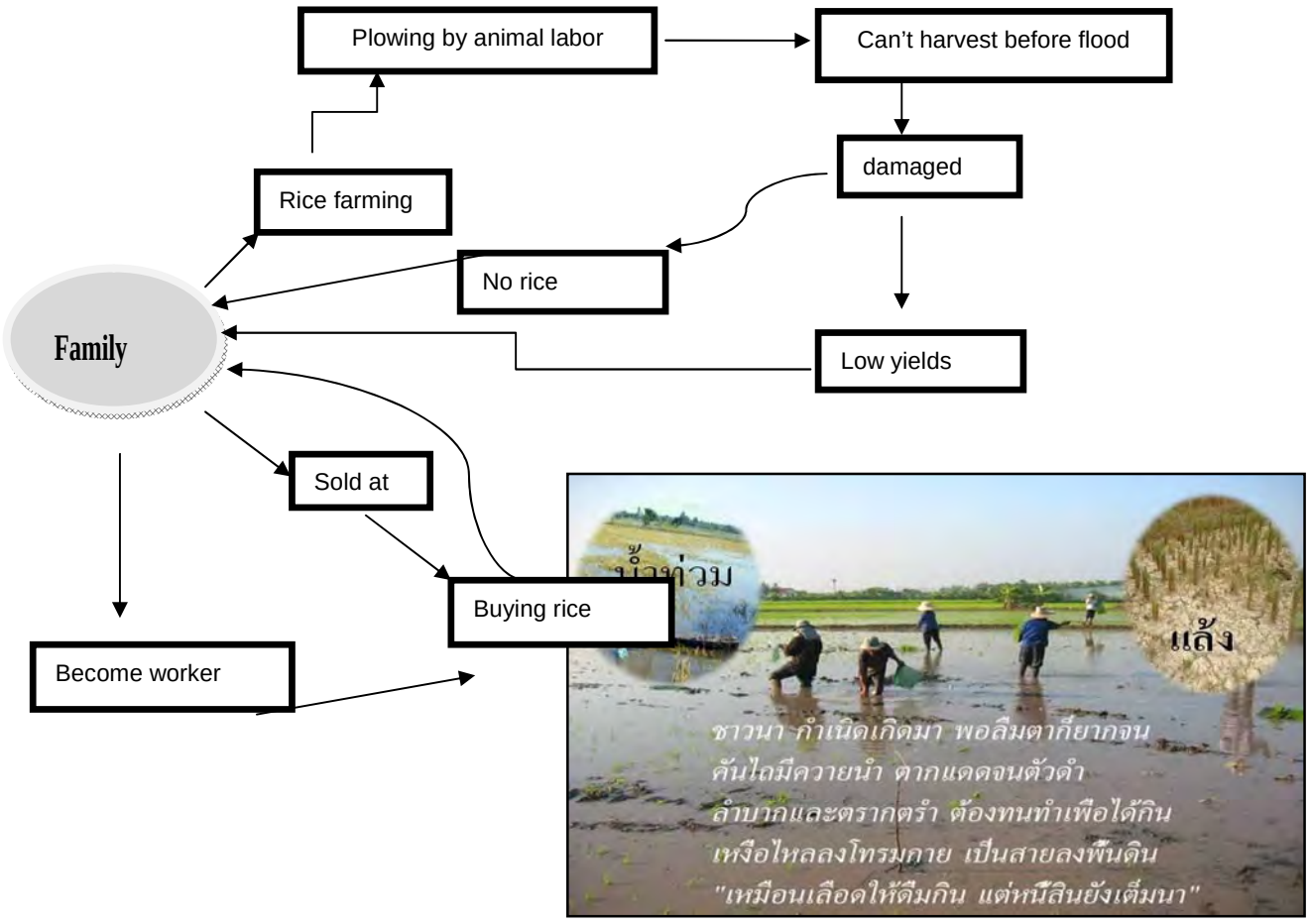
chemical fertilizers, grass killer, insecticides and fuel used in pumping water into the fields. For Chum Saeng Songkhram Sub-district, usually money gained after deduction the production cost will remain about 5,250 baht/ Rai. There should be planning to reduce production cost, reduce the use of chemical substances and maintain the soil. Farmers should also gather as a group for production to by materials at cheaper prices in order to reduce costs. Management post harvest to increase value into crops and to reduce risk towards the crops, and the meeting and discussion between the community and RID staff are recommended.

Flowchart 2 Mechanisms of the Dry Season Rice 1/ 2 of Chum Saeng Songkhram Sub-district, Bang Rakam District, Phitsanulok Province

For the marketing of the dry season rice ½ of farmers in Chum Saeng Songkhram Sub-district, Bang Rakam District, Phitsanulok Province, rice varieties most popular in this sub-district are light rice with 90 days of age to be good for harvest. Due to the regular flooded areas and water shortage since the first round of dry season rice cultivation, farmers have to find the short day aged rice varieties to avoid the drought and to avoid the flood for the second round. Farmers will sell rice to the rice mills in Bang Rakam District that are members of the government's Mortgage Scheme right after the harvest without drying first. This affects the high content of moisture and result in low prices. The harvest time is also not related to the Mortgage Scheme schedule.

The Mortgage Scheme for the Wet and Dry season Rice B.E. 2554 / 2555





Flowchart 3 Development of the Rice Plantation

1. PRA Report

According to the development of farmer's agriculture, water is the most important issue for rice cultivation. Water is the indicator of agriculture. Without water, we cannot do the agricultural activities or still capable but will not produce good yields as water is the main factor that indicates the yields as well as indicating the well-being of the farmer's family. Water is also influent to the labor migration. People have to migrate to work in other areas to earn extra incomes for the household expenses. Nowadays, water used for agriculture could be from any sources not only from rain or natural resources. In some areas that are in shortage of the rain, water from other resources could be provided such as artesian wells. Farmers in these days can solve the water issue quite a lot. For instance, the water management can help allotting water into more farm fields and extend the agricultural areas. These things will help improve rural agriculture to be widely available and more effective.

Agricultural Problems of Chum Saeng Songkhram Sub-district, Bang Rakam District, Phitsanulok Province

1. Agricultural areas in the sub-district often encounter the flooding in the rainy season and insufficient water in the drought
2. The ourbreaks of the weedy rice and insect pests
3. High production costs such as chemical fertilizer, insecticides, etc.
4. Problem in low product prices
5. Shallow water resources and cannot store water throughout the whole year long
6. Chemical substances used in the agriculture flowing into the natural water resources in the community
7. Lack of the soil nutrition and environmental conservation

Approaches in the Development of the Agriculture of Chum Saeng Songkhram Sub-district, Bang Rakam District, Phitsanulok Province

1. Dredging up the canals and public water resources in the area of the Sub-district.
2. The promotion for farmers to know how to plan the production for rice planting in order to reduce problem of the weedy rice.
3. Establishment of the Seed Bank and the Organic Rice Demonstration Plot.
4. The promotion for local farmers to improve the product quality to be in line with the market needs.
5. The promotion for the farmers to form in group for the production to be able to bargain in the product prices.
6. Arranging the community discussion forum on the rice management and value added rice in the community.

7. Arranging the discussion forum on the water management in the community and sub-district levels for the villagers and the RID officers.
8. The promotion for farmers to reduce the production costs by using the organic fertilizer and effective microorganisms (EM) to produce the organic rice.

Economy, Society and Culture

Chum Saeng Songkhram is the old community of Bang Rakam District. Of its name “Chum Saeng Songkhram” had used as the previous name of the district before changing to Bang Rakam District in the present. Primitively, Bang Rakam District was named Chum Saeng District on 10th December, B.E 2448 (A.D.1905). later in 24th April, B.E. 2460 in the period of King Rama 6, H.M. the King changed the name to Bang Rakan District as stated in the Announcement of the Ministry of Interior on 24th April, B.E. 2460 (A.D.1917). For the name “Chum Saeng Songkhram”, is assumed named after the area had been used as the route of the army movement and the training spot for the military.

In the past, Chum Saeng Songkhram community was full of bamboo forest growing intensely along the river/ canal banks, rivers and streams flowing through the areas so it was suit to grow rice as per its close to natural water resources although regularly flooded. So people began to do rice farming and seize the lands. Same to people from nearby areas and new immigrants who mostly were Lao Song from Petchaburi and Suphan Buri.

Nowadays, the community still maintains the traditions of the Lao Song. For example, the “Raising the Spirits of the Ancestors” which is the ceremony for the family members to be blessed for happiness, prosperity and get protection from the passed away ancestors. If they do not celebrate this tradition for more than three years, they believe that some of their family members might get into troubles, or get sick and that may cause to death. The ‘Sen Ruan’ ceremony, which is the practice for the family to unite and collaborate in pleasing the spirits of the ancestors so they can be protected from any dangers.

The ‘Rub Khwan Khao’ ceremony (literally translated as welcoming the rice spirit) or ‘Welcoming the spirit of Mae Po sob” (Mae Po Sob is the Mother Goddess of Grains) from the paddy fields to reside in the barns. Once they conduct this ceremony, it means that the rice planting season has just ended. The ceremony is held in two days: first on Friday called “khao Larn” refers to welcoming the spirit of the Mother Goddess of Grains falling all over the paddy fields; and on Monday “Welcoming” refers to the ceremony of welcoming and inviting the spirit of the Mother Goddess of Grains to reside in the barns.

Although it is seldom for this ceremony to be conducted by the local people in the present due to the cost spent in the ceremony and not many seniors who are strictly pursue that ceremony still alive in the community, old traditions and ceremonies are still carried out in these days as per their old beliefs and practices.

Figure 9 The Holy Items of Chum Saeng Songkhram Sub-district

From the stories told by Mrs. Hug Kamsorn, a senior lady who is Lao Song (a tribe of Laotian people) immigrated into the Chum Saeng Songkhram Sub-district with her parents primitively from Petchaburi Province since she was two years old. Now she is 82 years old. Mrs.Hug told that when she was young and at the time her family moved to Chum Saeng Songkhram community was abundantly full of bamboo. Flood occurred every year as she had been witnessed since their first relocation here.

People who settled at the same time were the pilot group of rice cultivation. They planted rice only once a year in the wet season and mainly relied on the rain water. They began to plow using the buffalo after Songkram Festival (April-May) and hurried to harvest due to be able to collect rice for family consumption. If the areas were flooded, that year they had to buy rice for eating. If they did not have money, they had to share some plots of their lands for sale to earn money for buying rice. At the time Mrs.Hug was about 20-30 years old, the land price was only 200 baht per Rai. So we can conclude that the land ownership loss had been occurring since the past history from disasters and the land shared as heritages for their clans resulting in the decreased amount of land properties of each household day by day.

Besides planting rice, Mrs.Hug and her family and people in Chum Saeng Songkhram community went to work as workers during the break of the rice planting seasons. Mostly they were hired to work as lumbermen in Larn Krabue District, Kamphaeng Petch Province as there were lots of timbers in that area in which totally different from Chum Saeng Songkhram District where was more abundant of bamboo. This implied that the area of Chum Saeng Songkhram District was the regularly flooded area so that other plants could not grow, or could hardly grow except the bamboo which was very endurable and resistant to flood. People in the community had to use boats in the flooding season. Every house had at least one or two boats. People in the past built their own boats, or if they had to buy the 6-wah-boat made of iron wood or teak wood, it cost only 5 baht.

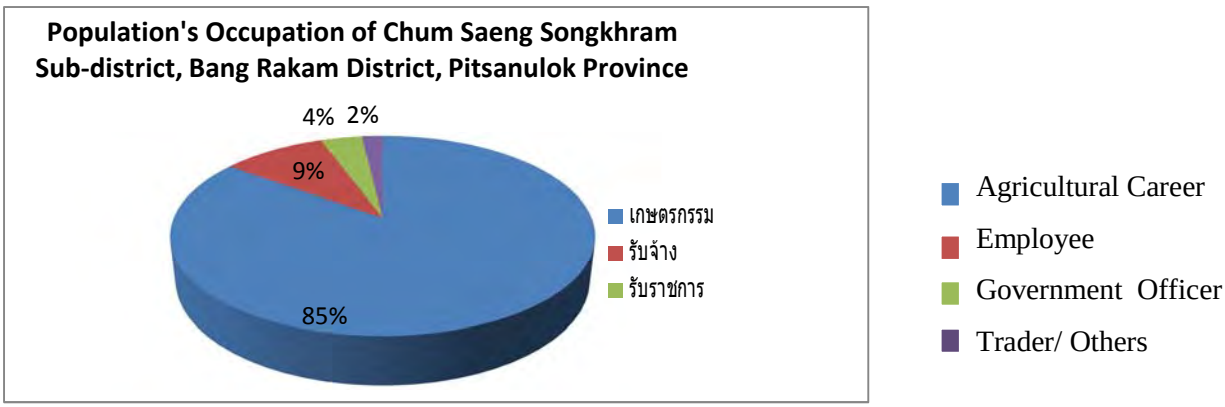


Chart 2 Proportion of the Population Occupation

The occupation of people in Nakhon Pamak community can be divided into four main sections of careers. The first and major career is the rice planting. Farmers plant rice 2-3 times per year and sometimes they also plant banana, sugarcane and fruits in addition. The second section is employee that includes employees in agricultural sector in the area working on the planting procedures such as labors in spraying pesticides, sowing rice seeds, removing weedy rice, etc.; others are employed who own the agricultural tools such as tractors or combine harvesters, they will be hired by people in the area and nearby sub-districts the whole year long; and the rest are the employee during their free time of planting rice.

Most of the communities are located in the high land part of the sub-district which located in villages Moo 8, 9 and 10 and no water management system for plantation. Thus, rice planting can do only one round per year which is in wet season. In case of using water from the shallow wells or artesian wells, it has to be dug much deeper than in other sub-districts and that need much money for the digging and pumping work despite of the groundwater situated very deep approx. 50-60 meters. Expenses spent in digging the artesian well add up the high production costs.

By restriction in planting rice only one round per year causes some groups of people to find work outside the community in the off-rice season in Phitsanulok, Pichit and Nawa Nakorn Industrial Zone and return to rice planting in the common wet season. Turnover of labors in the areas that can plant rice just one time per year is higher than in the areas that can plant rice throughout the whole year long. The third section of career is government officer and the fourth is trader and others.

Occupation of the people in Chum Saeng Songkhram Sub-district mainly consisting of four parts. The main occupation is rice cultivation and mostly they plant rice for two times a year. Recently, they have adjusted the planting calendar to two times of dry rice season cultivation due to the areas are often flooded in every year. Farmers therefore are unable to plant rice in the wet season due to high risk to the paddy fields. During the flood season, farmers can earn extra money by fishing, for household consumption and for selling.

The middle man merchants both inside and outside the community will come to buy fishes and sell in their own areas or sell at Ruam Jai Market, Phitsanulok Province, Ban Kong Market (Kong Krai Las District), Jeh Noi Shop which selling processed fishes such as Pla Yang (grilled fish), Pla Ra (fermented fish), Pla Rom Kwan (smoked fish), Pla Daed Diew (sun dried fish), Pla soi Tod Mun (fried Siamese mud Carps ball), etc. Some of fishes are processed by villagers and reserve for their own family during the flooding period. In some upland areas of the community, they can grow only one or sometimes possible two wet season rice if sufficient water supplied from the natural sources or underground water. Some villagers plant the field dry crops such as sugar canes and so on. They sell dry crops directly to the factories in Sukhothai Province or Bang Kratum District, Phitsanulok.

Figure 10 Villagers preparing their fishing tools ahead in awaiting for the flood period

The second main occupation is the hiring as workers in the agricultural sector in all agricultural areas, to work in various processes of rice cultivation such as being hired for pesticide spraying, seed sowing, weed removal, etc. And part of the worker occupation is hired in general work in the community and in the nearby areas, as well as in the municipal areas of Phitsanulok province. They work as both full-time and part-time workers during the break from the rice cultivation. The third main occupation is the government servants and the fourth main occupation includes merchant and others.

It is clearly seen that Chum Saeng Songkhram community has been adapted the way of their rice cultivation to reduce impacts from the flood since the long history. In these days, the main factor is about the volume of water to be used in rice cultivation and the flood level in the areas. From the past till now farmers have been struggling to find the most suitable methods for growing rice relating to the level of flood. Recently, other factor affecting the patterns and calendar of rice cultivation is the government policy. Most farmers have adjusted their patterns of growing rice to be “rice production industry” which refers to growing rice by relying on more related technological machines and chemicals to be able to sell rice at most profits. The Rice Mortgage Scheme and rules are playing more roles on the incomes of the farmers as most farmers often deposit their rice into this scheme via the mills authorized by the government. This becomes the second influencing factor for the rice production planning apart from the flooding.

However, there are some farmers who have tried to add value into their rice production. For example, Mrs.Srimuang Pimsorn, a farmer from village Moo 6 – Ban Huang Kra Dai Village who has decided to do the organic rice farming and planting the Hom Nin rice by implementing the parachuting method. This is another good and practical method of rice production. This farmer said that she had been using the chemical for the whole rice production system, but recently she realized about its bad impacts on health in the long term. She therefore tried to learn how to do the chemical free rice cultivation from many printed materials, and also tried to join the related trainings.

After that she started to implement those methods and now there are 16 members who join the organic rice production group. The group plants the Hom Nin rice by using the parachuting method. This method results in saving the rice seed varieties and reducing the weedy rice as well. For one Rai of parachuting employed method will need only one bucket of seeds. First planting seeds in the trays about 12-18 days for the seedlings. This is opposite to the direct seeding method which will use about 3 buckets per Rai. Hom Nin Rice will give the yields about 40 buckets of paddy grains. After grounding by the mill will remain the white grains only about 370 kilograms. Rice price sold in the market is about 40 baht per kilogram. So, farmer will earn about 14,800 baht (after deduction of production costs) per Rai from planting Hom Nin Rice. The production cost per Rai is about 3,500-4,000 baht in case of using own seeds and making the organic extracts. Farmers quite satisfy with the net income gained from this rice planting method.

The limitation of planting the Hom Nin rice is that farmers still cannot introduce it to the wider markets due to it is not popular yet. Suppose there is the promotion for this rice variety, products might be oversupplied and price could be dropped. But the thing should be promoted is the parachuting method. Training about rice planting by parachuting method should be arranged for farmers. So farmers can learn about all steps of parachuting since the selection of seed varieties, seedling preparation, soil preparation, parachuting the seedlings, cares of the plots until the harvest.

This remedy will reduce the weedy rice problem and reduce costs of buying seeds. Planting the seedlings in the tray before parachuting will help reduce the mixture of the weedy rice at a certain level. Parachuting method also reduces the cost in pumping water into the fields for seed sowing, amount of seeds, and increase the rate of seed germination. In conclusion, parachuting method can reduce the production cost effectively.

In the areas where regularly affected by flood, one important factor that can help them reduce the impacts from flood and can adapt their living to the flood, that is, keeping their own paddy otherwise they might found difficulty in finding the seeds as often high demand of seeds and expensive prices after the flood level reduction. Without storage seeds, farmers might have to invest more or wait longer for the seeds. And that will extend to the next production round and will result in not be able to harvest in time before flooding.

One method in generating income apart from selling rice is: if the community has the rice drying yards, farmers will dry their rice first to reduce the moisture content to gain better price when depositing with the Rice Mortgage Scheme. Farmers in Chum Saeng Songkhram Community normally dry the rice grains along the streets and partly at the renting private drying yards. The rent for drying area costs 200 baht per cart.

Figure 11 Rice Seeds Storage and Production of the Effective Microorganisms (EM)

Figure 12 Parachuting Field of Hom Nin Rice

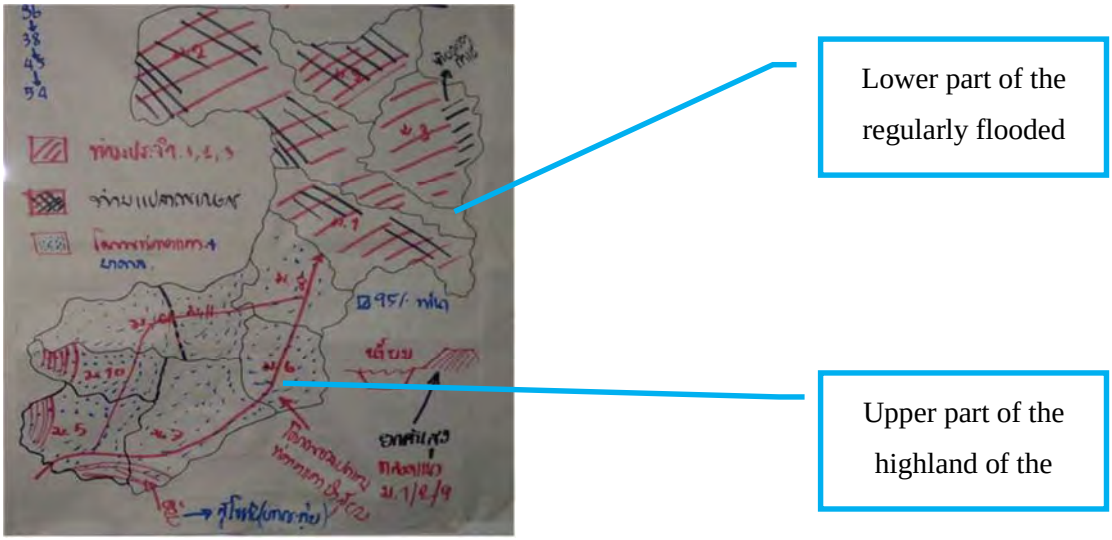


Figure 13 Agricultural Zoning Areas of Chum Saeng Songkhram Sub-district

1. PRA Report

The regularly flooded areas fall in the “lower part/ zone” of the community consisting of villages Moo 1, 2, 3 and 9. Most villagers are farmers planting two rounds of dry season rice and fishing in the flooding season. Farmers in the regular flooding areas have to plan their rice production calendar ahead focusing on planting two rounds of dry season rice and be able to harvest before the flood entering into the areas, around early August. Normally flood will enter into the areas around late August and will reduce the level around late November that farmers can continue the next rice planting season in December.

Normally flood will last for three months. The duration of flooding is the main factor influencing to the setting of the rice production calendar of this area. If they can plant rice earlier – around late November, then they can harvest the first round of rice around late March or early April. Then they will start the second round of rice cultivation immediately in order to be able to harvest in time, around late July or early August, before the flood entering into the areas. In the case that the flood enters into the areas before the usual flooding time, farmers have to harvest rice while still green and sell at the price of only 4,000-5,000 baht per cart.

At least, they still can have some money for the next rice planting season. However, this will affect to their ability in paying the debts and will cause more debts as well. Farmers who do not have their own lands, or have less areas for rice cultivation have to rent, and that they have to rent and will result in higher production costs. Farmers who have not enough lands for planting rice normally will rent the land from the local people equally to 80 percent and rent the land from people in other areas about 20 percent. The rent costs 1,000 baht per Rai per one production round, or rent could be calculated to compensate by 1 : 4 of the yields in one production round. Half of the farmers will keep their own seeds for the next planting season while the rest of the farmers have to buy the seeds for all rounds. In conclusion, risk factors for rice cultivation are as follows:

- If the flood enters into the community before the usual flooding time, it will cause big damages to these areas due to the rice are still not ready for the harvest.
- If the flooding period is longer than three months, or last until the middle of December, farmers then can start farming late and it will affect the first and the second rounds of the production calendar. They are at risk for not be able to harvest rice in time in the second round. Plus, if they proceed the direct seeding at the end of December, the cold weather will affect to the rice germination that the germination rate will be low.
- In some years if the volume of the available water in each year, both rain water and water from the natural resources is not sufficient, farmers have to rely on the rain water or water diverted from other canals and that definitely affects to the production rounds and risk of late harvest.
- The instability of the Rice Mortgage Scheme in terms of duration, rice varieties and other regulations that are influencing to the cultivation planning of the farmers to be harder particularly

when the scheme does not support the errors and the wrong modification of the production schedule by the community.

Figure 14 Flood entering into the area before the harvest season

Figure 15 Some farmers have to harvest their rice so called 'green rice' from the flooded fields before the harvest time

The "upper part which is situated in villages Moo 4, 5, 6, 7, 8, 10 and 11 is the partially flooded area while some areas are located in the highland and no irrigation for the rice cultivation. So, farmers plant rice in some areas and usually the wet season rice using the rain water, or twice times a year using both rain and artesian water. Some areas are good for sugar cane planting, for instance, areas in the highland that can plant rice only one time per year. Most of people go work outside the community after the rice plantation completed.

People in some areas raise animals as additional work. There is a saying to make the picture about animal raising of the community as "raising a pig equally to planting a Rai of rice". In comparison with the pig raising: piglet is sold at the average price of 1,000 baht. One mother pig will give 8-12 babies at a time and farmer will earn about 8,000 – 12,000 baht at a time, which is very close to rice

yields of 90 buckets per Rai and equally to 10,800 baht, or 12 baht per kilogram. Pigs are easier to be raised and with lower costs. Plus, raising pigs has low level of risks about the weather and flood than rice cultivation as well as lower production cost than the rice cultivation. This is an another interesting method in generating incomes for the households and in disaster countermeasure.

Figure 16 Area of planting sugar cane on the highlands of the sub-district that cannot grow rice due to no irrigation system

Figure 17 Rice cultivation on the highlands of the community

Chum Saeng Songkhram Sub-district has been providing many dredging and development projects for water resources due to Bang Rakam District is the pilot model area of the Policy of disaster countermeasures. Factors to be considered is about whether there is a change or reduction of impacts of flood/ drought in the area and how much the impact could be. This is to be used in the planning for the adaptation, coping and living with the disaster practically for the people of Chum Saeng Songkhram Community.

Suggestions for Flood Countermeasures

Flood

- Propose the Rice Mortgage Scheme that is related to the adjustment of the rice cultivation schedule of the community and it shall be the ongoing and clear-cut policy and shall accept the short day aged rice in reducing the impacts from disaster towards the community
- Dredging the Klong Sa Dao Canal, Ta Luk E-Taen Canal, Wang Sam Sam Canal, Nong Yai Canal, Eh Ah Canal and Nong Ta In Canal in village Moo 4
- Change from the square blocks to the high bride for faster drainage capability
- Building the barrier weirs at both sides of the Yom River at the points where the banks are low is at risk of flood entering into the community

Drought

- The extension for the Copper Pipe project had been proposed (water diversion for agriculture from Bhumibol Dam, Tak Province). Nowadays, the Project has reached Kong Kai Las District of Sukhothai Province but not yet Bang Rakam District. Water flows through the pipes sometimes but still not sufficient for rice cultivation. People in the areas had to group to bargain for the 'water' time to time. However, there is no proficient water allocation yet.
- Constructing the permanent drainage gates at the connecting point between Ban Mai Thanu Thong Village and Ban Tha Nang Naam Village so that water can enter the kruk Krak Canal. This will ease out the earthen dikes that have to be reconstructed every year.
- Adjusting the electricity power to facilitate the submersible pumps and the electricity groundwater pumps to draw groundwater for rice cultivation that will help farmers save costs rather than using the fuel pump which is more expensive than the submersible pump as well. The community has proposed to upgrade the electricity power from two- to three-phase-system. Therefore, it will help prevent the "drilling deeper" to get more water as it causes death time to time by doing this.

Suggestions from the JICA Study Team made for the community disaster countermeasures

- Hosting the meeting to collect all the brainstorming ideas and suggestions from the community in order to plan the development of the whole system of the community rice management, research on rice variety and plants that suit the terrains and the weather of the area, study of the drying yard and community rice mills, the development of the rice varieties that suit the terrains, promotion for the establishment of the Seed Bank, and the suggestions to be proposed to the Policy Department
- Improving the community water supply to produce standard and quality water for both in usual time and amidst the flooding in the community
- Preparation of the community Disaster management Plan to enhance the countermeasures and to reduce the impacts to the community in which the community is allowed to participate in the planning and operations

- Establishment the water user groups (WUGs) in each canal to manage the water systemically and working together in planning the water management at Tambon level
- Organizing the training to enhance the personnel capability in community disaster management to be expertise and to have sufficient knowledge in the disaster mitigation for the community
- Water Management Plan shall be systemically taken in cooperation with the nearby communities which have similar geography that may cause the disasters

3. Phenomenon, Impacts and Natural Disaster Management

Bang Rakam District is one of all nine districts of Phitsanulok Province situated in the Yom River basin (wetland) which is abundant with the fish varieties and quantity of birds and fishes. Chum Saeng Songkhram Sub-district has the Yom River flowing through the area, often faces the flood during the flooding season and water shortage during the dry season. Flood over the areas of Bang Rakam District and Chum Saeng Songkhram Sub-district is somehow a common even and a part of way of life of the people in the lower north region.

Disaster happened in Chum Saeng Songkhram Sub-district due to the storm called “Haima” and flood entered into the areas by three ways: Yom River, water from Yom River at the old route that water diverted from Kong Krailas District overflew into the areas and water diverted from Nan River in prevention of the economic areas of Phitsanulok Province, and water from Nan River and Naresuan Dam. In some years would have supportive water from Ping River flew through the copper pipes.

According to the disaster happening in Chum Saeng Songkhram Sub-district, flood overflow into the area before usual time so it caused big damages especially on the housing and farm fields. Rice is the main crop and an economic crop for this areas especially for villages Moo 1, 2, 3 and 9 which is the geosynclines and lowland with many canals and swamps all over around.

Flood Situations

With the geosyncline terrain, construction of water gates and barrier weirs at many places have not well maintained, that causes the drainage capacity limited particularly the Bang Kaew Canal. It resulted in long inundated period for three months during July to October 2011.

Impacts and Damages

The area of Chum Saeng Songkhram Sub-district, Bang Rakam District, Phitsanulok province is repeated flooded area in every year, only different in the duration of flooding. In 2011, flood entered into the area since July and continuingly to October. It caused many damages to the rice fields. Rice was the main economic crop in this area. In that year flood entered earlier than usual so farmers could not harvest in time. For those who cloud harvest but gained less quality, yields and sold at low prices.

Apart from the rice fields, it also damaged the living houses especially those in the lowland and one storey houses. The long inundated period also caused the damages to the house structure. The community roads both gravel and asphalt in total number of 18 routes were damaged as well as the water supply in 3 villages.

Transportation during the flooding was very inconvenient. People had to use the boats but boats were not sufficient, school had to close, lacked of safety water supply and the quality drinking water production so people were at risk of health caused by dirty drinking water. They had to buy drinking water and it increased the family expenses. Disaster is a cause of being in debts that farmers who had lost their lands had to change their careers and move to the other places. This results in more migrant of people in the community.

Disaster Management and Lessons

The flood occurred in the area of Chum Saeng Songkhram Sub-district is a part of the "Bang Rakam Water Management Model" by dredging the big canals, Klam Canal, Ket Canal, Ta Kreng Lake, Khi Raeng Lake and Raman Lake that lacked the people participation and ecosystem destruction that will result in changes of the areas.

The farmer adaptation is a part of water management. For example, the integration to raise funds to solve the flood problems, monitoring the water level in Sukhothai Province and same ecosystem management. Tung Klong Ket Field and Tung Ta Thom Field have joined together in the management of the water in the area. Cooperation should be emphasize on the water use situation of the water users of the copper pipes. The "Development of the Water Management Mechanisms in relation to the Agricultural systems" of the people in Chum Saeng Songkhram Sub-district will be a part of the extension of water solution at the community level.

Emphasizing the self-management in the family, the preparation of food, boats, equipment for fishing, Including the creation of the fish market, are all regarded as the adaptation to the disaster. The compensation management, the unexpected problems solving, survival bags, communication are all the problems that the community still have not yet be able to solve.

The adaptation of the family lifestyles to be able to live with disaster, patterns of adaptation such as fishing, shortening the rice cultivation time, and the water management in the fields to solve problem of water shortage during the dry season.

4. Suggestions and Measurements

1. Management of the small canals and creeks such as Klong Darb Canal, Klang Mek Canal, Klong Bang Bah Canal, Eh Ah Canal, Taluk E-lan Canal, small lakes and ponds based on the irrigational techniques that are related to the use of the water particularly the canals connecting between the Klam Canal and Ket Canal.

2. Development the ecological mechanisms for the water management, communication, management, fund raising, inventing the machines to suit with the fields, breaking the gender roles in the water management in the fields, development the group management for Ket Canal,Tom Tum Field, Mae Rahan Field, in connection with the water management in the Yom River Basin, including the communication development between the water management staff and community people.
3. For the agricultural system especially the rice cultivation, development of the production techniques such as cost reduction, establishment of the Seed Bank, organic agriculture, improvement of seed varieties that are related to the market and disaster, managing the weedy rice by using the parachuting method, production management, rice market management in order to be able to bargain with the outside systems, seed cost, fertilizer cost, crop prices and policies involved with the rice.
4. Development of the Rice Master Plan for the areas affecting by the disasters in order to develop the economy about rice in the community, storage, selection, incubation, processing and market for the value added to rice.
5. Design the infrastructure, houses, roads, buildings, canals to be related to the natural disaster.
6. For the management of the rice cultivation in the dry season, development the water reservoirs in the rice fields, small ponds, shallow wells are all related. So it is necessary to improve the electricity to suit the water management.
7. Preparation of the plan and potential enhancing for the community people to be ready to cope and adapt themselves to the natural disaster continuingly.
8. Water management should be operated in the term of area rather than in the term of administration zone. For example, water management at the Yom River Basin, local intellectual on the lateral canals and the community's existing water management still in used in the present days.
9. Value added to fish, development of the fish capturing, career building during the flooded time, fish processing and the marketing management.
10. The self adaptation, highland crop diversification, preparing boats and equipment for fishery, traps, setting the management system for the fisher group, etc.
11. Development the mechanisms for the water user group, monitoring, building the participation in planning, continuing exchange and developing the activities for the community to find the solutions for coping with the natural disasters.
12. Improving the sag pipes to be wider and building the water gate for proficient performance
13. Building the dikes along the roads at a low level to prevent flooding at the street, or shifting to a higher road to be dikes so that flood will not affect to this area.
14. Dredging the public water resources (ponds, lakes), increasing the storage capacity, repairing Ban Sam Ruan Gate with the electricity gate installing.
15. Dredging all canals and building the weirs intermittently for the purpose of storage and drainage.

1. PRA Report

Appendices

Meeting on the Participatory Community Study of Chum Saeng Songkhram Sub-district

19 June 2012 , 08.30 AM - 01.00 PM

Venue: Meeting Room of Chum Saeng Songkhram TAO

Supported by Ministry of Agriculture and Cooperatives and JICA

Participants

1.	Mr.Suladetch Namthip	TAO from Village Moo 9
2.	Mrs.Moongfah Putthakosa	TAO from Village Moo 7
3.	Mr.Banjong Kotsuk	Chairman of TAO Chum Saeng Songkhram
4.	Mr.Suchart Kanyao	TAO from Village Moo 9
5.	Mr.Boonthon Sae-ro	TAO from Village Moo 8
6.	Mr.Piak Phohom	TAO from Village Moo 1
7.	Mrs.Sapaporn Thaithampipat	TAO from Village Moo 8
8.	Mr.Surin Somjai	TAO from Village Moo 2
9.	Mr.Thanoo Faosap	Village Headman of Village Moo 6
10.	Ms.Marian Ngoen-rian	Assistant Village Headman of Village Moo 1
11.	Mr.Petch Prathumthong	Village Moo 4
12.	Mr.Manas Thappleng	Village Headman of Village Moo 11
13.	Mr.Chawalit Youngcharoen	Village Headman of Village Moo 10
14.	Mr.Boonthip Faosap	TAO from Village Moo 6
15.	Mr.Nawin Poomnak	Village Headman of Village Moo 7
16.	Mr.Sak Puangrod	Deputy Chairman of TAO Chum Saeng Songkhram
17.	Mr.Prathuang Sriwong	TAO from Village Moo 7
18.	Mr.Prayoon Thongyaem	TAO from Village Moo 5
19.	Mr.Songsak Saengsawang	Disaster Prevention and Mitigation Staff
20.	Mrs.Waraporn Ditchaona	TAO Chum Saeng Songkhram Officer
21.	Representatives from Civil Works of Chum Saeng Songkhram TAO	
22.	Representatives of farmers from the villages (3 persons)	
23.	Mr.Akkrawit Muenkul	Community Study Team
24.	Mr.Sakorn Songma	Community Study Team
25.	Mr.Krittikorn Noipin	Community Study Team
26.	Mr.Nattawut Uppa	Community Study Team
27.	Mr.Seksak Limsiriwat	Community Study Team
28.	Ms.Sirirasda Thammarassakul	Community Study Team
29.	Ms.Kanueng Wanwiset	Community Study Team

1. PRA Report

Self-introduction and General Information about Chum Saeng Songkhram Sub-district

General Information

Chum Saeng Songkhram Sub-district has been named after the setting of the army of King Naresuan. Na Prang or Dry Season rice is the photoperiod sensitive variety, planted twice time a year. It has been planting since B.E. 2510 (A.D. 1967). Primitively the seeds were taken from Suphan Buri Variety so called Mae Paed (Kor Khor 7) at Wat Bot Sub-district. Farmers reported the yields of one cart per Rai. Then others began to follow the plantation. In the past, farmer could grow rice only once a year due to the water shortage during the drought.

Many new rice varieties have entered into Thailand during the time that Thailand had amounts of foreign debts. It caused Thai people to produce rice more than ever. When the rice price was high, it urged people to grow rice more than before.

Farming ways of life had changed, from the farmers to the employees of framing instead. Chum Saeng Songkhram Sub-district has the geosynclines and repeated flooded every year, only different in rainfall volume. Flood normally affected over the agricultural area in villages Moo 1,2,3,9 due to flood overflew the banks and canals. The relief at that time was to build the dykes on both sides of the river till the end area of the sub-district and shifting the dikes to be higher. Building the water gate was not necessary as it would obstruct the water flowing during the inundated period. It was necessary to pump water out of the area of Tung Ta Tum Field. It was concluded that although we could build the water gate to drain water at some points, however it would be useless during the flooding time.

The earthen dikes already constructed at Ket Canal, Wang Rae Canal and Klam Canal so last year farmers could harvest their crops in time before the flooding. This is the right solution after all. The upper area receives water from the copper pipes during the drought but still not enough. Upper area consists of villages Moo 6,7, 8, 5,10 and 11. Water flows from Pra Pai Canal to Paeng Puay Canal and Krung Krak Canal. Sometimes villagers use the water from the artesian wells (in villages Moo 4, 11 and 8). Upstream areas of water could have the water allocation but not the downstream areas of water. Water flows from Nikhom Pattana Sub-district via the copper pipelines and passes through villages Moo 5, 7, 6 and 8 and the lateral canals.

The transportation is quite fair but not as good as it should be. Although some remedy from the Rural Roads and Highway Department, some roads still remain damaged. For the agricultural area, the rice planting area occupies 95 percent of the total area, the rest belong to sugar cane plantation (in villages Moo 5, 10 and 7) to supply the buyers in Sukhothai Province and Bang Kratum District. For the lemon gardening, the Office of Agriculture and Cooperatives has contributed some but not fully yet assistance.

1. PRA Report

Assistance

- The Red Cross contributed the survival kits
- The Ministry of Public Health supported the medicine
- Habitat for Humanity Thailand helped constructed houses
- The Governor had requested the sponsorship from Osotspa Co., Ltd. For the construction of two houses in villages Moo 2 because the houses were too old and the residents were poor to rebuild from the damage.
- Dredging the Krung Krak Cana; by RID in the areas situated Village Moo 6 of Chum Saeng Songkhram Sub-district and Village Moo 7 of Bang Rakam Sub-district
- Bank of Agriculture and Agricultural Cooperatives (BAAC) gave away rice seed varieties 50 buckets per village
- Department of Rural Roads built the Kui Ma Toom Nong Pa Yom Road, Nong Pa Yom – Tabaek Ngam and Nong Pling – Tabaek Ngam roads including two bridges with the length of 60 meters each at Nong Pling – Tabaek Ngam Road
- Department of Highways constructed the road connecting Sukhothai Province and Bang Rakam District
- RID dredged the Klam Canal and Ket Canal for the total distance of 10 kilometers.
- Engineer Department (The Security Development Company 30) contributed their help in dredging the Pra Pai Canal

Groups

Groups of Villages Moo 1, 2, 3 and 9

Flood during the flooded season but no water during the drought. Before the real flood occurs, it often have 1-2 flooding from the raining first of all. Flood starts from village Moo 9 to Moo 3. If water cannot drain in time, water from the area of Itok will drive the water from Yom River to overflow into the area.

Yom River at the old route begins from Hok Baht Canal flowing through Mek Canal. Water from Sawan Ka Lok will enter Huay Chan Creek, Na Chak Wai and Mek Canal. Flood will cover four districts: Kong, Bang Rakam, Prompiram and Muang District. Yom River at old route will enter Bang Kaeo Canal (at bang Rakam Bridge) whereas the Yom River at the new route will enter Chum Saeng Songkhram Sub-district.

Yom River at the new route flowing from Ban Sa Tue Village to ban Mai Village called Ban Wang Mai Si Plai Canal (located in the area of Kong Krailas District), receives water from Wang Rae Canal and Canal in village Moo 9.

Muan Chang Canal receives water from Hok Baht Canal before entering into the Ket Canal in village Moo 9.

Water from Wang Rae Canal flows to join the Mek Canal before entering into villages Moo 3 and 8 of Ta Ngam Sub-district and ending at Bang Kaeo Canal. Klam Canal parallels with Ket Canal flowing to enter into Wang Rae Canal. Flood started from May to June and inundated for 7 months. Farmers cannot grow rice. Rice cultivation can do during October – November in the areas where water dries out first. But they will face the drought problem earlier.

Artesian wells normally will be used during the second round of rice cultivation when water supplied from Naresuan Dam is not sufficient. Farmers want to use the artesian wells due to insufficient electricity power as to it is two phase system. So, they need to use fuel for water pumping and that causes high production cost. Water used about 4 buckets per months equally to 24,000 baht or 10,000 baht of electricity use.

Suggestions

- Extend the electricity power to three phase system
- Canal dredging

The Community Organizations of Villages Moo 4,5,6,7,8,10 and 11

Artesian wells normally will be used during the dry season, pump water out during the flooding period. Farmers will grow rice twice times a year starting from May to August and November for the second round after the water reduced but at risk of hard booting or black seeds. If using the direct sowing method, it will not yield at all. During the drought, water supplied from the copper pipelines. If water level at Bhumibol Dam is rather high, meaning it is good for the crops. No irrigation canals yet, only natural canals and that cause poor management. No water use management group and that cause competition among those who want to use water as well.

For the artesian wells, normally the underground water level has been deeper and deeper day by day. The current level is about 9 – 12 Wah, normally will dig deep to 30 - 60 Wah or 50 Wah. The expense for drilling the artesian well is about 60,000–150,000 baht. The artesian well will be the submerge system, not the pipeline system as low security. Some artesian wells might use the generators and set close to the electricity posts.

Suggestion

- Dredging canals or setting the irrigation system for water management

1. PRA Report

Overall Suggestions

- Build the big drainage gate at Bang Kaeo Canal
- Rice price guarantee for the short day age rice of 90 days because if using the seed varieties suggested by the government, then they will be unable to harvest in time prior the flood arrive
- Shift the road levels
- Dredge the Sa Dao Canal, Ta Luk E Taen Canal, Wang Sam Sam Canal, Nong Yai Canal, Eh Ah Canal and dredge the Ta Inn Canal in village Moo 4 as well
- Build two side dikes around Yom River to prevent flood overflow the area starting from the Kong Krai Las District
- Extend the electricity power to three phase system
- Setting the closing-opening system to allow the water gate function properly
- Change from the squared block to the high bridge
- Build the drainage gate at the connecting point of the area of Ban Mai Thanu Thong Village and Ta Nang Ngam Village to facilitate water can enter Krung Krak Canal so there will be very beneficial for many areas and no more need to build the earthen dikes.

Guidelines

- Reduce the severity of the flood in each year by dredging canals and building dikes at both sides of Yom River
- Supply water after the flood and during the dry season. The upper part can have the irrigation system all over the area while the lower part has to upgrade the electricity to three phase system and build the water gate at the connecting point between Ban Mai Thanu Village and Ta Nang Nga Village
- Reduce risks from the flood by planting rice twice times a year and make the Rice Mortgage Scheme available for the short day age rice of 90 days from 120 days.

Fish Capturing

In villages Moo 2, 3 and 9, they capture fishes as a main occupation. The upper part of the community had dug the ponds accounted 20 percent and artesian wells for 80 percent. While the lower part has ponds accounted 20 percent and artesian wells for 50 percent.The upper part will pump water out from the ponds to capture fishes around February-April, and to get water for rice cultivation. Fishes can be sold about 3,000 – 10,000 baht.

The lower part will pump water out from the ponds to capture fishes around February-April, and to get water for rice cultivation. Fishes can be sold about 5,000 – 20,000 baht. During the flooding period, villagers will set the nets, traps, etc. for capturing the fishes. In the lower part in the areas of villages Moo 1, 2, 3 and 9, can capture fishes accounted to 70 percent or about 10,000 – 40,000 baht. The

merchant middlemen in the villages will buy them before selling in other districts or province like Kong Krai Las District, Sukhothai Province or Chiangrai Province or Mae Sod District; or sell to Choke Siri for their latter selling in Phitsanulok or Ang Thong; or sell to Bang Rakam Market, even make Pla Ra (fermented fish), Pla Yang (grilled fish) and Pla Daed Diew (sun dried fish). During the peak of capturing fishes in huge number, price will drop down during August to October, the cheapest price takes place during January – February.

In the areas of villages Moo 2, 3 and 9 villager preserve the Pla Soi (Siamese mud carps) as fermented fish in almost every family to sell to the merchant middlemen or at Ban Kong Village. If they want to sell to Choke Siri they would sell to Ban Nam Ruang Village of Ta Cha Nuan Sub-district, then they will process to be able to sell to wider markets in different provinces. About 70 percent of villagers who capture fishes will also process them as well.

Villagers do the grilled fishes (Pla Yang). Small fishes can make fermented fish, bitter fish and fish sauce. For fishes in big size they will sell them fresh, snake head fish will be preserved with salt and sold at the prices of 50 baht per kilogram for middle size or 70 baht per kilograms for big size. Most of the fishes captured are the snake head fishes, Bagrid catfishes, red snappers, Khao fishes, striped catfishes, and clown knife fishes. Fishes which are rare to find and expensive are sheatfishes, red snappers, blue fishes and twisted-jaw sheatfishes. Suppose there is sufficient water, then our lives can continue. No more for the sand bags. Today meeting makes us feel warm, not alone anymore.

Recommendation:

- Find the methods to increase value added into fish.

Meeting dismissed at 01.00 PM.

Chum Saeng Songkhram Sub-district B.E.2554/2555 Bang Rakam District, Chainat Province															
	Haima (1)			Haima (2)			Nok Ten 2			Nok Ten 4			Total		
Village No.	**Area**	**Person**	**Credit Line**	**Areas**	**Person**	**Credit Line**	**Area**	**Person**	**Budget**	**Area**	**Person**	**Budget**	**Area**	**Person**	**Budget**
1				722	31	1,604,284	3,027	137	6,725,994				**3,749**	**168**	**8,330,278**
2				2,200	120	4,888,400	1,569	66	3,486,318				**3,769**	**186**	**8,374,718**
3							4,201	167	9,334,622				**4,201**	**167**	**9,334,622**
4							2,174	80	4,830,628				**2,174**	**80**	**4,830,628**
5							3,349	141	7,441,478	12	1	37,800	**3,361**	**142**	**7,479,278**
6							2,947	98	6,548,234				**2,947**	**98**	**6,548,234**
7							6,061	211	13,496,302	66	3	207,900	**6,127**	**214**	**13,704,202**
8							2,505	103	5,614,082				**2,505**	**103**	**5,614,082**
9	573	58	1,273,206	4,307	185	9,570,154	500	40	1,111,000	10	2	50,980	**5,390**	**227**	**12,005,340**
10							3,025	102	6,721,550				**3,025**	**102**	**6,721,550**
11							1,828	67	4,061,816	17	1	53,550	**1,845**	**68**	**4,115,366**
Total	**573**	**58**	**1,273,206**	**7,229**	**336**	**16,062,838**	**31,186**	**1,212**	**69,372,024**	**105**	**7**	**350,230**	**39,093**	**1,555**	**87,058,298**

Strategic Planning for Flood Management
at Chum Saeng Songkram Sub-district
During 27-31 August 2012
At Somapa Pasak Resort, Pattana Nikom District, Lopburi Province

Current Situations of Chum Saeng Songkram Sub-district about Flood

The topography of Chum saeng Songkram Sub-district is sloping toward the southwest. The area is divided into two parts: first part on the north of the Yom River is a lowland areas with many natural rivers flowing through such as Klong Ket Canal, Klong Kam Canal, Klong Eh Ah Canal, Klong Taluk E-Lan Canal, Klong Wang Rae Canal, Klong Puang Sadao Canal, etc. These are canals receiving water from the Yom River and the drainage canals in some seasons.

So it affects to this side of the area to get flooded before others and slower drainage due to the lack of the systematic water management. But it is an abundant area. The second part of the area is situated on the south of the Yom River which is higher than the upper part of the river. Canals in the area are unable to supply water through the whole year so it is necessary to get water from the copper pipes from Kamphaeng Phet Province but still not adequate. The community has to construct the artesian wells for agricultural uses and it causes this area to be much arid than other areas in the upper part.

Most people occupy in agriculture. Rice plantation consists of direct seeding and parachuting. There are also animal farming particularly the Thai Bangkaew Dog which is the most well known breed of Pitsanulok Province. People raise the Thai Bangkaew dogs as an extra work and catching fishes during the inundated season in compensation of rice plantation.

The area of Chum Saeng Songkram Sub-district is the area full of fish varieties and quantities especially in the flood season. The community has the fish processing for selling in the community such as Pla Ra (fermented fish), Pla Yang (grilled fish) and Pla Klua (salted fish). Fresh fishes are sold at the nearby market in the community. There is also the fermented fish processing to be sold outside the market.

Goals of Chum Saeng Songkram Sub-district

As the current situations of Chum Saeng Songkram Sub-district are related to the natural disasters such as flood, drought and inundation, so the dream vision is to view Chum Saeng Song Kram Sub-district as follows:

- Can effectively prevent flood within the Sub-district
- Diversion of water from the flood areas to the dried and highland areas
- Drain fast and not flood too long
- Having wide and deep rivers
- Having dikes along both banks of the water
- Ditching canals and public areas to be the water reservoirs
- Having the complete irrigation system starting from Ping River to Yom river

Analysis of the Internal – External Factors of the Community

Internal Factors of the Community

Strengths (S)	Weaknesses (W)
1. There are many canals as the sources of water and public areas for the community 2. A flat area suitable for paddy plantation which is the economy crop of the community. The areas of rice farming occupy big plot equally to 90 percent of the total area of the Sub-district. 3. Fishes are abundant throughout the year and more in the flood season. A source of income and food for people in the community. 4. Raising the Thai Bang Kaew Dogs which are simple to care and transfer at the stage of disaster. This can be an extra occupation that can create extra income and can get developed to be the main occupation later. 5. The community has experienced in self-adjustment during the various disasters such as drought, flood and learned to make fishing tools, moving objects to higher places, driven home to escape the water, etc. 6. Having extra income from fish processing during flood season 7. Having knowledge and skills in fish processing such as salted fish, fermented fish, etc. 8. Culture of the Thai Song Dam of two villages. Promoting the relations as kinship. 9. Having strong community organizations: Bang Ba Village Water User Group, Ta Baek Ngam Village Water User Group, Tung Ta Toom Farmer Group and Copper Pipe Water User Group 10. There are WUGs established to negotiate with the Copper Pipe Project in Kamphaeng Petch Province for the use of water 11. The community has stored the rice seeds for next plantation season after the flood	1. The area is the area with flood repeatedly 2. Shallow water reservoirs, cannot store water for the use in the dry season 3. Lack of the cooperation in the implementation of activities within the community 4. Does not have standard marketing 5. Lack of the opportunity in learning/ training new knowledge and timely information update from outside the society 6. Lack of the knowledge in food processing which is diversified and demanded by the markets 7. No drainage gates in water management 8. Lack of knowledge in the proper use of chemicals so it affects to the community health 9. No tourist attractions. Actually, the community has initiated to develop the tourist attractions in village Moo 4 but no support 10. No whole water management planning 11. The existing rubber dam cannot function completely 12. From dredging the Klong Kam Canal, the dikes were built unnecessarily too high

External Factors of the Community

Opportunities (O)	Threats (T)
1. The government agencies realized about the actual facts happened in the areas 2. Work in coordination with JICA 3. Budgets from the Chum Saeng Songkram Sub-district Administrative Organization (TAO) 4. Having the Oil Fund that the TAO has been provided for people in the Sub-district can borrow with free of interest 5. Budget allotted from the PTT Exploration and Production Public Company Limited (PTTET) for 30 million baht/ year 6. Policies of the Bang Rakham Model were implemented in the development of the water resources in the 7. Having the stable cooperatives in the community 8. Selling fermented fish in other areas and that initiated the new markets for local products. 9. Creating the new careers (fish processing) in the community during the flood 10. Huang Kradai Village Learning Center, village Moo 6 can produce organic paddy processing for selling outside the community	1 Lack of budget for water management 2 Lack of water management (no dam, irrigation canals and irrigation conjoint) 3 Lack of personnel to provide advice 4 Community lacks of knowledge about water management 5 Inconsistent weather (hot weather, long inundation, severe dry, etc.) 6 The involved agencies do not solve the problems promptly 7 Operations of the local government agencies do not h have the participation from people in the community 8 Local water management is intervened by the politics 9 Water management of the government is not suitable with the terrains

Proactive Strategic Analysis of Chum Saeng Songkram Sub-district

Proactive Strategies (S+O)		
Strengths (S)	**Opportunity (O)**	**Proactive Strategies (S+O)**
1. There are many canals as the sources of water and public areas for the community 2. A flat area suitable for paddy plantation which is the economy crop of the community. The areas of rice farming occupy big plot equally to 90 percent of the total area of the Sub-district. 3. Fishes are abundant throughout the year and more in the flood season. A source of income and food for people in the community. 4. Raising the Thai Bang Kaew Dogs which are simple to care and transfer at the stage of disaster. This can be an extra occupation that can create extra income and can get developed to be the main occupation later. 5. The community has experienced in self-adjustment during the various disasters such as drought, flood and learned to make fishing tools, moving objects to the higher places, driven home to escape the water, etc. 6. Having extra income from fish processing during flood season 7. Having knowledge and skills in fish processing such as salted fish, fermented fish, etc. 8. Culture of the Thai Song Dam of two villages. Promoting the relations as kinship. 9. Having strong community organizations: Bang Ba Village Water User Group, Ta Baek Ngam Village Water User Group, Tung Ta Toom Farmer Group and Copper Pipe Water User Group 10. There are WUGs established to negotiate with the Copper Pipe Project in Kamphaeng Petch Province for the use of water 11. The community has stored the rice seeds for next plantation season after the flood	1. The government agencies realized about the actual facts happened in the areas 2. Work in coordination with JICA 3. Budgets from the Chum Saeng Songkram Sub-district Administrative Organization (TAO) 4. Having the Oil Fund that the TAO has been provided for people in the Sub-district can borrow with free of interest 5. Budget allotted from the PTT Exploration and Production Public Company Limited (PTTET) for 30 million baht per year 6. Policies of the Bang Rakham Model were implemented in the development of the water resources in the 7. Having the stable cooperatives in the community 8. Selling fermented fish in other areas and that initiated the new markets for local products. 9. Creating the new careers (fish processing) in the community during the flood 10. Huang Kradai Village Learning Center, village Moo 6 can produce organic paddy processing for selling outside the community	1. Development of the water resources to relieve suffers from disasters 1.1 Dredging the natural water resources in the area for drainage water in the flood season and storing water in the drought. 1.2 Building the drainage canals in village Moo 11 to divert water from flooded areas. 1.3 Water management by constructing the water gate at Nong Paeng Puay Canal 2. Development of the agricultural system to give more yields, to have low production cost and to reduce damages from disaster. 2.1 Reduce production cost by reduce the use of chemicals, making the composting for agriculture and development of the electricity energy 2.2 Changing the rice planting duration, planting rice with life cycle shorter than three months and twice times a year planting rice crops. 2.3 Development of the techniques for rice varieties prodcution 2.4 The government has improved the Rice Mortgage Scheme to be able to get the actual prices as proposed and continuingly conducting the project throughout the year regardless the timing of the Scheme. 3. Study and preparation of the whole system water management in terms of the irrigation and the society. 4. Creating the Water Management Network among the water users in Chum Saeng Songkram District and the Copper Pipe Project in Kamphaeng Petch Province - Meeting of the Water User Groups - Water level measurement for the water allocation

Analysis of Development Strategies of Chum Saeng Songkram Sub-district

Development Strategies (O+W)		
Opportunities (O)	**Weaknesses (W)**	**Development Strategies (O+W)**
1. There are many canals as the sources of water and public areas for the community 2. A flat area suitable for paddy plantation which is the economy crop of the community. The areas of rice farming occupy big plot equally to 90 percent of the total area of the Sub-district. 3. Fishes are abundant throughout the year and more in the flood season. A source of income and food for people in the community. 4. Raising the Thai Bang Kaew Dogs which are simple to care and transfer at the stage of disaster. This can be an extra occupation that can create extra income and can get developed to be the main occupation later. 5. The community has experienced in self-adjustment during the various disasters such as drought, flood and learned to make fishing tools, moving objects to higher places, driven home to escape the water, etc. 6. Having extra income from fish processing during flood season 7. Having knowledge and skills in fish processing such as salted fish, fermented fish, etc. 8. Culture of the Thai Song Dam of two villages. Promoting the relations as kinship. 9. Having strong community organizations: Bang Ba Village Water User Group, Ta Baek Ngam Village Water User Group, Tung Ta Toom Farmer Group and Copper Pipe Water User Group 10. There are WUGs established to negotiate with the Copper Pipe Project in Kamphaeng Petch Province for the use of water	1. Area with repeated of flood 2. Water reservoirs are shallow, cannot store water for the dry season 3. Lack of cooperation in the implementation of activities in the community 4. No standard marketing system 5. Lack of opportunity to learn new things from the outside and to be updated promptly 6. Lack of knowledge in a variety of processed food and the needs of the market 7. No water gate in management of the water 8. Lack of knowledge about the use of chemicals correctly and that affects to the health of the community 9. No tourist attractions. The community would like to develop the attraction in village Moo 4 but no support 10. No management planning for the whole water system 11. The existing rubber dam cannot function properly 12. Dredging the Klam Canal making too high earthen dikes	1. Development of the member potential in the community organizations on specified topics such fish processing, making own trademarks and finding the markets. 2. Development of the Thai Bang Kaew Dog Learning Center, including the improvement of the breeds and the standard raising methods. 3. Development of the mechanisms at the community level 4. Establishment of the mechanisms in operation, monitoring and evaluation. 5. Empowerment of the personnel skills in the community organizations particularly on the accounting. 6. Strengthening the existing water management groups and connecting the cooperation among the groups

Analysis of Protective Strategy of Chum Saeng Songkram Sub-district

Protective Strategy (S+T)		
Strengths (S)	**Threats (T)**	**1. Protective Strategy (S+T)**
1. There are many canals as the sources of water and public areas for the community 2. A flat area suitable for paddy plantation which is the economy crop of the community. The areas of rice farming occupy big plot equally to 90 percent of the total area of the Sub-district. 3. Fishes are abundant throughout the year and more in the flood season. A source of income and food for people in the community. 4. Raising the Thai Bang Kaew Dogs which are simple to care and transfer at the stage of disaster. This can be an extra occupation that can create extra income and can get developed to be the main occupation later. 5. The community has experienced in self-adjustment during the various disasters such as drought, flood and learned to make fishing tools, moving objects to higher places, driven home to escape the water, etc. 6. Having extra income from fish processing during flood season 7. Having knowledge and skills in fish processing such as salted fish, fermented fish, etc. 8. Culture of the Thai Song Dam of two villages. Promoting the relations as kinship. 9. Having strong community organizations: Bang Ba Village Water User Group, Ta Baek Ngam Village Water User Group, Tung Ta Toom Farmer Group and Copper Pipe Water User Group 10. There are WUGs established to negotiate with the Copper Pipe Project in Kamphaeng Petch Province for the use of water 11. 11. The community has stored the rice seeds for next plantation season after the flood	1. Lack of the budget for water management 2. Lack of water management (no dam, irrigation canals and water system connection) 3. Lack of personnel to provide instruction 4. Community lacks of knowledge about water management 5. Inconsistent weather (global warming, prolonged flooding, severe drought) 6. Agencies to take responsibility did not solve the problems promptly 7. The government operations in the areas lack of the local participation 8. Political intervention in the community water management 9. Water management of the government are impropriated for the areas	1. Building understanding and support for the community to build the houses suitably to the terrains 2. Providing the boats for transportation during the flood 3. Establishment of the Fish Raising Group in Nong Ta In Swamp and Nong Pa Yom Lake 4. Adjusting the rice planting timetable 5. Development of the water resources for agriculture during the drought such as small ponds and artesian wells.

Analysis of Avoidance Strategy of Chum Saeng Songkram Sub-district

Avoidance Strategy (W+T)		
Weaknesses (W)	**Threats (T)**	**Avoidance Strategies (W+T)**
1. Area with repeated of flood 2. Water reservoirs are shallow, cannot store water for the dry season 3. Lack of cooperation in the implementation of activities in the community 4. No standard marketing system 5. Lack of opportunity to learn new things from the outside and to be updated promptly 6. Lack of knowledge in a variety of processed food and the needs of the market 7. No water gate in management of the water 8. Lack of knowledge about the use of chemicals correctly and that affects to the health of the community 9. No tourist attractions. The community would like to develop the attraction in village Moo 4 but no support 10. No management planning for the whole water system 11. The existing rubber dam cannot function properly 12. Dredging the Klam Canal making too high earthen dikes	1. Lack of the budget for water management 2. Lack of water management (no dam, irrigation canals and water system connection) 3. Lack of personnel to provide instruction 4. Community lacks of knowledge about water management 5. Inconsistent weather (global warming, prolonged flooding, severe drought) 6. Agencies to take responsibility did not solve the problems promptly 7. The government operations in the areas lack of the local participation 8. Political intervention in the community water management 9. Water management of the government are impropriated for the areas	1. Preparing the areas and food production at the household level 2. Reviving the culture and lifestyles of living with the water 3. Restoring the concept of community tourism in the area of village number 4 (Moo 4) 4. Motivating new generation to participate in the management of flood and drought

Vision: *"Chum Saeng Songkram Sub-district has systematic water management related to the nature, culture and ways of life of the community, in which conducive to the proper agriculture for the area and the happy lifestyle aswell as the source of various fish varieties and fertitity"*

Promoting the participation of the people, strength of the groups and the water management network

Strategy 1: Strengthening the water management networks within and outside the sub-district

- Activity Plan 1: Study the potential of making canals to connect Eh Ah Canal to Kui Muang Canal
- Activity Plan 2: Strenthning the Copper Pipe Water Management Groups between CSS and Kamphaeng Petch Province

Strategy 2:Building the participation of people on water management and lifestyles of the community

- Activity Plan 1: Workshop on the water management
- Activity Plan 2: Conducting the research on impacts of water management
- Activity Plan 4: Trainign and support the use of organic composting for paddy fields

Strategy 3: Development of the water management groups

- Activity Plan 1: Setting the mechanisms of management and performance evaluation
- Activity Plan 3: Raising fishes in natural water reservoirs using the community constitution
- Activity Plan 5: Providing water resources during the drought such as small ponds and artesian wells

Community-based water management

Strategy 1: Improvement and development the natural water resources and water resources in the areas of the households

- Activity Plan 1: Study and preparing the community-based water management plan
- Activity Plan 2: Dredging the natural water resources in the area for drainage in the flood season and storing water in the drought
- Activity Plan 3: making the drainage canal to divert water from flooded areas
- Activity Plan 4: Water management by using the water gate at Nong Paeng Puay Canal

Monitoring the communication, surveillance and coping with the disaster

Strateg 1: Creating the Water Situaion Monitoring Networks

- Activity Plan 1: Connecting the Water Situation Monitoring Networks via radio communication
- Activity Plan 2:Installing water guages for justified the use of water

Strategy 2: Preparedness for coping with the disaster

- Activity Plan 1: Adjusting the rice farming methods to be in line with the disaster
- Activity Plan 2: Development of the Evacuation Center as the area of sustenance
- Activity Plan 3: Establishment the Rice Seed Bank

Development of the local economy and occupational security

Strategy 1: Development the infrastructure

- Activity Plan 1: Improvement the proper electricity supply

Strategy 2:Reviving the community lifestyles in related to the local knowledge blending with the modern one for sustainable life

- Activity Plan 1: Development the tecniques of rice seed production
- Activity Plan 2: Restoring the concept of community tourism
- Activity Plan 3: Study on the fish types and varieties
- Activity Plan 4: Enhancing skills for the community organizations on accounting

Promotion for marketing and community products

Strategy 1: Development and promotion of the markets for the local products

- Activity Plan 1: Training on specific topics such as fish processing, etc.
- Activity Plan 2: Making the community trademarks
- Activity Plan 3: Development the breeds and improvement the standard raising methods for Thai Bang Kaew Dogs

Table of Pilot Plans for Chum Saeng Songkram Sub-district, Bang Rakham District, Pitsanuloke Province

Strategies	Reasons	Activities	Agencies/ Persons in Charge	Duration	Sources of Budget		Issues to be discussed by the community	Issues to be confirmed by the Experts	Remark
					JICA	Thailand			
Promoting the people participation, community empowerment and water management network	Discussion and the study on the actual operational sites that can employ the experiences of management from other areas suitably	Workshop on the water management							
The Community based-Water Management	Water management requires the overall study and preparation of the map covering the whole water management system contributed by the community participation to achieve the proper water management of the community	Conducting the study and preparation of the Community based-Water Management -Water Study Team in the Sub-district - searching the suitable methods for the whole water management system				The Hydro and Agro Informatics Institute (HAII) can be a coach for operation			
Monitoring the communication, surveillance and coping with the disaster	Radio communication radio is the tool that can be used even in a state of disaster. Connecting the water monitoring networks in the areas of upstream, middle and downstream that can help handle the disaster timely. Some areas are in the remote areas that the mobile telephone system does not function	Connecting the water monitoring networks via the radio communication with the existing network of the Sub-district Administrative Organization (TAO)	Office of the secretary General of Chum Saeng Songkram Sub-district Administrative Organization	Sep. 2012	- Radio host antenna installed in 1 point and one host radio station costs about 60,000 baht approx. - 12 radio clients cost 144,000 baht	-TAO has one host radio network but cannot function properly -Twenty-two persons have been trained on the use of the radio communication			

Strategies	Reasons	Activities	Agencies/ Persons in Charge	Duration	Sources of Budget		Issues to be discussed by the community	Issues to be confirmed by the Experts	Remark
					JICA	Thailand			
					approx. -Radio licensing	- the Telemetry System is already installed			
Development of community economy and occupational security	The use of water for agriculture in the community in the present is the water pumps using oil which is quite expensive and that affects the high rice production cost. Water pumping using the electricity would cost less. In these days, the electricity supplied in this area is insufficient for water pumping. Therefore, it is a must to get improved.	Improvement of the electricity supply system						Expenses and methods in expanding the electricity supply system	Possible to use the water power system
Promoting the marketing and community products	Chum Saeng Songkram Sub-district is full of fish varieties and quantity. Value added for fish is necessary in order to increase the income for the community people	Training for specific skills like fish processing, making fish balls, pickled fish, etc.			As the trainers				

Activities Proposed at the Meeting but were Crossed out

Activities	Reasons for Not being Chosen	หมายเหตุ
1. Study the possibility in making the canals to connect the Aeh Ah Canal up to Kui Muang Sub-districy		
2.Strengthening the Water Management Group for the copper pipes of Chum Saeng Songkram Sub-district and Kamphaeng Phet Province		
3.Conducting the research about the impact of water management		
4.Training and supporting the use of bio-fertilizer in the paddy fields		
5.Setting the mechanism for management and performance evaluation		
6.Rasing fishes in the natural water resources by using the principle of the community constitution		
7.Supply the water resources during the drought such as small well or artesian well		
8.Dredging the natural water reservoirs to be used for drainage in flood season and storing water in the drought		
9.Contruction of the drainage canals to divert water from flooded areas		
10.Water management by constructing the water gate at Nong Paeng Puay Canal		
11.Installing the water gauges to optimize the use of water to be thoroughly justified		
12.Modification of the paddy planting methods to suit the disasters		
13.Development the evacuation centers as areas for sustenance		
14.Establishment of the Rice Seed Bank		
15.Developmemt the rice seed production techniques		
16.Restoring the community tourism		
17.The study of the fish types and varieties		
18. Increasing the accounting skills for the community groups		
19.Creating the community trademarks		
20.Development of the standard Thai Bangkaew Dog breed and improvement of the raising methods		

Disaster Management Unit:

- The Committee is established
- Contact the military unit for emergency evacuation
- Evacuation centers for each village are identified (temples, schools)
- TAO office is the center.
- Village number 4,6,8,11,1,2,3,9 have declared as the disaster affected areas.
- Flood was not as serious as last year.

Output Table of Tambon Chumsaengsongkram, Bangrakam Disstric of Pitsanulok Province

Strategy	Justification (Why Selected?)	Activity	Organization/ person in charge	Schedule time	Necessary inputs		Issues to be further discussed/confirmed by the community	Issues to be confirmed with Japanese experts
					JICA	Thai		
1.Promote People Participation on Water Management		**1.1 Promote Water Management Network of Tambon and others**						
		1.1.1 Feasibility study on canal construction to link Klong AR canal and Kuimuang canal						
		1.1.2 Expand irrigation area of Thothongdaeng Irrigation to Chumsaengsongkram						
		1.2 Promote people participation in water management						
		1.2.1 Study visit on water management						
		1.2.2 Research on impact of water management						
		1.2.3 Promote the use of organic liquid in rice field						
		1.3 Develop water management group						
		1.3.1 Set up management structure and monitoring						
		1.3.2 Fish raising in community ponds and apply the community regulation						
		1.3.3 Develop water resource for dry season cropping such as farm ponds and ground water						
2.Community water management system		**2.1 Improve community ponds and farm ponds**						
		2.1.1 Prepare community wate management plan						
		2.1.2 Dredge canals to improve drainage during wet season and store water during dry season						
		2.1.3 Construct of drainage canals						
		2.1.4 Construction of gate to regulate water in Nongpaengpuay canal						
3. Improve communication and early warning system		**3.1 Establish early warning network**						
		3.1.1 Establish radio system						
		3.1.2 Installation of water gauge						
		3.2 Disaster Prepareness						
		3.2.1 Adjust cropping pattern to avoid crop damage from flood						
		3.2.2 Develop evacuation site to become integrated crop production site						
		3.2.3 Establish seed bank						
4. Improve Community Economy		**4.1 Development of Infrastructure**						
		4.1.1 Increase electric power						
		4.2 Rehabilitate of local knowledge						
		4.2.1 Rice seed production						
		4.2.2 Promote community base tourism						
		4.2.3 Local research on fish species						
		4.2.4 Improve community capacity on accounting						
5.Promotion of community product and market		**5.1 Promotion of community product and market**						
		5.1.1 Vocational training such as fih processing						
		5.1.2 Create brand name						
		5.1.3 Improve Bang Kaew dog						

3. Pilot Project Sheets

Tambon Chum Saeng Songkram, Bang Rakam District, Phitsanulok Province

Sector	Model Area / Program	Phitsanulok Province T.Chum Saeng Songkram (CSS), A.Bang Rakam	Project Code Number
Community-based Disaster Risk Management Against Big Flood (CDRM)	Evacuation/ Rescue Coordination Center and Equipment (EVC)	(1) Improvement of Communication System	CSS-CDRM-EVC-1
	Youth Activities to Transfer Knowledge and Lessons Learned (YALL)	(1) Synthesize of culture and knowledge on flood (no project sheet)	CSS-CDRM-YALL-1
Community Water Resources Management (WRM)	Preparation of Flood Hazard Map (HZDMP)	(1) Preparation of Flood Hazard Map	CSS-WRM-HZDMP-1
	Participatory Flood Monitoring/ Information Management (PFIM)	(1) Participatory Flood Monitoring	CSS-WRM-PFIM-1
	Community Water Resource Management Plan (CWRMP)	(1) Review of Government Intervention	CSS-WRM-CWRMP-1
Flood Damage Reduction in Agriculture and Livestock Sector (AGRI)	Crop Diversification and Food Security (CRDV)	(1) Promotion of Sufficiency Agriculture	CSS-AGRI-CRDV-1
Income Generation Activities towards Recovery of Rural Livelihood (iGEN)	Study on Fish Variety and Value in Flood Prone Area (FISH)	(1) Fish Survey (no project sheet)	CSS-iGEN-FISH-1
	Income Generation utilizing Local Resources (IGLR)	(1) Fish Processing	CSS-iGEN-IGLR-1

PILOT PROJECT SHEET

Project Code	Sector	Community-based disaster Risk Management Against Big Flood (CDRM)
CDRM_EVC-1	Program	Evacuation/ Rescue Coordination and Equipment (EVC)
Title	Improvement of Communication System	
Purpose	- Prepare disaster mitigation plan for big flood by community initiatives based on government flood/water management plan and their own preparation. - Prepare flood hazard map in community level through participatory workshop to promote people's awareness and prepare future flood by community initiatives.	
Location	Tambon Chum Saeng Songkhram, Amphoe Ban Rakam in PhitsanulokProvince	
Beneficiaries	The entire population in Tambon	
Implementing Agency	T.ChumSaengSongkhram、Hydro and Agro Informatics Institute (HAII)	

Background/Concept

Community lives with flood in almost every year in this area and people know the way water comes from and where to evacuate by their experience. They have tried their best to reduce the impacts from the flood by various methods. However, to avoid damage by unexpectedly big flood such as 2011 in rainy reason, it is necessary to organize information in a more easily readable and understandable format for community. In the past, the warning system relied on the mobile telephone report communication with families, friends, etc. for better preparation to be informed about the water levels and water situations up-to-date, it is necessary to have the practical and proficient communication system.

Expected Outcome

- To have the up-to-date and timely disaster warning system installed
- People can prepare for the future flood and evacuate promptly when big flood comes
- Community can prepare disaster management plan by their initiatives for future flood
- Guideline for the process of installing the communication system

Component (Input/ Activities)

(1) Field survey to collect the general condition of community
(2) Meeting with the involved agencies and individuals
(3) Community summarizing on their adaptation to the flood since the past
(4) Working along with the community to plan the communication system installation
(5) Setting the communication plan for the disaster countermeasures such as risk areas, floodways, etc.
(6) Field survey for the locations/ points to install the warning stations with the support from the disaster surveillance team of Ladkrabang Model
(7) Summarizing the 13 installing points and the broadcasting center

Related Program, if any		**Code:**

Cost (w/ Source)

Implementing Schedule

1. Data Collection
2. Discussion with involved agencies and individuals
3. Installation
4. Final monitoring
5. Follow-up

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Dec	- Data collection
Jan	- Discussion with involved agencies and individuals
Feb	- Installation
Mar	- Final monitoring
Apr	- Follow-up

*Describe main findings about the project, including progress, problem, issues raised.

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	●
Timing of Implementation (Pre-, During , Post-Flood)	● The installation of the communication system can be prepared during dry season.
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	● The community accepted the project with the hope to reduce impacts from the flood proficiently and conveniently than in the past. ● Community will maintain the continuing lessons learned and development. ● Training about the utilization of the communication equipments will be performed regularly to the community.
Replication and extension (role of stakeholder, cost share, etc.)	● Involved agencies should continue financial aids if necessary for the extension of the project. ● The communication system committee should be set up as well as the rules and regulations. ● Information about the precautions should be arranged for all community members.
Sustainability (incl. O&M, benefit during normal time)	● After completion of the Project, the communication system should be studied how to apply and utilize to the other Tambons and then be introduced to the other Tambons with the lessons learned of pilot activities by involved agencies. ● Stakeholders should contribute their participation for practical disaster warning system.

PHOTOS

Locations installing the water gauges

Ladkrabang Engineering Disaster Surveillance Team supported on the communication system installation

Installation of the signal station at 12 locations

PHOTOS

The Team was testing the communication system

Training the persons-in-charge

Discussing with Mr.Chalard Yungcharoen, the Chief Executive of the TAO

PHOTOS


Thai PBS Channel shooting the news about the project


Thai PBS Channel reporting from the signaling station of the water gauges

News shown on the Thai PBS Channel broadcasted on 21 May, 2013; 01.30 pm – 02.00 pm.

PILOT PROJECT SHEET

Project Code	Sector	Community Water Resources Management
WRM-PFIM-01	Program	Participatory Flood Monitoring/ Information Management
Title	Participatory flood monitoring activity	
Purpose	1) To understand water levels in community area during rainy season 2) To learn how to monitor the flood level using staff gauge 3) To inform and educate local community for the flood event through the water level monitoring 4) To setup water level monitoring system	
Location	T. Chum Saeng Sonhgkhram, A. Bang Rakam, Phitsanulok	
Beneficiaries	T. Chum Saeng Sonhgkhram	
Implementing Agency	T. Chum Saeng Sonhgkhram、Hydro and Agro Informatics Institute (HAII)	

Background/Concept

After the 2011 flood event, the Thai Government responded with various near- and long-term measures. The strategy action plan aims to address long-term flood management strategy, urgent flood mitigation strategy and sustainable flood management strategy.

For the local community level, the community should be informed on the government plan and policy that may affect their community living, and participate on the government flood management. By understanding the flood nature and the national flood management, the local community could be adapted to it and prepared to the future flood through the monitoring the community water level data for minimizing the flood damage.

Through the participatory flood monitoring activities, participants discuss and evaluate the community water resources, and establish the community water resource management plan.

Expected Outcome

- To gain new skill about water level measuring method.
- To aware of the information of flood situation in community level.
- The collected data will be useful for the assessing the flood damage.
- Provision of flood based on monitored water level data by information system.
- Formulation of community water resources development plan by community

Component (Input/ Activities)

1) Inform the objectives and scopes of the project to the local community
2) Survey and assist local community to install water level indicator for the community
3) Give education to the community people, teachers and students in schools
4) Set up community meeting and event for promoting participatory flood monitoring
5) Improve the community communication for the flood warning and share the information with the government agencies
6) Obtain feedback from local community on their need from the government agencies

Related Program, if any	Preparation of Flood Hazard Map (HZDMP)	**Code** CSS-WRM-HZDMP-1

Cost (w/ Source)

Elevation survey 10 locations / 1 Tambon	1	lump sum	30,000
Staff gage installation (One sheet has 1 m long)			
Metal staff gage	1	sheet	1,200
Elevation tag (MSL)	1	Tag	60
Installation instrument and labor	1	sheet	1,100
RC column 0.15 x 0.15 m and 2 m long with foundation support	1	lump sum	5,800
Community website and data base system	1	lump sum	40,000
Monthly measurement and record	1	month	3,000

Implementing Schedule

September 2012 to March 2013

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Sep. 2012	- Community meeting about interview for 2011 flood experience, constructing a community map, field visit of water management structure and to meet local community on Moo Ban. - Field survey for staff gage installation - Survey and Bench Mark setting for installation of staff gage - Staff gage installation
Oct. 2012	- Monitor and record the water level data
Nov. 2012	- Monitor and record the water level data
Dec. 2012	- Monitor and record the water level data
Jan. 2013	- Monitor and record the water level data
Feb. 2013	- Monitor and record the water level data
Mar. 2013	

*Describe main findings about the project, including progress, problem, issues raised.

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	・ The community people can understand the meaning of MSL (Mean Sea Level of water) as well as importance of water levels observed by RID. ・ This monitoring activity shall be continually promoted by community. For instance, school is one of the choice to observe the water level at installed water level staffs in Tambon
Timing of Implementation (Pre-, During , Post- Flood)	・ Dry season is the best period to carry out the staff gage installation.
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	・ The community can learn how to install the staff gage and monitor the water level observation easily. ・ Villagers are able to know the relation of water levels between staff gage in Tambon and gaging stations in RID nearby Tambon. ・ The relation of the water levels will be benefited to the villagers to know a warning water-level in flood period.
Replication and extension (role of stakeholder, cost share, etc.)	・ The Provincial or District government agencies should introduce and disseminate “the participatory flood monitoring activity project” to other Tambons affected by flood.
Sustainability (incl. O&M, benefit during normal time)	・ TAO should support all activities comprising of water level recording, monitoring, maintenance, staff replacement (if it is broken). Some regular budget also shall be provided to the group for these activities. ・ The warning color indicator system in community level should be established in future.

PHOTOS

Set up community workshop

Benchmark survey tools

Installed staff gage

Staff gage reading training

Data collection of 2011 flood water mark by staff gage

Community draw map of their tambon with infrastructures and water resource

PILOT PROJECT SHEET

Project Code	Sector	Community Water Resources Management (WRM)
CSS-WRM-HZDMP-1	Program	Preparation of Flood Hazard Map (HZDMP)
Title	Preparation of Flood Hazard Map	
Purpose	- Prepare disaster mitigation plan for big flood by community initiatives based on government flood/water management plan and their own preparation. - Prepare flood hazard map in community level through participatory workshop to promote people's awareness and prepare future flood by community initiatives.	
Location	Tambon Chum Saeng Songkhram, Amphoe Ban Rakam in PhitsanulokProvince.	
Beneficiaries	The entire population in Tambon	
Implementing Agency	T.ChumSaengSongkhram、Hydro and Agro Informatics Institute (HAII)	

Background/Concept

Community lives with flood in almost every year in this area and people know the way water comes from and where to evacuate by their experience. However, to avoid damage by unexpectedly big flood such as 2011 in rainy reason, it is necessary to organize information in a more easily readable and understandable format for community. For this purpose, preparing hazard map in community level is useful to organize information and to understand people their community clearly such as topography, location of infrastructures, hazard area, and evacuation route.

Hazard map should help people to evacuate in an expeditious way and also to make a disaster management plan preparing for future flood in community level. Moreover, to aware the community the warning water level and the timing of evacuation in flooding time, water level data measured by community will be shown on the hazard map by linking with "Participatory Flood Monitoring/Information Management".

Expected Outcome

- People can prepare for the future flood and evacuate promptly when big flood comes.
- Community can prepare disaster management plan by their initiatives for future flood.
- Guideline for the process of making hazard map

Component (Input/ Activities)

(1) Field survey to grasp the general condition of community
(2) Colleting data to be shown on Hazard map by using GPS device and input to GIS data.
(3) Input the survey result on "Participatory Flood Monitoring/ Information Management (PFIM)" to the flood hazard map and GIS data.
(4) The data to be shown on Hazard map is as follow.
    - Infrastructure (Road, water body, canal)
    - Administrative Boundary (Tambon, Moo)
    - Location of major buildings (TAO, Police station, School, Hospital, Water Supply, EvacuationCenter, RID Facilities, etc)
    - Flood Flow, Hazard Area
    - Location of Staff Gage and water level data measured by community(by PFIM)
(5) Set up participatory design workshop to finalize flood hazard map, promote awareness for community's flood management and construct guideline for future flood.
(6) Distribute PR materials to the community to gain understanding of hazard map and promote their awareness to the flood.

Related Program, if any	Participatory Flood Monitoring/ Information Management	**Code**CSS-WRM-PFIM-1

Cost (w/ Source)

The contract has been made between HAII and the total amount includes PFIM in CSS and NPM..
The following items are a part of the total amount of the contract.

- Facilitation and organization of flood hazard map making(Personnel)	100,000
- Staff gage (12 stations)	60,000
- Information Technology (PC, GPS, etc)	90,000
Total	250,000 (THB)

Implementing Schedule

1. Data Collection	Sep 2012 to Jan 2013
2. Data Input for Hazard Map	Dec 2012 to Jan 2013
3. Finalize Hazard map by participatory workshop	Feb 2013

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Aug. 2012	- GIS training to CSS and NPM and explained how to read map, use GPS devise, explained about media box, its usefulness for water resources management.
Sep. 2012	- Organized Study tour to Community Water Management Project in Ban Nongyaplong, TambonChompoo, Nernmaprang District, Phitsanulok Province. - Water level monitoring
Oct. 2012	- Water level monitoring
Nov. 2012	- -Organized meeting for understanding the data collection process to create the water resources management. - -Organized meeting for understanding the data related hazard map making. - -Water level monitoring
Dec. 2012	- Collecting data for hazard map - Creating draft hazard map - Organized Study tour to Buri Ram community water resources management site. - GIS training has given to representatives of Chum SaenSongkhram - HAII and The Royal Thai Army had a meeting with CSK and NPM to set plans for rehabilitation of local construction and survey the area
Jan. 2013	- Collecting data for hazard map - Creating draft hazard map
Feb. 2013	- Confirmation of hazard map through the participatory workshop
Mar. 2013	

*Describe main findings about the project, including progress, problem, issues raised.

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	● The Flood Hazard Map prepared by the Project is easy to understand the direction of the flood flow, evacuation route and site for the villagers,so that villagers with animalscould be easy to evacuate in accordance with the map . ● The flood observation web sitehas beenset up for recording the staff gage water level data in Tambonto disclose the information to public. From this internet device the villagers are able to know the relation of water levels between staff gage in Tambon and gaging station in RID nearby Tambon. ● The relation of the water levels will be benefited to the villagers to know a warning water-level in flood period. ● However, after completion of the Project, TAO should take a responsibility to revise the flood hazard map at regular intervalscontinuouslyfor community self-reliance flood warning.
Timing of Implementation (Pre-, During , Post-Flood)	● The Flood Hazard Map can be prepared during dry season.
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	● The community accepted themaking HZDMP technique with participatory way, so they understood and realized how essential it is. At the same time, they learned the evacuation sites and routes through their own discussion as well as know the contact person in charge of the flood countermeasures during the flood period. ● However, it is not easy to carry out this work by the community itself even it takes not big budget. ● Provincial Disaster Protection and Mitigation Office (PDPM) should assist them to practice theprocess of the hazard map making through their normal rehearsal activity incorporated with other agencies concerned.
Replication and extension (role of stakeholder, cost share, etc.)	● PDPM should support the HZDMP preparation process to other risky impacted area in the future using the Manual, Guideline and Lessons learnt from PilotTambonregarding the Projects of Preparation of Flood Hazard Map and Participatory Flood Monitoring Activities prepared by JICA Study Team. ● Task Force Provincial Committee also should follow up and promote the map utilization in pilot Tambon and also disseminate the map to the other Tambons.
Sustainability (incl. O&M, benefit during normal time)	● After completion of the Project, HZDMP should be studied how to apply and utilize to the other Tambonsand then introduced to the other Tambons with the lessons learned of pilot activities by PDPM. ● Large scale of A1 sizeHZDMP was printed and distributed to each village and Tambon. TAO should distribute the map to the public facilities such as school and hospital, etc. in order to remind their evacuation routes and sites. Sign boards also should be installed at the main public facilities.

PHOTOS

GIS Training in August 2012, HAII hold a seminar for how to use GPS and how to read maps

Participants for GIS training measures elevation and coordinate by GPS device

Staff gage reading training and water balance training

GPS device to collect elevation data from satellite

Staff gage installation work

Site visit to Ban Nongyaplong, TambonChompoo, Nernmaprang District, Phitsanulok.

PHOTOS

Site Visit to Ban Limthong community, Buri Ram province

Site Visit to Ban Limthong community, Buri Ram province

Discussion about water management by using map drawn by community in December 2012 at study tour to Buri Ram.

Community draw map of their tambon with infrastructures and water sources in workshop at study tour to Buri Ram.

Discussion about water management

Community people check and discuss about existing water resources.

PILOT PROJECT SHEET

Project Code	Sector	Flood Damage Reduction Measures in Agriculture and Livestock Sector
AGRI-CRDV	Program	Crop Diversification and Food Security
Title	Promotion of Sufficiency Agriculture	
Purpose	*Overall*: Diversify the types of crops to reduce the risk of complete loss under mono culture especially paddy; and introduce short-cycle crops, which enable generating quick cash or securing foods for home consumption. *Project*: Promote safe vegetable production for home consumption and for marketing.	
Location	Tambon Chum Saeng Songkhram, Amphoe Ban Rakam in Phitsanulok Province	
Beneficiaries	The entire population in Tambon and 7 model schools	
Implementing Agency	Tambon Administration Office (TAO), Department of Agricultural Extension (DOAE)	

Background/Concept

As a means to reduce the risk of flood damage, it is recommended to diversify the farming portfolio of farmer household. It is well known that mono-cropping entails a certain level of risks, which may be incurred by a price fluctuation, outbreak of pest and disease, or natural calamities like flood. Diversification of crops is therefore recommended. In this program, some types of crops that can be cultivated in relatively short period are introduced.

After a flood, recovery process should be commenced as soon as possible. Although it is desirable to restart paddy cultivation for paddy farmers, it is not always possible due to a lack of funding, remained inundation in lowland, and lack of seeds and inputs. In this context, short-cycle crops such as vegetable, which also require relatively lower investment cost, can provide farmers with an opportunity to earn quick cash. By revolving such small but quick cash, farmers can strengthen their capital for re-cultivation of paddy thereafter. Introduction of vegetables can be a good source of income and home consumption even during ordinal years. If marketing channel is established, restart of vegetable production after flood can be smoothly facilitated.

Expected Outcome

- Farmers gain new skill on safe vegetable cultivation
- Farming portfolio of individual farmer household is diversified
- Household income is increased
- Marketing channel is established (MKT)
- Students understand on safety vegetable growing and building the food sources such as raising chicken, fish, frogs, etc.

Component (Input/ Activities)

1) Identification of participants (7 model schools)
2) Workshop for planning of safe vegetable production and marketing
3) Study tour to an existing vegetable-farmers' group near the area
4) Training on safe vegetable cultivation and marketing
5) Technical assistances by DOAE
6) Preparation of guideline

Related Program	Logistic and Market for Agro-produce	Code:	MKT

Cost (w/ Source): *Family labor cost for ordinal maintenance of the field is born by the participants*

- Workshops:	10,000Bt	(JICA)	
- Farm input and material	150,000Bt	(JICA)	(materials for net houses included)
- Public relations	20,000Bt	(JICA)	
- Total (approx.):	180,000Bt	(JICA)	

Implementing Schedule: *November 2012 to April 2013*

- Dec. 2012: Planning workshop
- Jan. 2013: Construction of net houses, and training on seedling preparation
- Feb. 2013 Continued cultivation of vegetables, revision of cultivation plan (types of vegetables)
- Mar. 2013 Establishment of green market in the community, lesson learned workshop, preparation of media
- Apr. 2013 Final workshop

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Dec. 2012	- Meeting was conducted with farmers and school children to draft a plan of safety vegetable growing and marketing on December 19, 2012.
Jan. 2013	
Feb. 2013	
Mar. 2013	

*Describe main findings about the project, including progress, problem, issues raised.

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	
Timing of Implementation (Pre-, During , Post-Flood)	
Acceptance of technique by community (cost, benefit, easiness, relevance to	● The community accepted the project with the hope to reduce impacts from the flood proficiently and conveniently than in the past. ● Community will maintain the continuing lessons learned and development. ● Training about the utilization of the communication equipments will be performed regularly to the community.
Replication and extension (role of stakeholder, cost share, etc.)	● Involved agencies should continue financial aids if necessary for the extension of the project. ● Finding more markets to sell products of the community. ● Agricultural food processing should be extended to more activities for various sources of additional incomes.
Sustainability (incl. O&M, benefit during normal time)	● After completion of the Project, the communication system should be studied how to apply and utilize to the other Tambons and then be introduced to the other Tambons with the lessons learned of pilot activities by involved agencies. ● Joining with the other market networks and extending the areas of sustaining.

PHOTOS


Discussing on planning for the food sources and sustaining areas with schools and communities


Safe vegetable growing at a model school


Visiting the pilot sufficiency project at Nong Payom School (Frog raising, fish pond and growing vegetables)

PILOT PROJECT SHEET

Project Code	Sector	Income Generation Activities towards Recovery of Rural Livelihood (iGEN)
iGEN-IGLR-1	Program	Income Generation Utilizing Local Resources
Title	Fish processing utilizing local fish resources for income generation	
Purpose	To utilize local fish resources available in flood period for income generation in community people	
Location	Tambon Chung Saeng Songkram, A. Bangrakham, Phitsanulok Province	
Beneficiaries	Fish processing group in Chung Saeng Songkram 10-15 members combine with nam-prik producer in Moo7, final product will be nam-prik pla-ra or nam-prik pla-yang	
Implementing Agency	Naresuan University, local FDA, Industrial Standard Office, Provincial Community Development office	

Background/Concept

In order to improve community resilience for natural disaster such as flood, it might be effective to diversify sources of cash income in communities. Through the PRA workshops in the model area, based on that concept, it was proposed to utilize community available resources for income generation, especially fishes available during flood. Through the activity, JICA team and Naresuan University support community food processing group to utilize local fish resources and improve their product quality.

Current situation, the group or individual characteristics mainly have some technical skills as they routinely work in drying and fermentation, have providing the fish raw material or/and being fish processor or related products and may have their own and related products currently available for sale in the market or sale at home or having potential to launch their products to the market such nam-prik. Sa-gueam nam-prik's producer is one of success producer in local area.

Project support to improve quality of produce and obtain FDA and/or OTOP certificate for selling outside community by training and advice on package and marketing.

Expected Outcome

- Potential local resource/ products are identified
- Quality of processed food and its techniques is improved by training
- Processed food products of groups are sold outside community

Component (Input/ Activities)

- To identify interested person in local resource utilization (food processing) activities including existing groups according to the survey result in the community.
- To discuss with the community for confirmation of members, product and components of activity.
- To prepare materials of trainings for the community food processing group as follows: 1) product development in general: guideline how to generate the new product ideas and screen the ideas to meet the need of consumer, 2) general guidance to food product processing mainly fermented food, including safety and quality concern, and 3) packaging, labeling and marketing strategy
- To demonstrate food processing utilizing local resources from selected producer
- To provide to technical trainings for select participants

Related Program, if any	Study on Fish Variety and Value in Flood Prone Area	**Code:**OTHER-FISH-1

Cost (w/ Source) ***for 2 Tambon***

1) Equipment/facilities for food processing
   TOTAL 25,000 Baht
2) Trainings
   TOTAL 60,000 Baht
3) Other cost
   - Food processing group for materials 25,000 Baht

Implementing Schedule: *November 2012 to April 2013*

- 28th Nov. 2012: Fish resource survey in local area
- 28th Nov. 2012:Survey of community food processing activity
- 6th Feb. 2013. Confirmation meeting of activity, starting improvement of product
- 16th Mar. 2013. Workshop on new product
- 23-24th Mar 2013. Workshop of production development and improvement
- Apr. 2013 Final workshop to present products

RESULT OF MONTHLY MONITORING

<table>
<tr><th>Term</th><th>Findings (Progress/ Problems/Other Issues)</th></tr>
<tr><td>Dec. 2012</td><td>- Conduct Fish Resources Survey continued.
- Monitoring, progress, problem etc.
- CSS members are not get together.
- Target group must be carefully screened to participate in the next activities.</td></tr>
<tr><td>Jan. 2013</td><td>- Report preparation was on going.</td></tr>
<tr><td>Feb. 2013</td><td>- Meeting on the 6th Feb 2013, the group decide to conduct the process of namprik pla-ra at Sa-ngeam's processing house, Moo 7.
- Sa-ngeam Piathong (เสงี่ยม เปียทอง) is a leader of occupational group (ประธานกลุ่มอาชีพ) in tambon CSS. Phone: 087-1953783
- Pla-ra producers has problem of control the salt quality and buying sea salt, except Sunantha feels confident to buy salt with no brand from retail car with constant quality
- Untreated water from canal/ natural water resources was used for washing fish in Pla-ra processing.
- Processing date was not exactly decided, but the beginning of March on site and middle of March at NU.
- Ms.Wasana will cooperate with the group and make appointment with the group for the training on site and at NU.</td></tr>
<tr><td>Mar. 2013</td><td>- Fish processing on the 6th March 2013 in CSS with the combination of pla -yang and namprik was conducted. (19 participants)
- Eight participants from NPM were attended the activity at CSS.
- 9 participants from CSS attended on workshop in NPM on 13th March, 2013
- Workshop on Nampric Processing and canning at NU on 23-24th March with 5 participants
- Draft of stickers for marketing activity
Analysis results of samples
<table>
<tr><th>รายการวิเคราะห์
Lists of analysis</th><th>วิธีวิเคราะห์ Analytical method</th><th>ผลการวิเคราะห์
Results</th></tr>
<tr><td>2. Yeast and Mold Count</td><td>FDA BAM(2001),Ch.18</td><td>< 100 cfu/g</td></tr>
<tr><td>4. E.coli</td><td>FDA BAM (2002),Ch.4</td><td>< 3 MPN/g</td></tr>
<tr><td>1. Total Plate Count</td><td>FDA BAM (2001),Ch.3</td><td>5.40x10 5 cfu/g</td></tr>
</table>
Workshop program at NU 23rd – 24th March 2013
23rd March 2013
08.00-08.45 Register
08.45-09.00 Opening remark
09.00-10.30 Introduction for can processing
10.30-11.00 Coffee break
11.00-12.00 Demonstration of can processing
12.00-13.00 Lunch
13.00-14.30 Namprik narok processing
14.30-15.00 Coffee break
15.00-16.30 Namprik narok processing (cont.)
24th March 2013
08.00-09.00 Register
09.00-10.30 Discussion: Can processing
10.30-11.00 Coffee break
11.00-12.00 Discussion: Can processing (cont.)
12.00-13.00 Lunch
13.00-14.30 Discussion: Namprik narok processing
14.30-15.00 Coffee break
15.00 End of the workshop</td></tr>
<tr><td>April</td><td></td></tr>
</table>

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures	- CSS can encourage NPM members to run the same activity on 13th March 2013 and invited CSS member to be the guess and the mentor. More fish resources will be in consideration among villages and tambons if they success in group set up, produce varieties of good taste fish products and more networking.
Timing of Implementation (Pre-, During , Post- Flood)	- Capturing natural fish during flood period. Big flood bring more fish and longer duration will benefit to villagers in terms of obtain cash income during flood. - Small fish can be cultured in pond after flood water reduced, and sold in dry season. - Processing of small fish which is lower value can be added value by processing during and after flood. - Higher processing skill shall be started before flood. By increasing capacity of production according to demand, the group can purchase more fish from villagers.
Acceptance of technique by community (cost, benefit, easiness,	- Community members start to aware of control quality of pla-ra, eager to learn how to develop new product and making namprik. - They don't know how to eliminate the worm from pla-ra after packing. -
Replication and extension of (role stakeholder,	- CSS feel more unite and confident to set up the new group and network and to generate the new products in the near future. - More confident that they can earn more income from these activities.
Sustainability (incl. O&M, benefit during normal time)	- Net working for food producers among different area: CSS, NPM, Tha-pho group - Networking for marketing with TAO, Community Development office, etc. - Good relationship and networking among Naresuan University, government authorities and producers. - Understanding of good practice in processing and using more advance technology in preserving fish. - More confident to set up the group and network and to generate the new products in the near future. - More confident that they can earn more income from these activities.

(Draft) Stickers of CSS

PHOTOS

6th March 2013 workshop at CSS

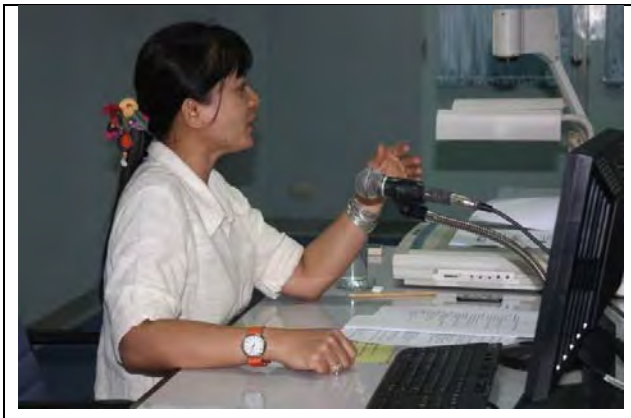
Warmed welcome at CSS

Cooking activity at CSS

Cooking activity at CSS

<table>
<tr><td>  </td><td>  </td></tr>
<tr><td>Mixing equipment</td><td>Minced and Mixed</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Phitsanulok FDA staff was invited to observe the activity and guide how to get อย. or FDA certificate.</td><td>Industrial officer in Phitsanulok was invited to observe the activity and guide how to get มผช.</td></tr>
<tr><td>  </td><td>  </td></tr>
<tr><td>Packing anmprik</td><td>Namprik pla-yang and hand-made label
Sampling for microbial analysis for FDA certication
Sampling for microbial analysis at NU laboratory</td></tr>
</table>

23rd-24th March 2013 workshop at NU



Ms.Yupa and Ms.Kesinee, Community Development officers were invited to observe the activity and guide how to apply for OTOP and marketing.

Workshop of namprik na-rok processing by Ms.Tawee and her team from Tha-pho Group

Demonstration of canning process of fish products

Provide equipment for food processing to CSS

Provide handy-mixer

Tambon Disaster Resilient Plan of Chum Saeng Songkhram TAO

Vision: *"Chum Saeng Songkhram manages water systematically with balance between nature and community way of life. Promote appropriate agricultural system and generate income from fish"*. Community maintains this vision.

Strategies

In order to achieve the above vision, seven strategic activities were proposed by community namely;

a) Promote people participation in flood management
b) Improve water resources
c) Install communication system for early warning
d) Promote self-help activity during flood
e) Promote income generation activities
The community maintain and follow these five strategies for flood adaptation.

Activities

Activities are grouped into three after implementation of pilot activities namely

1) Pilot activities(orange)
2) Short term activities (green)
3) Long term activity (blue)

Remarks :  Long-term plan  Completed activity  Urgent plan  Ongoing Plan

Vision: *"Chum Saeng Songhkram Sub-district has systematic water management related to the nature, culture and ways of life of the community, in which conducive to the proper agriculture for the area and the happy lifestyle aswell as the source of various fish varieties and fertitity"*

Promoting the participation of the people, strength of the groups and the water management network			Community-based water management	Monitoring the communication, surveillance and coping with the disaster		Development of the local economy and occupational security		Promotion for marketing and community products
Strategy 1: Strengthening the water management networks within and outside the sub-district	Strategy 2:Building the participation of people on water management and lifestyles of the community	Strategy 3: Development of the water management groups	Strategy 1: Improvement and development the natural water resources and water resources in the areas of the households	Strateg 1: Creating the Water Situaion Monitoring Networks	Strategy 2: Preparedness for coping with the disaster	Strategy 1: Development the infrastructure	Strategy 2:Reviving the community lifestyles in related to the local knowledge blending with the modern one for sustainable life	Strategy 1: Development and promotion of the markets for the local products
Activity Plan 1: Study the potential of making canals to connect Eh Ah Canal to Kui Muang Canal	Activity Plan 1: Workshop on the water management	Activity Plan 1: Setting the mechanisms of management and performance evaluation	Activity Plan 1: Study and preparing the community-based water management plan	Activity Plan 1: Connecting the Water Situation Monitoring Networks via radio communication	Activity Plan 1: Adjusting the rice farming methods to be in line with the disaster	Activity Plan 1: Improvement the proper electricity supply	Activity Plan 1: Development the tecniques of rice seed production	Activity Plan 1: Training on specific topics such as fish processing, etc.
Activity Plan 2: Strenthning the Copper Pipe Water Management Groups between CSS and Kamphaeng Petch Province	Activity Plan 2: Conducting the research on impacts of water management	Activity Plan 2: Raising fishes in natural water reservoirs using the community constitution	Activity Plan 2: Dredging the natural water resources in the area for drainage in the flood season and storing water in the drought	Activity Plan 2:Installing water guages for justified the use of water	Activity Plan 2: Development of the Evacuation Center as the area of sustenance		Activity Plan 2: Restoring the concept of community tourism	Activity Plan 2: Making the community trademarks
	Activity Plan 3: Trainign and support the use of organic composting for paddy fields	Activity Plan 3: Providing water resources during the drought such as small ponds and artesian wells	Activity Plan 3: making the drainage canal to divert water from flooded areas		Activity Plan 3: Establishment the Rice Seed Bank		Activity Plan 3: Study on the fish types and varieties	Activity Plan 3: Development the breeds and improvement the standard raising methods for Thai Bang Kaew Dogs
			Activity Plan 4: Water management by using the water gate at Nong Paeng Puay Canal				Activity Plan 4: Enhancing skills for the community organizations on accounting	

Table of Pilot Project Plans for Chum Saeng Songkram Sub-district, Bang Rakam District, Pitsanulok Province

Strategies	Strategies/ Plans	Completed Activities	Further Plans
Promoting the people participation, community empowerment and water management network	Strategy 1: Strengthening the water management networks within and outside the sub-district	Chum Saeng Songkram Water Management Committee was established.	
	Activity Plan 1: Study the potential of making canals to connect Eh Ah Canal to Kui Muang Canal	Have not been performed	
		Completed dredging of Wang 33 Canal and connected to the Nong Yai Canal with total distance of 7.5 km. of the Monkey Cheek area. Beneficiaries are in villages Moo 1, 9, 3 and 6 namely Nong Samian, Nong Yao, nong Yai and Kui Muang Villages respectively.	
		Conducting the dredging of Wang Rae Canal at 4.5 km. with width of 60 m. and depth of 4 m. Beneficiaries are in villages Moo 2,3, 5 and 8 of Ta Nang Ngam Sub-district (5 villages) or average rate of 600 beneficiaries per village and 5,000 Rais of agricultural areas.	Want to continue the dredging of Wang Rae Canal until complete the whole length of 10 kilometers.
	Activity Plan 2: Strengthening the Copper Pipe Water Management Groups between CSS and Kamphaeng Petch Province	To be connected with Kamphaeng Petch Province's. Already discussed with the related agencies to store water in Bhumipol Dam and divert when need. Proposal was presented to RID. The official project will be extended to Kong Krai Las District. Increasing the areas of irrigation to 6 Tambons of Bang Rakam District was also requested.	The community will push forth to the MRC.
	Strategy 2:Building the participation of people on water management and lifestyles of the community Activity Plan 1: Workshop on the water management	Workshop at Nang Rong District, Buriram Province, Ban Nong Ya Plong, Noen Ma Prang Sub-district, Pitsanulok Province and Ban Nong Ping Kai, Kamphaeng Petch Province.	
	Activity Plan 2: Conducting the research on impacts of water management	Have not been performed	
	Activity Plan 3: Training and support the use of organic composting for paddy fields	Have not been performed	
	Strategy 3: Development of the water management groups Activity Plan 1: Setting the mechanisms of management and performance evaluation	Coordinated with these following Tambons: Dong Duay, Kuay Muang and Tha Nang Ngam for their collaboration.	
	Activity Plan 2: Raising fishes in natural water reservoirs using the community constitution	Office of the District Fishery worked in cooperation with the Office of Provincial Fishery released fishes and frogs into various	

Strategies	Strategies/ Plans	Completed Activities	Further Plans
		natural water sources to increase their population.	
	Activity Plan 3: Providing water resources during the drought such as small ponds and artesian wells		Continue the projects of supplying and improvement the small scale water resources and improvement the groundwater recharge at the shallow aquifer area.
The Community based-Water Management	Strategy 1: Improvement and development the natural water resources and water resources in the areas of the households	ALRO (agriculture Land Reform office) is executing the construction of ponds in the paddy fields.	
	Activity Plan 1: Study and preparing the community-based water management plan	On process, working in cooperation with HAII.	
	Activity Plan 2: Dredging the natural water resources in the area for drainage in the flood season and storing water in the drought Activity Plan 3: making the drainage canal to divert water from flooded areas		Site survey of villages Moo 7 and 8 to plan the dredging work for Klong Sarn Canal to connect with Nong Paeng Puay Canal to for drainage and storage (Development Plan for the Fiscal Year 2014 will be proposed to HAII) and E-Hok Canal and dredging the Nong Aor Swamp for total area of 6 Rais.
	Activity Plan 4: Water management by using the water gate at Nong Paeng Puay Canal	Have not been performed	Preparation of the proposal to HAII to implement work for the whole system not only at Nong Paeng Puay Canal, which are: slide gate at the joining point with the Yom River situated in Nong Kao and Sa Dao canals (Nong Jok Canal), 2 points at Ket Canal, 1 point at Ta Luk E-Taen Canal, Wang 33 Canal, Nong Yai Canal, 2 points at Nong Paeng Puay Canal, 2 points at Paeng Puay Canal, 1 point at E-Hok Canal around the area situated behind the Nong Aor Temple.
Monitoring the communication, surveillance and coping with the disaster	Strategy 1: Creating the Water Situation Monitoring Networks		
	Activity Plan 1: Connecting the Water Situation Monitoring Networks via radio communication	The use of the radio network to connect with the gauge station of the HAII.	
	Activity Plan 2:Installing water gauges for justified the use of water	Installation of gauges at 13 points and one point of telemetry.	
	Strategy 2: Preparedness for coping with the disaster Activity Plan 1: Adjusting the rice farming methods to be in line with the disaster		The community had proposed that the govern Rice Mortgage Scheme should be separated exclusively for the risk areas of disasters, with different mechanisms. The government should establish special mechanism to supply water for rice

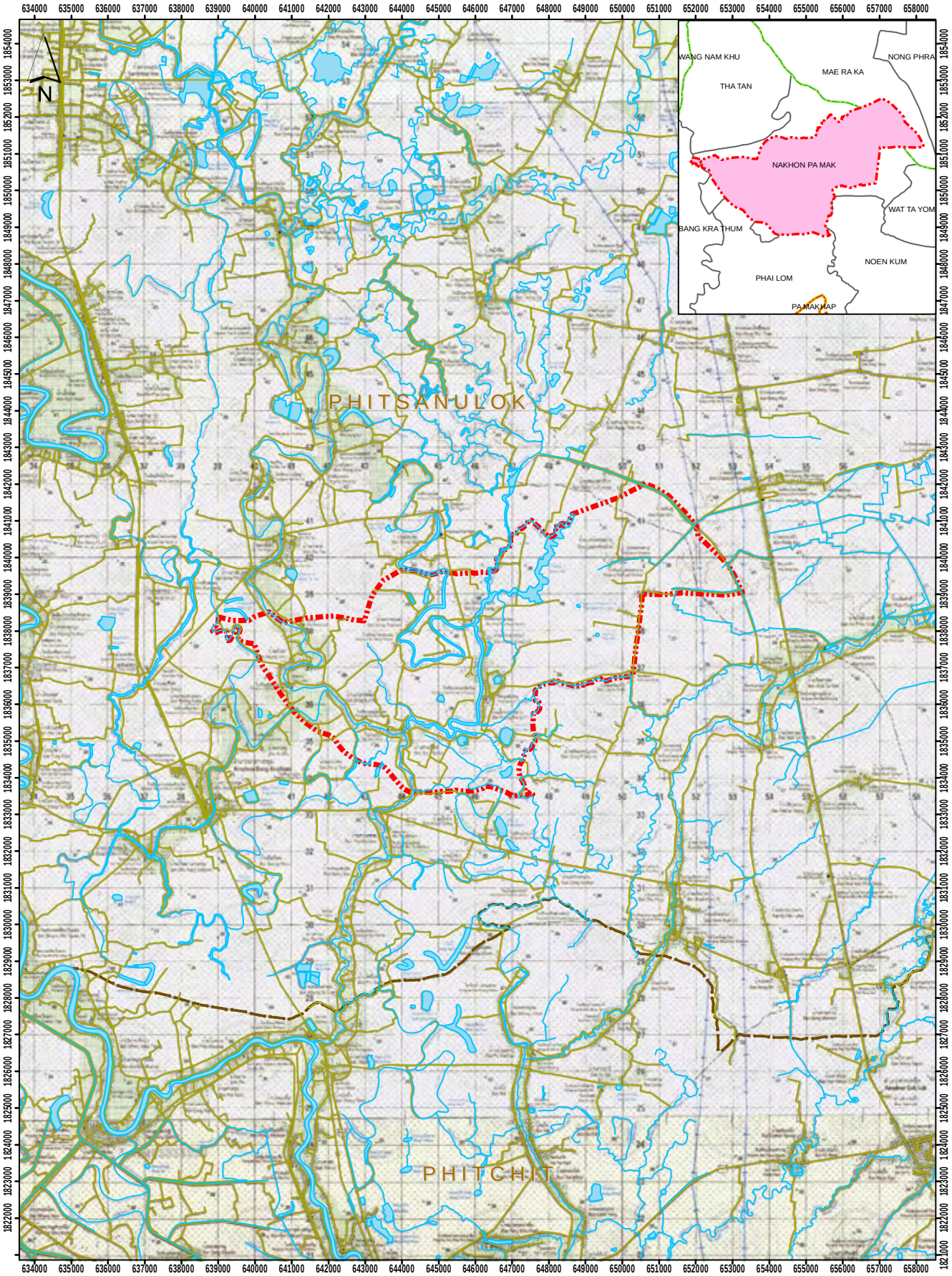
Strategies	Strategies/ Plans	Completed Activities	Further Plans
			cultivation, any government projects must not use the same calendar as other common areas, the calendar must be related to the disasters.
	Activity Plan 2: Development of the Evacuation Center as the area of sustenance	Completed the designation of the evacuation sites by the community and HAII. Seven evacuation sites were defined.	
	Activity Plan 3: Establishment the Rice Seed Bank	Have not been performed.	
Development of community economy and occupational security	Strategy 1: Development the infrastructure Activity Plan 1: Improvement the proper electricity supply		Upgrading the 2-phase power system to 3-phase system to be sufficiently supplied for the need of the community, the electricity pump station and to support the Water User Group (WUGs).
	Strategy 2:Reviving the community lifestyles in related to the local knowledge blending with the modern one for sustainable life Activity Plan 1: Development the techniques of rice seed production	Have not been performed.	
	Activity Plan 2: Restoring the concept of community tourism	Have not been performed.	
	Activity Plan 3: Study on the fish types and varieties	Completed activity performed by Chum Saeng Songkram Women Group in cooperation with Naresuan University.	
	Activity Plan 4: Enhancing skills for the community organizations on accounting	Have not been performed.	
Promoting the marketing and community products	Strategy 1: Development and promotion of the markets for the local products Activity Plan 1: Training on specific topics such as fish processing, etc.	Chum Saeng Songkram Women Group works in cooperation with Naresuan University.	
	Activity Plan 2: Making the community trademarks	Chum Saeng Songkram Women Group works in cooperation with Naresuan University.	
	Activity Plan 3: Development the breeds and improvement the standard raising methods for Thai Bang Kaew Dogs		

Community Case Study

Tambon Nakhon Pa Mak, Bang Kra Tum District
Phitsanulok Province

Content

1. PRA Report NPM-1-1
2. SWOT Analysis and Strategic Plan.....NPM-2-1
3. Pilot Project Sheets NPM-3-1
4. Tambon Disaster Resilient Plan NPM-4-1



Legend

- Provincial Boundary
- Water body
- Tambon Nakhon Pa Mak
- River
- Road

Note

Data Source:
Tambon Boundary of Nakhon Pa Mak: TAO
Neibouring Tambon Boundary: GISTDA
Other data: RID

Scale 1:100,000 (1 0.5 0 1 2 3 4 km)

Date July 2013

Project for
Flood Countermeasures
for
Thailand Agricultural Sector

JICA

Topographic Map of Tambon Nakhon Pa Mak, Amphoe Bang Kratum, Phitsanulok Province

1. General Information of Nakhon Pa Mak Sub-district

History of Nakhon Pa Mak Sub-district

Nakhon Pa Mak Sub-districtis an ancient sub-district. In the past it used to be Nakhon Pa Mak District. But because of the inconvenience transportation, the Bang Kratum Sub-district (King Amphoe in Thai) in replacement of Nakhon Pa Mak District. The status of Nakhon Pa Mak District has been changed to Nakhon Pa Mak Sub-district up to the present.

Nakhon Pa Mak Sub-districtis located in the administrative area of Bang Kratum District, Phitsanulok Province. It is about 5 kilometers from Bang Kratum District to the east direction. The area contains 36,637 Rais or58.62 sq.km. approximately. The majority of population has an agriculture as occupation.

Boundaries

To the north, connected to:	Ta Tarn Sub-district of Bang Kratum District and Wangthong District, Phitsanulok Province
To the south, connected to:	PaiLom Sub-district, Bang Kratum District Phitsanulok Province
To the east, connected to:	WatTayom Sub-district, Bang Kratum District Phitsanulok Province
To the west connected to:	Bang Kratum Sub-district, Bang Kratum District Phitsanulok Province

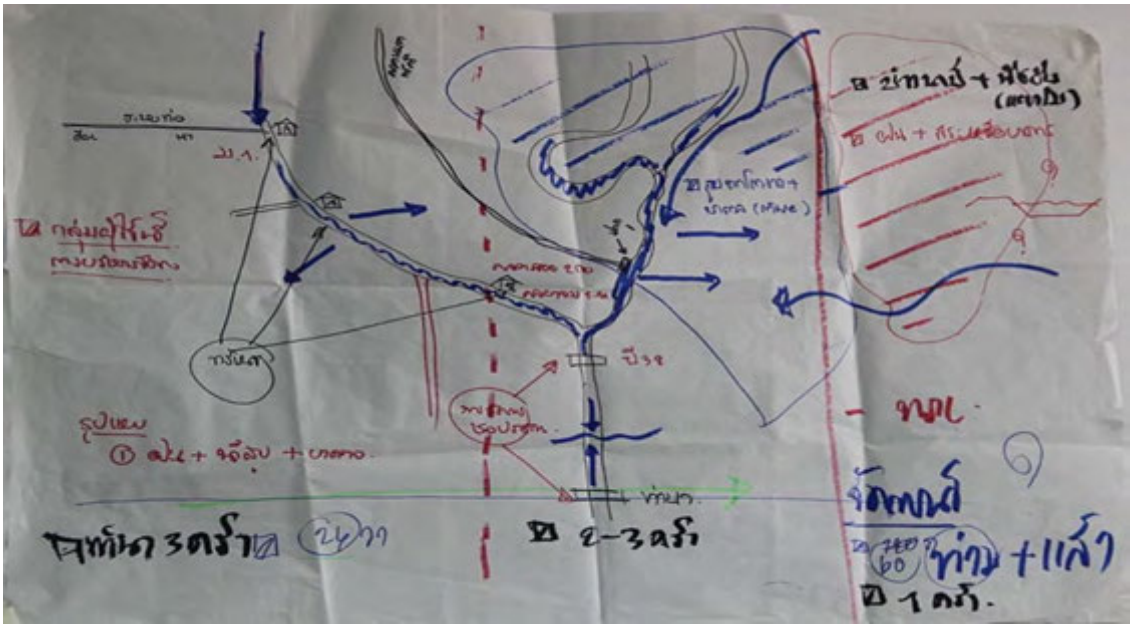
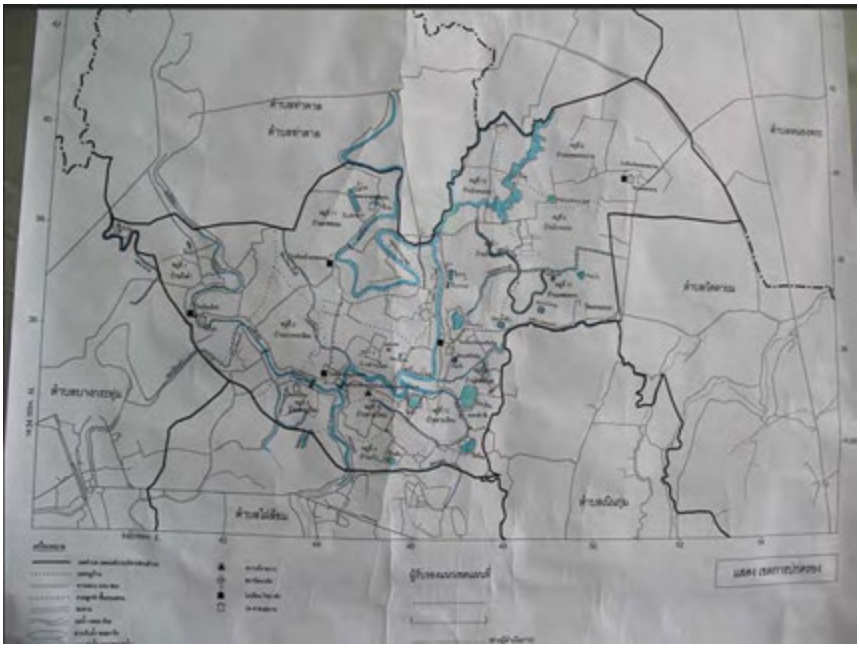


Figure 1 Map of Nakhon Pa Mak Sub-district



Map 1 Nakhon Pa Mak Sub-district

Governmental Administration

Divided into 13 villages as follows:

Moo 1 Ban Bueng Lam
Moo 2 Ban Bang KraNoi
Moo 3 Ban Sam Ruan
Moo 4 Ban Kao
Moo 5 Ban Sam Ruan
Moo 6 Ban Krong Kreng
Moo 7 Ban Krong Kreng
Moo 8 Ban Krong Kreng
Moo 9 Ban Laem Prathat
Moo 10 Ban LaemK rok
Moo 11 Ban Dong Payom
Moo 12 Ban Sam Ruan
Moo 13 Ban Krong Kreng

Number of Population

Table 1 Number of Population

Village No. and Name	Male	Female	Total	Households
Moo 1 Ban Bueng Lam	484	521	1,005	255
Moo 2 Ban Bang KraNoi	293	286	579	143
Moo 3 Ban Sam Ruan	242	241	483	120
Moo 4 Ban Kao	138	143	281	67
Moo 5 Ban Sam Ruan	126	142	268	59
Moo 6 Ban KrongKreng	306	323	629	185
Moo 7 Ban KrongKreng	223	267	490	147
Moo 8 Ban KrongKreng	170	160	330	92
Moo 9 Ban LaemPrathat	283	295	578	144
Moo 10 Ban LaemKrok	99	109	208	52
Moo 11 Ban Dong Payom	343	319	662	188
Moo 12 Ban Sam Ruan	261	337	598	181
Moo 13 Ban KrongKreng	198	168	366	90
TOTAL	**3,166**	**3,311**	**6,477**	**1,723**

Source: Nakhon Pa Mak Sub-district Administrative Organization

Geography and Culture

Most of the terrain is the drainage basin during the flood season. The terrain is suitable for rice planting. The east side of Nakhon Pa Mak Sub-district lies in villages Moo 8, 9 and 10, is higher terrain than the west side. National water resource is not available for the whole year so it causes dryness. Farmers can plant rice only one time a year during the drought. But in the west there is natural water resource in which capable to provide water the whole year long. In addition, there is water management implemented so that farmers can plant rice about 2-3 times a year.

Some significant natural water resources are: Kwai Wang Thong River flowing along villages Moo 1, 2 and 3; Krong Kreng Lek Canal and Krong Kreng Yai in the east and join with Kwai Wang Thong River. Apart from that, at the east side of Kwai Wang Thong River there are also Klong Nam Dam Canal and Nong Nam Dam Pond flowing along with the Kwai Wang Thong River separated by the gate. In village Moo 9 there is Nakorn Canal flowing from Wat Ta Yom Sub-district into Krong Kreng Canal. And Wai Canal flowing in the area of village Moo 1.

Religion and Belief

The majority of Thai people believe in Buddhism. Within the area of Nakhon Pa Mak Sub-district there are 6 temples and Luangpu Rang and Luangpor Sa-Nguan (Names of Buddhist monks) are respected by the people in Nakhon Pa Mak sub-district. Important traditions of the community are New Year merit-making, harmony ordination, traditional merit-making festival in which held in every village during January and April, celebration for Luang Poo Rang and celebration for LuangPor Sa-Nguan.

Occupation

The majority of the people in the community have an occupation of agriculture planting rice and garden trees. Some are employees and merchants and running family industry such as making dry bananas.

Transportation

For transportation, there are three main roads and 18 sub-routes in which 4 roads are asphalt and the rest are gravel.

Land Holding

Total Land Holding	36,637	Rais
Total Agricultural Area	25,888	Rais
Rice farming	23,419	Rais
Dry crops	1,470	Rais
Vegetables	8	Rais
Fruits	926	Rais
Standing Timbers	65	Rais
Total Housing Area	10,740	Rais

For the rights in land holding, most farmers own their land property, only some of them rent the land for their farming.

2. Physical, Biological, Social and Economic Features

Physical Features

Nakhon Pa Mak Sub-district, Bang Kratum District, Phitsanulok Province is located from Bang Kratum District to the east around 5 kilometers, with the total area of 36,637 Rais or 58.62 sq.km., containing the agricultural area of 29,730 Rais and the majority of area is agricultural area. Nakhon Pa Mak Sub-districtis located in the lower north of Thailand. Most terrain is the lowland having Kwai Wang Thong River pass for a short distance. There are Krong Kreng Lek and Krong Kreng Yai Canals flowing through the sub-district and 22 natural water resources availability.

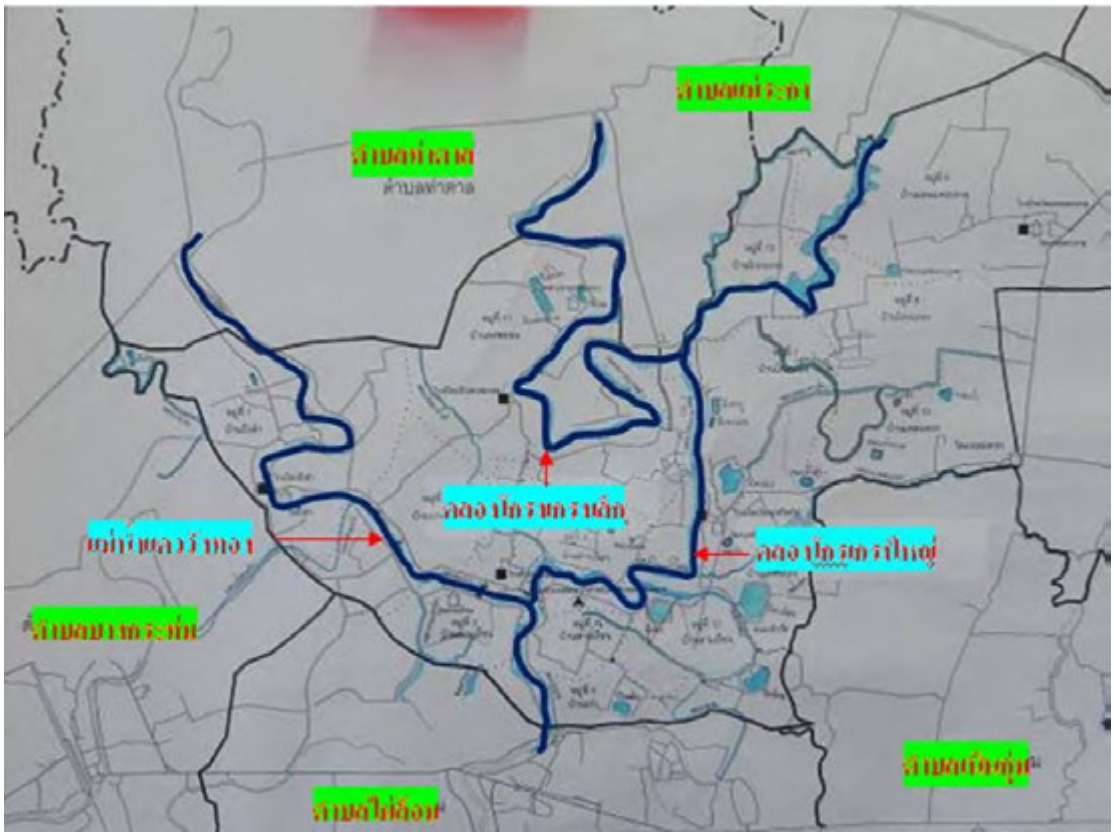
Map 2 Phitsanulok Province

Rainfall

The total volume of rainfall in six years (1999-2008) was 1,090.55 millimeters per year. According to the distribution of rainfall, it starts to rain in April that will provide enough water for plantation and rains harder in May before decreases in June. Rain will fall more during July-August-September, rain falls the most during August-September and later will decrease and stops around the end of October.

Natural Water Resources

The natural water resources of Nakhon Pa Mak Sub-district (river, canal, pond, lake) are: Kwai Wang Thong River, Krong Kreng Yai Canal, Krong Kreng Lek Canal and other canals such as Nongnam Dam, Huay Maew, Wai, Huay Kaeo, Nong Look Pla, Yang, Duan, Laem Krok, Nong Tasook, Inn Nin and Salu Canals. Natural water resources like pond and lake, there are Bueng Chang Lake, Nong Raman Pond, Laem Prathat Pond, Salu Lake, Takoo Lake, Ta Duang Lake, Ta Nuam Lake, Nong Ta Sook Pond, Nong Tao Pond, Nong Batan Pond, Takian lake, Nong Bua Pond, Nong Raman Pond, Nong Krod Pond, Plub Lake, Thao Wan Lake, Toom Lake, Samrong Lake and Ching Lake.



Map 3 Displays Kwai Wang Thong River, Krong Kreng Yai Canal and Krong Kreng Lek Canal

Kwai Wang Thong River has the origin from the high mountain in the south-west, Phitsanulok Province, in the Petchaboon Mountain Range consisting of Plu Pa Hin Mountain and Sam Mountain. Kwai Wang Thong River flows through Ta Tarn Sub-district and enters Nakhon Pa Mak Sub-district via villages Moo 1, 2, 3, 4 and 12, and exits in the direction of Phailom Sub-district before enters Pichit Province. The total length is 135 kilometers. Kwai Wang Thong River has the highest rainfall during the rainy season and lowest or becomes dry in the drought. Krong Kreng Canal consists of Krong KrengLek Canal, Krong Kreng Yai Canal. The Krong Kreng Canal breaks out of the Krong Kreng Yai Canal at Krong Kreng Nua Temple.


Figure 2 Krong Kreng Yai (Big Krong Kreng) Canal (left)
Figure 3 Siew Lake (right)

Man-mad Water Resources

Man-made water resources consist of 2 dams, 276 shallow wells, 30 artesian wells (hand pump) and 1 pond.


Figure 4 Shallow Wells (Left)
Figure 5 Artesian Well (Hand Pump) (Right)

Irrigational Buildings

Ban Sam Ruan Watergate is a Watergate built for controlling and managing the water in KrongKrengYai Canal, closing and opening for water retention and drainage, as well as receiving water from KaewWangthong River.


Figure 6 Ban Sam Ruan Watergate (Left)
Figure 7 Electric PumpingProject (Right)

There are three Electric Pumping Projects named as follows:

1. Ban Sam Ruan Electric Pumping Station
   Canal M(0+000) - (2+200); with the size of 0.30,0.25,0.15 and 0.10
   Canal M-1L(0.000) – (0+375); with the size of 0.05

The length is 2,575 meters approximately, distributing pipeline to the reservoir is about 200 meters

2. Ban Dong Klang Electric Pumping Station (Bueng Lam Lake),piping system is 3,599 meters in length.
3. Ban Bang Kra Noi Electric Pumping Station

Canal MC (0+000) - (1+750); with the sizes of 0.50, 0.45,and 0.40. The length of the irrigational building is 91.30 meters; length of the concrete pave is 1,658.70 meters; length of the pumping pipeline–reservoir is 275.00meters. Total length is 2,025.00 meters.

This project pumps water from Kwai Wang Thong River having the drainage building for draining water from Kwai Wang Thong River (called Tana Watergate), is responsible in controlling the water volume. Suppose the water level in Kwai Wang Thong is low, then the Watergate is needed to shut down to prevent water from flowing out. In case of the water volume in Nan River is sufficient to flow back into Kwai Wang Thong River, the Watergate must be opened to receive water from Nan River but water can flow up to the bridge at Ban Bueng Lam Village only.

Figure 8 The Weir

The weir is a type of irrigational building, constructed across the water at the headwater of the natural rivers to irrigate the water and to allow the water to flow across onto the ridge of the building. The weir (dam) will act as the irrigational building for water flowing from the rivers to be a high level until it can flow into the irrigational canals in the latter time upon the required amount for each planting season. The rest of the water will flow across the weir ridge and be kept for the use in the drought.

Suggestions on Water Resources

It is suggested to construct the Chompoo Dam (Pink Dam) in Chompoo Sub-district, NoenMaprang District in order to retain and slow down; dredging canals and build the weir intermittently for the

benefit of water retention and irrigation; dredging the public water resources (pond, lake) to increase the capacity; improve the Ban Sam Ruan Watergate by installing the electric switching (On-off) system; dredging and expanding KrongK reng Canal; improve the road culverts by expanding to be wider and to have more sluices to enhance the capability in water management; construct the water barriers along the road at low level to prevent the street flood; or upgrading to a higher road to act as a dike to prevent the flood at the agricultural areas; and construct the Electric Pumping Project from Kwai Wang Thong River at east side of the village Moo 1 to villages Moo 2 and Moo 11 with the separated pipe en route to Ta Tarn sub-district and put the end of pipe into Krong Kreng Canal.

Causes of the Flood

There was often heavy rain at the area of Dong Chompoo Mountain, Chompoo Sub-district, Noen Ma Prang District and caused the flash flood, water overflew from Kwai Wang Thong River, the drainage canals became shallow and road culverts were too narrow and could not drain in time. Some parts of the road along the Kwai Wang Thong River were low and that caused water to flow into the farming fields. The flood mainly was from the water overflew from Nan River and water in the Nan River pushed high at the Ta Na Floodgate and trapped in flood water in Nakhon Pa Mak area could not drain out.

Damages caused by the Flood

From the past flood event, it had caused people suffering from the flood into the housing area of 10,336 Rais and agricultural area of 19,223 Rais accounted to 91 percent of the whole area. There were 613 households suffered by the flood.

Village Water Supply System

The village water supply is provided for all households in villages Moo 1, 2, 6, 7, 11 and 12 in which the large groundwater water supply system and a small water supply system in village Moo 8. For villages Moo 1 and 7, the groundwater used in the production is turbid and with the red rust sediments. It is required to clean up the sand filtration as often as possible.

Figure 9 Village Water Supply of Ban Bueng Lam Village

For drinking water, villagers have to buy due to the water supply is unclean, turbid and contaminated red rust sediments. Rain water is not commonly used because it is not clean due to there are many pigeons living on the roof of the houses. Some families even buy the water filter for household consumption.

Roads

There are 4 main roads as follows: 1. Bang Kratum - Bueng Lam, 2. Sam Ruan – Ta Tarn, 3. Sam Ruan – PhaiLom and 4. Krong Kreng – Laem Pra That; there are 18 minor roads connecting villages within the sub-district which are concrete for 15 lines and gravel for 3 lines.

Figure 10 KrongKreng – LaemPrathat Road

Figure 11 Map and Cross-section of Nakhon Pa Mak Sub-district

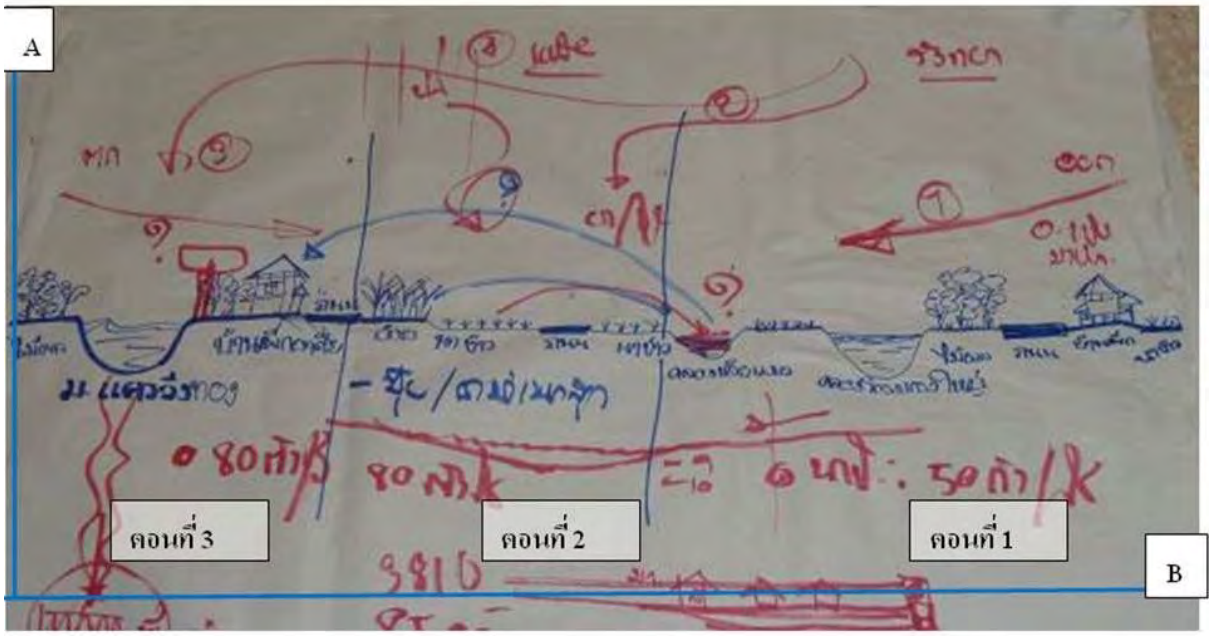


Figure 12 Cross-section of Nakhon Pa Mak Sub-district

Land Use

Both sides of the Kwai Wang Thong River are used for planting vegetables, fruits and standing timber complied in group scattered along the lines of rivers and canals. Usually, roads lie in parallel with the rivers and canals. For the areas planting sugarcane, garden plants often found at the highlands whereas the lowlands is for rice planting provided with the irrigational and drainage canals.

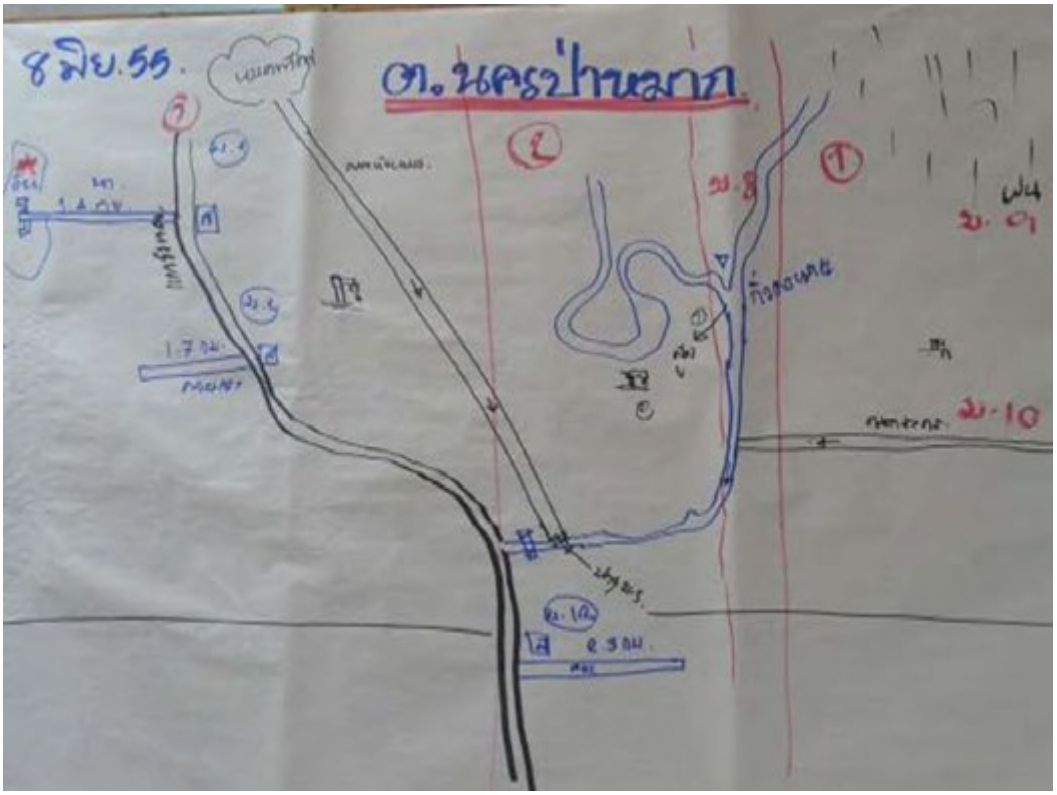


Figure 13 Zoning of Nakhon Pa Mak Sub-district

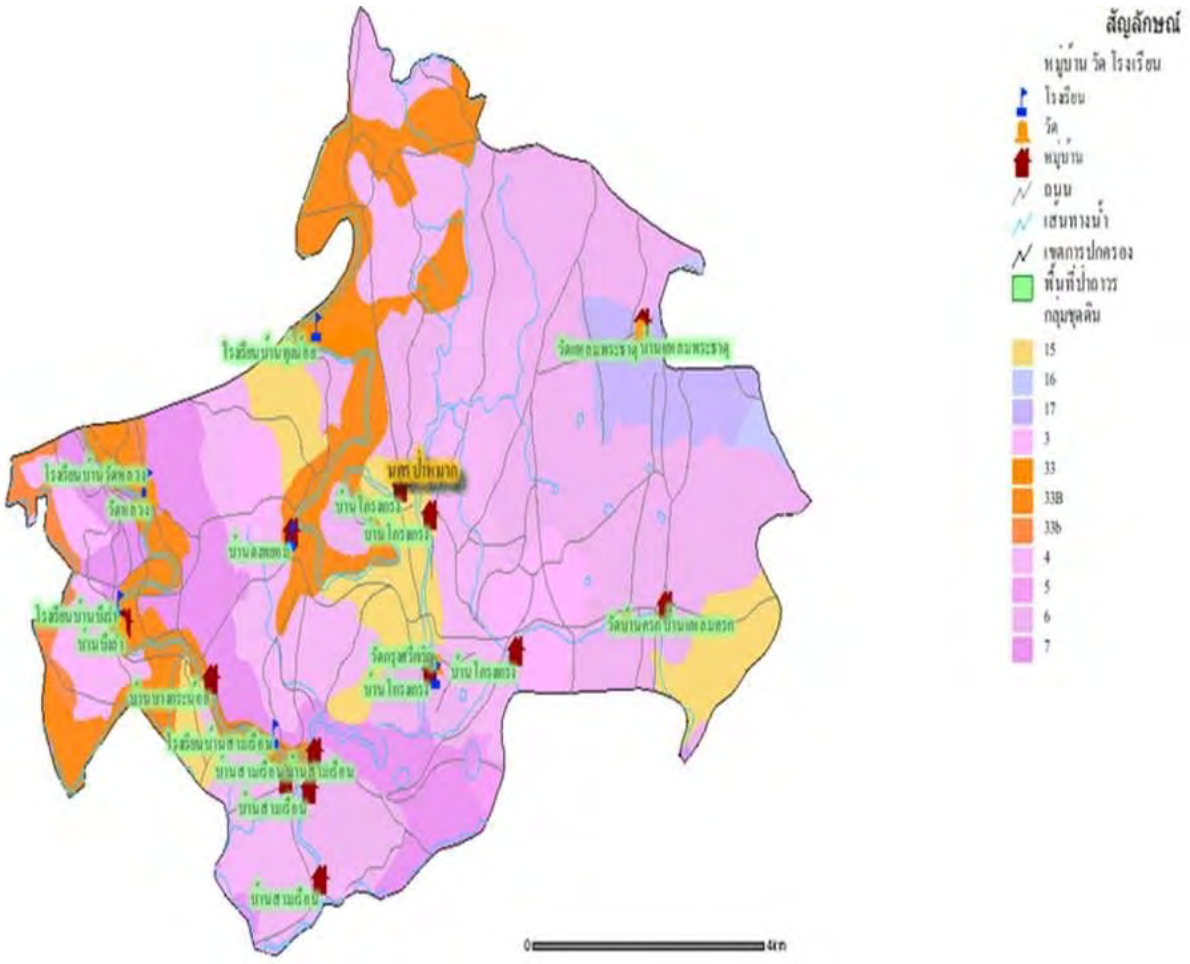
The terrain of Nakhon Pa Mak Sub-district is divided into three parts as follows:

Part 1: is located in villages Moo 8, 9 and 10. In some areas are quite dry and no artesian water or have to drill so deeply. Bringing water for rice planting is rather expensive. Subsurface water is not sufficient for agriculture. Farmers usually use rain water and soil is not such abundant.

Part 2 (central part):Moo 7 – the terrain of Ban Krong Kreng is similar to part 1's but more plain. Krong Kreng Canal passes through this area. There is water retaining during the rainy season. Drilling the artesian well is less deep than part 1 and more abundant than part 1 as well.

Part 3: consists of villages Moo 1, 2, 3, 5 and 12. It is an abundant area that can plant rice twice times a year. During the drought, if the water in Kwai Wang Thong River or Krong KrengYai dry out, farmers usually pump artesian water for rice planting by mean of drilling the shallow artesian well. This part is abundant in the water resources.

Soil Series of Nakhon Pa Mak Sub-district



Map 4 Soil Series of Nakhon Pa Mak Sub-district

According to the characteristics of Nakhon Pa Mak's Soil Series, it contains Soil Series 3, 4, 5, 6, 7, 15, 16, 17, 33, 33B and 33b.

Soil Series 3 is deep soil. Soil texture is clay. Top soil is black whereas the lower soil is light gray with dotted yellow and brown or red. It is found most around the lowlands or flat landform with poor to rather poor drainage capacity and naturally abundant. The pH is about 7-8. Mostly is used in planting rice, rarely found problem in the land use. But if the terrain is too low, there is often trouble with the flood during the rainy season.

Soil Series 4 is clay. Top soil is black or dark gray. Lower soil is light brown or brown or gray-olive green, with dotted brown-yellow, yellow or dark brown. Sometimes the lumps of concrete or chemical substances such as Zinc and Manganese might be found at the lower soil. This soil has rather poor to poor drainage capacity. It is mostly found at the flat landform or lowlands, with medium level of natural abundance, the pH values of 6-8. At present, it is widely used in planting rice. In some areas they make beds for planting vegetables and fruits.

Soil Series 5, the soil texture is deep soil, top soil is dark gray, lower soil id light brown or gray, with dotted brown and yellow or red throughout the layer. It was created by the river sediments at the alluvial plan areas. The terrain is the low lands or the flat landform with poor drainage. It is often found the lumps of chemicals such as Zinc and Manganese accumulative mixed in the soil and lumps of concrete may be found at the deep lower soil. This soil has rather low to medium levels of natural abundance with the pH values of 6-8. At present, the soil is used for planting rice. If the water resources available, it may be used for planting dry crops and vegetables.

Soil Series 6 texture is clay, top soil is dark gray, lower soil is light brown or gray with dotted brown, yellow or red throughout the whole layer. In some areas, it is often found the soft laterite or lumps of chemicals such as Zinc and Manganese mixed. Soil was created from the origin of the river sediments. It is deep soil with poor drainage, found most at the flat or relatively flat landform. The natural abundance is low or rather low, with the pH values of 4.5-5.5. At present, it is used in planting rice or annual crops during the drought. Problem of this soil series is only the relatively low abundance.

Soil Series 7 texture is clay, brown-gray with dotted brown, yellow or red mixed throughout the soil layer. It was created by the river sediments with the characteristics of deep soil with rather poor drainage. Mostly found at the flat or relatively flat landform with medium level of natural abundance and the pH values of 5.5-7.5. Nowadays, it is used for rice cultivation. If the irrigation and management are efficient, then farmers can plants rice twice times a year.

Soil Series 15 texture is silt loam, gray or gray-pink or gray-yellow with dotted dark brown, yellow or red in the lower soil. In some areas might be found the accumulative chemicals such as Zinc and Manganese. It was formed by the river sediments, found mostly at the flat or nearly flat landforms,

very deep soil with nearly poor or poor drainage, low natural abundance with the pH values of 4.5-5.5. Nowadays, is used for planting rice, dry crops or fruits but often trouble with the flooding immersion during the rainy season. Problem found in this soil series is that the low natural abundance.

Soil Series 16 texture is clay loam or silt loam. Top soil is brown-gray, lowers soil is brown or brown-red, dotted yellow or dotted brown-yellow are found throughout the soil layer. In the lower soil, it is often found the accumulative chemical sediments such as Zinc and Manganese as well as the lumps of concrete. It was formed by the river sediments, found at the flat or nearly flat areas. Soil property is deep soil with nearly poor drainage to medium. The pH is about 5.5-8.0. Nowadays, is used for planting rice and if the irrigation and management are efficient, then rice planting can be operated twice times a year. Problem found in this soil series is the low abundance.

Soil Series 17 texture is fine loamy, very deep, formed by the river sediments, acid sulfate soil, poor to nearly poor drainage, low abundance. Some areas soil is very acid sulfate, been lacked of water for a long period of time and has flooding immersion during the rainy season and that causes damages to plants that do not like water.

Soil Series 33 is very deep soil with well to moderately well drainage. Soil texture is fine silty or silt loamy, brown or brown-red in the very deep lower soil, it may be found the dotted gray and brown as well as the Mica or lumps of concrete, was formed by the river sediments at the old river levee's alluvial fan, or the plain alluvium, moderate abundance and pH 7.8-8.5 approximately.

Soil Series 33B is very deep soil, well to moderately well drainage. Soil texture is fine silty or fine loamy, brown or brown-red in the deep lower soil, dotted gray and brown soil may be found as well, including the Mica and lumps of concrete. This soil series was formed by the river sediments at the old river levee's alluvial fan, or the plain alluvium, moderate abundance and pH 7.0-8.5. Soil unit is the 5-12 percent slopes. Its soil unit is not suitable for rice planting but there are earthen dikes for rice planting anyway.

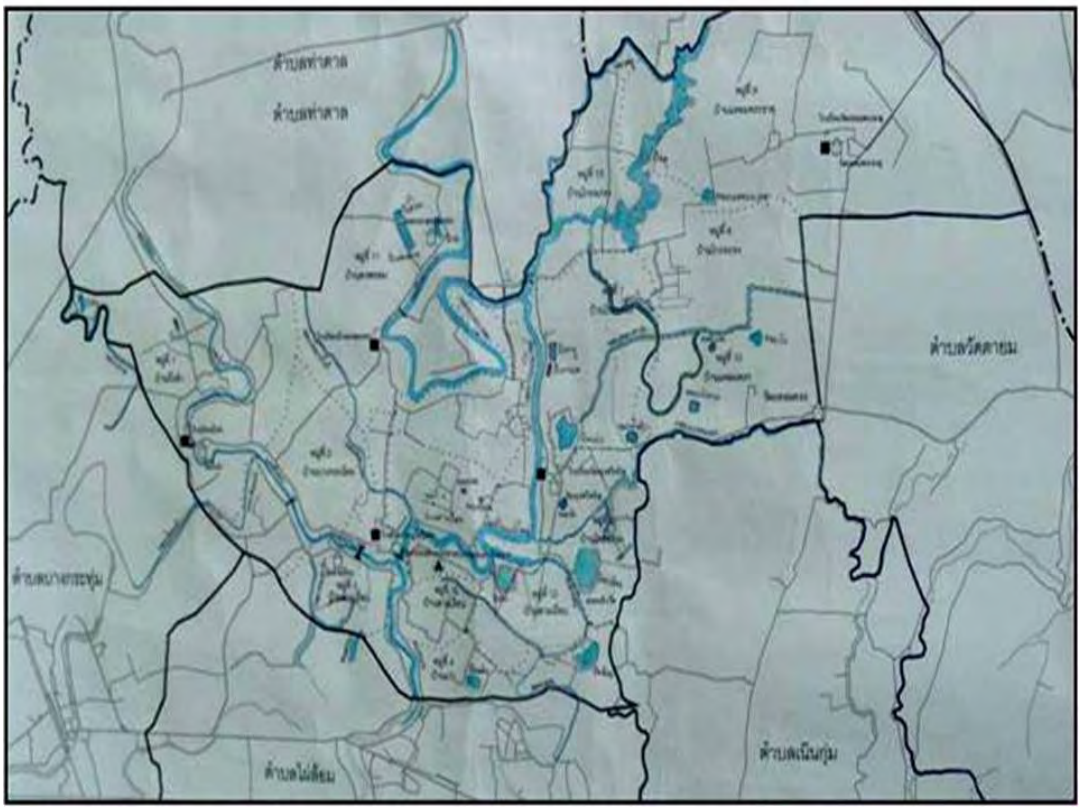
Biological Features

Economic Crops

Nakhon Pa Mak Sub-district, Bang Kratum District, Phitsanulok Province has the total area of 36,637 Rais. Of the total area, 25,888 Rais are the agricultural area. Topography is the lowland and upland in the north of the sub-district in the area of villages Moo 8, 9 and 10. Total households consist of 1,723 families. Most population in the sub-district occupy agricultural career. Economic crops are rice and followed by the planting of sugar cane. The other kinds of plant are also grown but as in a minority. Most agricultural area located on the lowlands. Its terrain is suitable for plantation. Farmers in Nakhon Pa Mak Sub-district plant rice the whole year long, both wet and dry rice seasons due to the water contribution from Kwai Wang Thong River in which flows through the area, three electrical pumping

stations located in villages Moo 1, 2 and 12, Krong Kreng Canal and other swamps throughout the agricultural areas. Moreover, farmers also built the artesian well to pump water for agriculture during the drought. Most of the area where in the zone that the Kwai Wang Thong River flows by could plant rice for both wet and dry rice seasons. Some areas in this zone can plant rice 2-3 times a year due to water availability by means of electrical pumping from Kwai Wang Thong River and water drawn from the artesian wells dug by farmers.

Areas of Nakhon Pa Mak Sub-district could be divided into three zones regarding the terrains and cultivation of farmers. The terrains of Nakhon Pa Mak Sub-district are both lowlands and uplands and that make the farmers' cultivation in each zones differ. Physical properties of the water resources flow by the areas, the available water of each zones and underground water are vary and result in different agriculture, flood and dry problems influencing the yields of the sub-district. During the flood, the flood will be held for a long time because of the area is the plain particularly in villages Moo 6, 7 and 8. Flood in such areas often stay for a longer period of time than in other villages of the sub-district. After the water receded, farmers in the area began to plant rice but often experienced other problems following the sowing. For instance, cold weather affects the growth of the seedlings, and problems found in the water use especially in villages Moo 8, 9 and 10 after the three-month-flood in the sub-district. After the water receded for a month, the area faced the drought and that damaged the crops planted in a hurry once again apart from after the flood.



Map 5 Nakhon Pa Mak Sub-district, Bang Kratum District, Phitsanulok Province

Nakhon Pa Mak Sub-district, Bang Kratum District, Phitsanulok Province occupies the total area of 36,637 Rais as divided into housing area for 10,740 Rais and agricultural area of 25,888 Rais

including the dry crops and standing timber (Perennials). Farmers' land holding is about 27 Rais per household. Total number of households is 1,527 and divided as follows:

1. Holding right in their own lands, no rent amounting to 530 households
2. Holding right in their own lands and rent more lands amounting to 595 households
3. No right in the farming lands, rent only amounting to 502 households

Agriculture in this area basically farmers do the wet and dry rice cultivation. Farmers also plant sugar canes in some areas due to the promotion of the factory but still a minor. Some farmers allow the sugar factory rent their own lands for planting sugar canes. Planting sugar canes mostly do in the villages Moo 1 and 2 including the areas of villages Moo 8, 9 and 10 that can plant only wet rice. They plant the standing timbers during the drought and watermelon in village Moo 9 instead of planting dry rice in consideration of the flood which not allow the dry rice cultivation at all.

Occupation in Nakhon Pa Mak Sub-district, Bang Kratum District, Phitsanulok Province

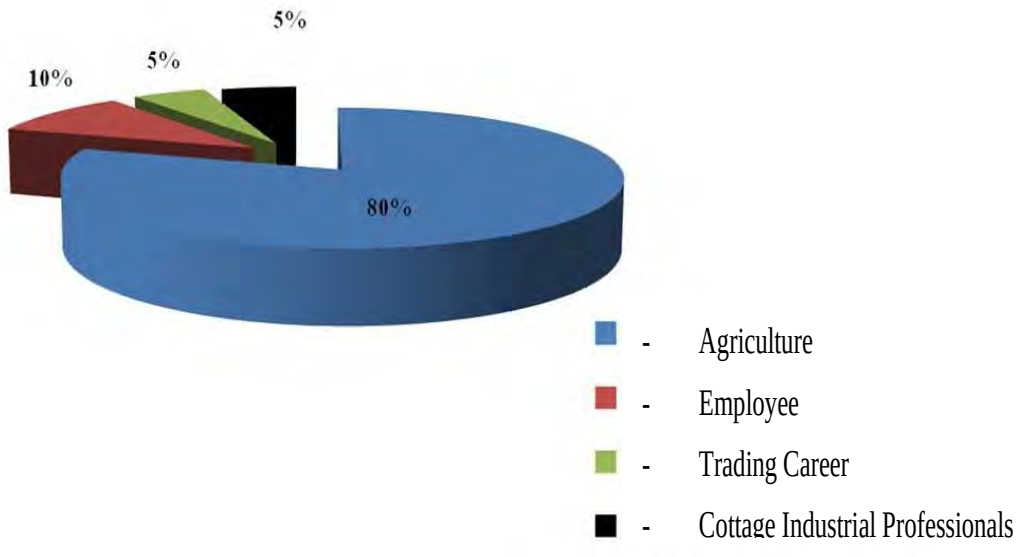
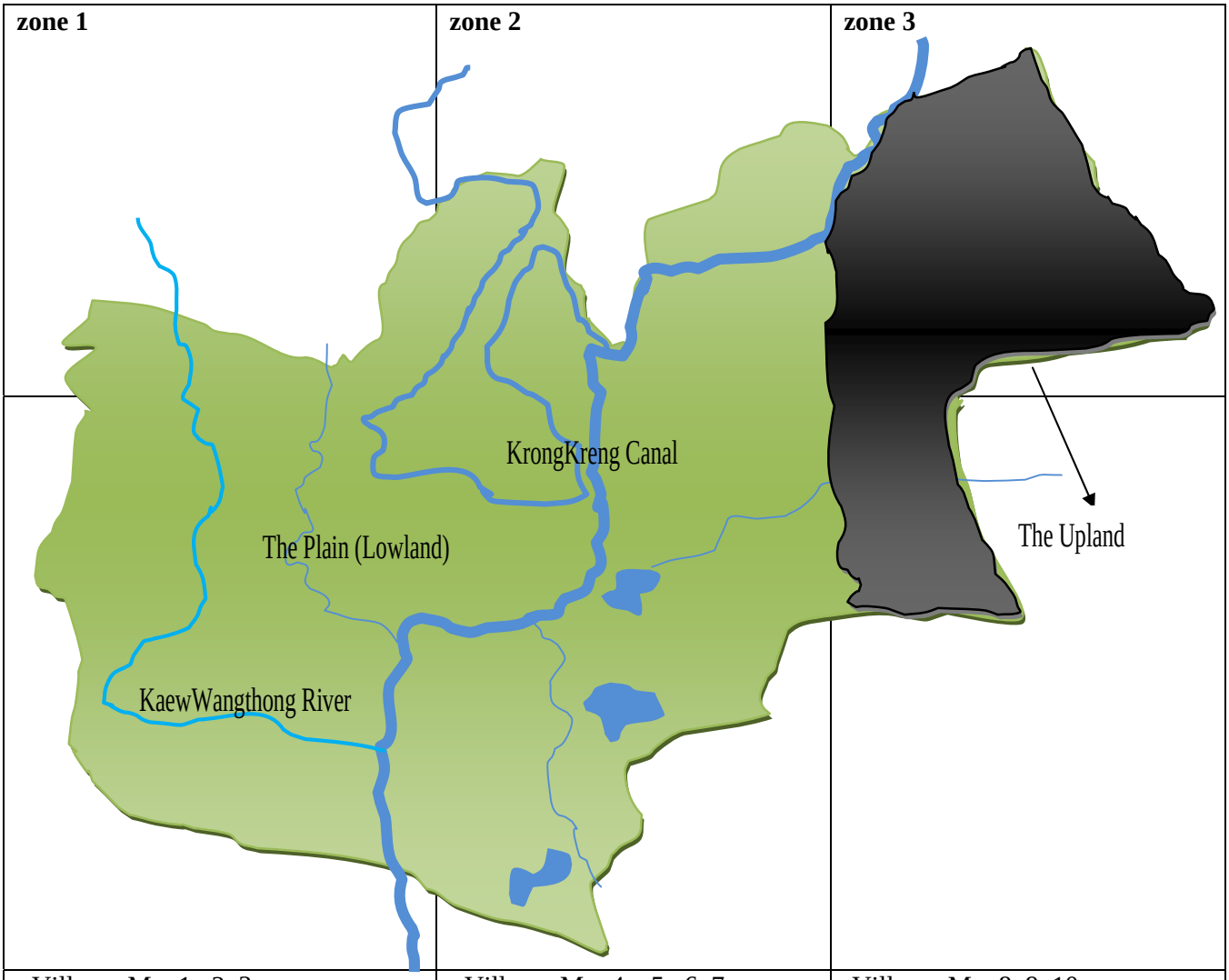


Chart 1 Proportion of Occupation

Livelihood of the population in Nakhon Pa Mak Sub-district, Bang Kratum District, Phitsanulok Province is various because of the terrains and the agricultural areas of each village. Most of the people in the sub-district have agricultural career accounted to 80% due to the terrain is suitable for cultivation especially the wet and dry rice cultivation including planting sugar cane to feed the factory and eucalyptus planting in some uplands. Another 10% are employees in the agricultural sector within the sub-district area in making dried banana. They earn extra income in their free time. The entrepreneurs hire employees for peeling and drying banana mostly in villages Moo 1 and 2. Followed by the trading career in which approximately 5% is the trading within the community such as grocery, noodle shops and cooked to order shop. For the cottage industrial professionals, is also a way of earning extra income of farmers such as making and selling dried banana in the community,

establishment of an agricultural tourism with home stay that allows travelers to stay overnight in the community, selling souvenirs made by the community, fish and frog farming. All are for earning an extra income apart from rice planting and during the flood time that damages the crops.

Map 6 Nakhon Pa Mak Sub-district, Bang Kratum District, Phitsanulok Province



zone 1	zone 2	zone 3
- Villages Moo1 , 2 ,3 - Plant rice 2-3 times a year - Average Wet and Dry Season Rice 80 buckets per Rai (Rice varieties: Chainat, Suphan Buri, Phitsanulok) **Water Use for Agriculture** Rain water + Pumping + Artesian Well	- Villages Moo4 , 5 , 6, 7 , 11 ,12 ,13 - Plant rice 2 times a year - Average Wet and Dry Season Rice 80 buckets per Rai (Rice varieties: Chainat, Suphan Buri, Phitsanulok) **Water Use for Agriculture** Rain water + Artesian Well	-Villages Moo8, 9, 10 - plant rice 1 time a year - Average Wet and Dry Season Rice 50 buckets per Rai (Thai Jasmine Rice) **Water Use for Agriculture** Rain water

Source: Information from the community

1. PRA Report

Soil in the area of Nakhon Pa Mak Sub-district, Bang Kratum District, Phitsanulok Province can be divided into three groups as follows:

Group 1: Soil was formed by the deposition of sediment. Soil texture is hard sandy loam or sand with low soil nutrients, used in rice planting. If the rain delay or less, it will affect the crops grown in this area. If the irrigation system is good, then any plants can be grown the whole year long. Mostly, it happens in villages Moo 6, 9 and 10.

Group 2: Soil was formed by the deposition of fine sediment. Soil texture is clay loam. The flood often happens in the zone. It is suit for Wet and Dry season rice planting because of its abundant nutrients caused by the flood and the decomposition of sediment. Mostly found in villages Moo 1, 2, 3, 5, 11 and 13.

Group 3: Soil was formed by the decomposition of sediment. Soil texture is clay loam with well water storing and high NPK. This soil group is suit for rice planting but has problem with the flooding somehow. This soil group is mostly found in villages Moo 4, 7, 8 and 12.

Figure 14 Soil Texture in Nakhon Pa Mak Sub-district

Map 2 Wet and Dry Season Rice Planting Calendar of Nakhon Pa Mak Sub-district, Bang Kratum District, Phitsanulok Province

Types of Crops	Rice Varieties	MONTHS												Yields (per Rai)
		JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	
Wet Season Rice	Phitsanulok Chainat Suphan Buri					Plant ←	—	—	Flood from August to late October		→ Harvest			90 buckets
Dry Season Rice	Phitsanulok Chainat SuphanBuri		→ Harvest									Plant →		90 buckets

1. PRA Report

According to the planting Wet season rice of farmers in Nakhon Pa Mak sub-district, farmers begin the cultivation by plowing to prepare the soil, and sowing in May. Generally, farmers start to plant rice during May but it also depends on each farmer's readiness. Plowing and preparing the seeds often take place in May which is the month of rice planting. Rice varieties used in the Wet season cultivation area: Phitsanulok, Chainat and Suphan Buri. Farmers receive water from the water resources located in other sub-districts: Kwai Wang Thong River, Electrical Pumping Station and Krong Kreng River, plus the artesian wells dug in the farmers' areas.

Some parts of this sub-district rely on rain water only during the Wet season cultivation due to no available water and artesian well. There is no groundwater in the areas of villages Moo 8, 9 and 10. Rice variety used is the Thai jasmine rice as to its drought tolerance. Average yield per Rai is 50 buckets approximately. In the areas with water availability the yield per Rai is 80 buckets approximately. But in Nakhon Pa Mak Sub-district always has flood problem during waiting for the harvest season and that causes damages to the Wet season rice. Farmers therefore have to be hurry in harvesting rice before the flood time.

Rice is not yet ready for harvest so the yield is not as good and not balance with the production cost. Farmers in this area begin to plant the early rice instead as it has shorten the harvest duration, in avoiding the damages from flooding. However, they find another trouble with the Rice Mortgage Scheme due to the harvest timing is not in accordance with the government's setting scheme.

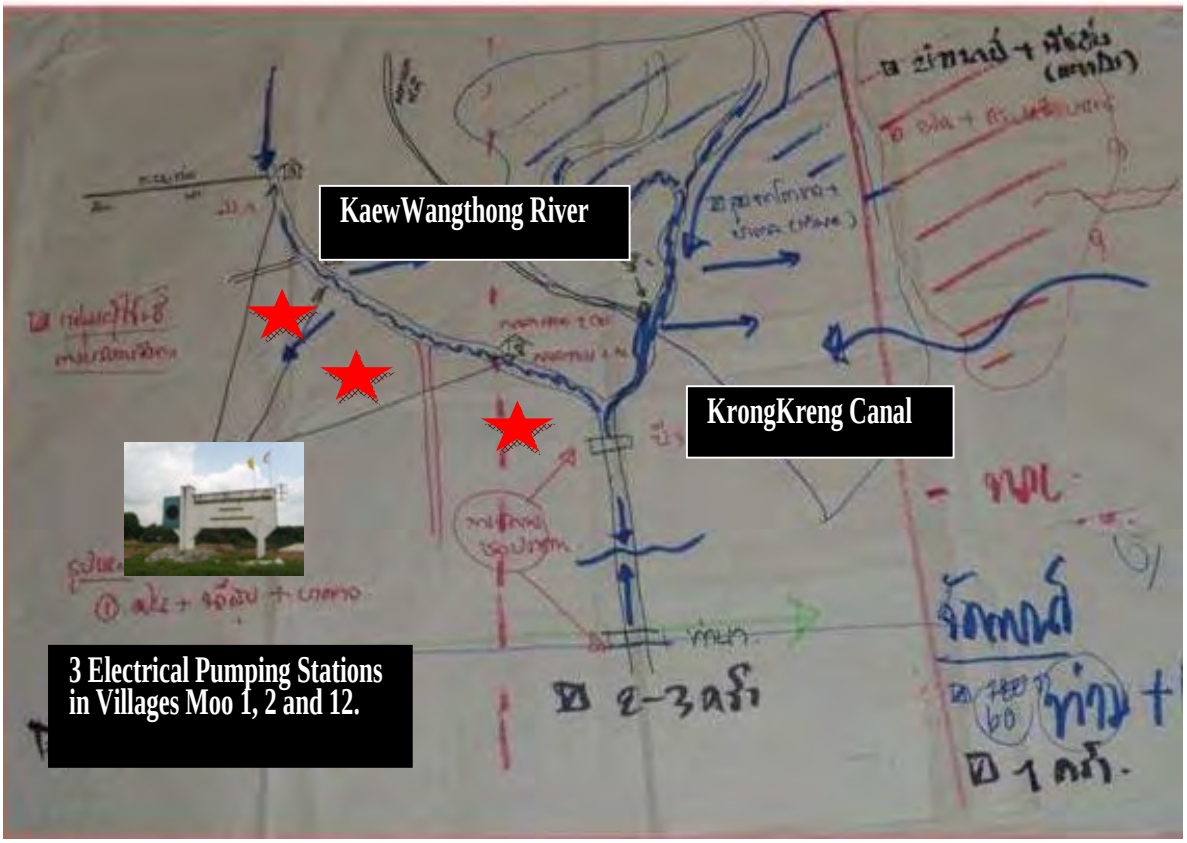
For the Dry season rice planting in Nakhon Pa Mak Sub-district, farmers begin to plant rice immediately after the low tide from the flood. In each area of Nakhon Pa Mak Sub-district, water will not decrease at the same time in villages Moo 6, 7 and 8 as the terrain is quite lowland, flood water retention will be reduced slower than in other villages. That affects to their late cultivation of Dry season rice. Farmers begin to plow the mud and sow the seeds around November. Farmers in Nakhon Pa Mak Sub-district use the rice varieties of Phitsanulok, Chainat and Suphan Buri which are the same varieties as those used in the Wet season planting.

In planting, the Dry season rice, farmers will pump water from the available water resources within the area, i.e. Kwai Wang Thong River, Krong Kreng Canal, natural swamps and artesian wells. But in some areas have to rely on rain water only as per their lack of available water and could not dig the artesian well. So they cannot plant the Dry season rice in such areas. So, they try to plant suitable crop rotation such as watermelon and animal raising during the drought to earn extra income in compensation with the income from the Dry season rice planting that they could not do. The yield from the Dry season rice planting is approximately 80 buckets per Rai. Farmers always face trouble with insufficient water during the Dry season rice planting. Around a month after the water decrease, the areas will face the drought, dry weather, dried out water resources, for example.

Farmers could not bring groundwater to use due to big volume of pumping since the beginning of the planting season and result in insufficient water in the areas. Then farmers will face another problem once entering the cold season. Products from the Dry season rice planting yield less than the high production cost.

Figure 15 Rice Fields and Artesian Well

Water Use of Farmers in Nakhon Pa Mak Sub-district, Bang Kratum District, Phitsanulok Province



Water Use for Agriculture in Nakhon Pa Mak Sub-district

Figure 16 Electrical Pumping Station and Swamp in the Rice Field

Table 3 The Wet and Dry Season Rice Production Costs of Nakhon Pa Mak Sub-district, Bang Kratum District, Phitsanulok Province

No.	Descriptions	Costs (Baht)
1.	Soil preparation	500
2.	Seeds	600
3.	Sowing cost	50
4.	Chemical fertilizer	1,500
5.	Weed killer	500
6.	Aphis and insecticide	450
7.	Harvest	500
8.	Transportation	100
9.	Fuel	1,000
	TOTAL	5,200
	Yield per Rai	
	900 kg. × 12 baht	10,800
	10,800 baht - 5,200baht	5,600

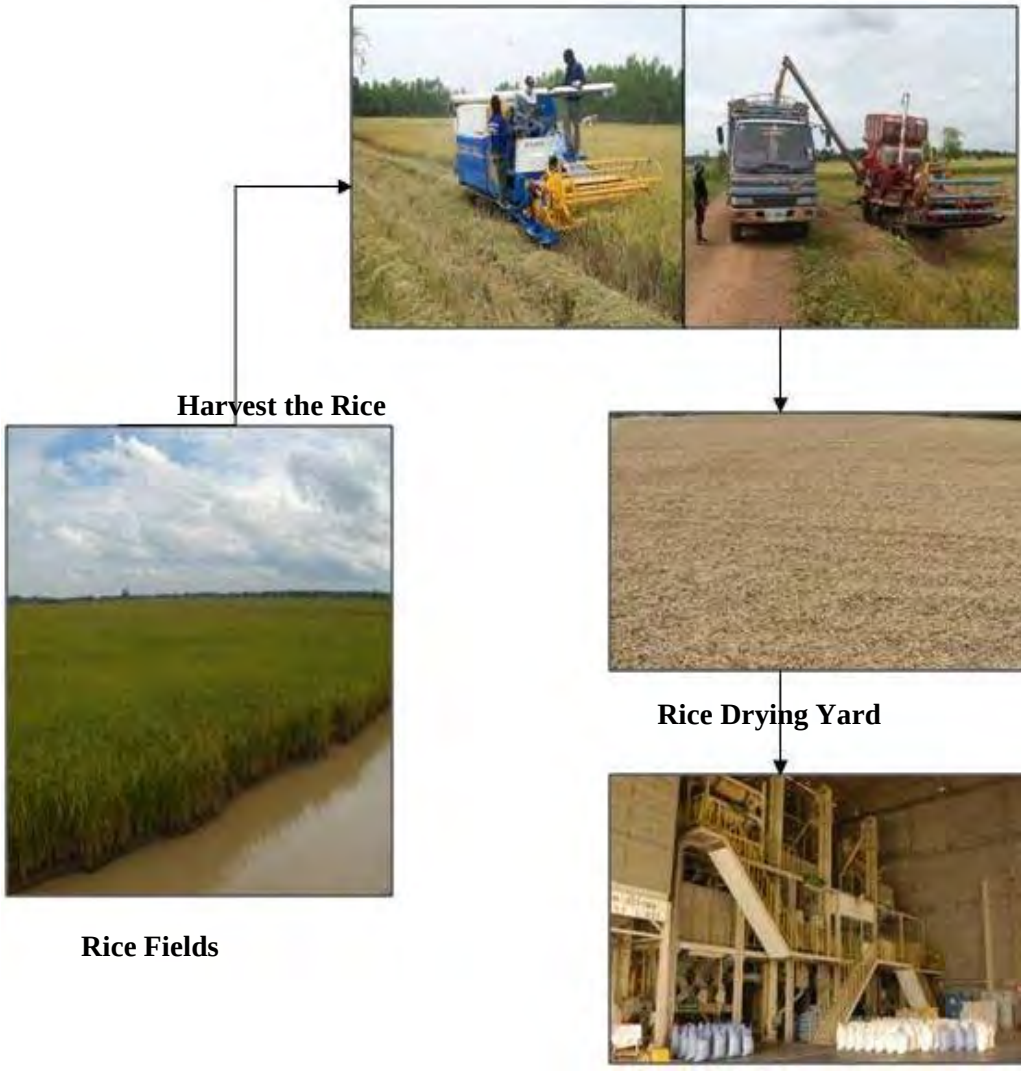
Source: Information from Farmers and Community Leaders of the Focus Group

The average Wet and Dry season rice production costs of Nakhon Pa Mak Sub-district, Bang Kratum District, Phitsanulok Province is approximately 5,200 baht per Rai. Factors influencing the high production costs are: the use of chemical fertilizer, weed killer and pesticide, and the fuel charge in pumping water into the rice fields. All factors make the Wet and Dry season rice production costs of Nakhon Pa Mak Sub-district high. In general, the average rice production of farmers in Nakhon Pa Mak sub-district is approximately 5,600 baht per Rai after the production cost deduction.

From the information of the Wet and Dry season rice production cost in Nakhon Pa Mak Sub-district, Bang Kratum District, Phitsanulok Province, farmers who perform the Wet and Dry season rice

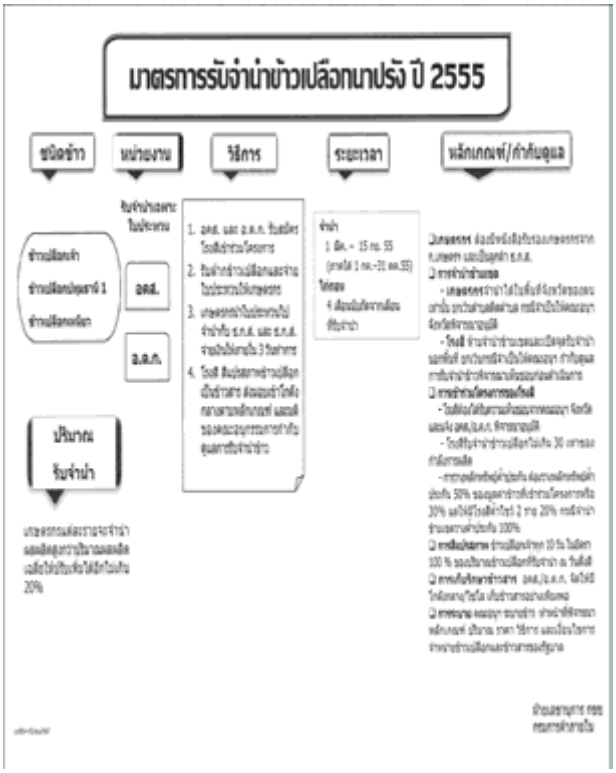
planting should well plan the production for cost saving. In addition, there should be the promotion for the use of organic fertilizer and Effective Microorganisms (EM) in farmers' rice fields in order to reduce the use of chemical substances and to maintain the soil. Moreover, farmers should gather in group for production, procurement and post-harvest management aimed at cost saving and value added. Focus group should held the discussion forum on water use in the community level to reduce risk and damages for the crops, as well as the establishment of the discussion forum on the water use with other communities and the RID staff in the areas.

Market Mechanism of the Wet and Dry Season Rice of Nakhon Pa Mak Sub-district, Bang Kratum, Phitsanulok Province

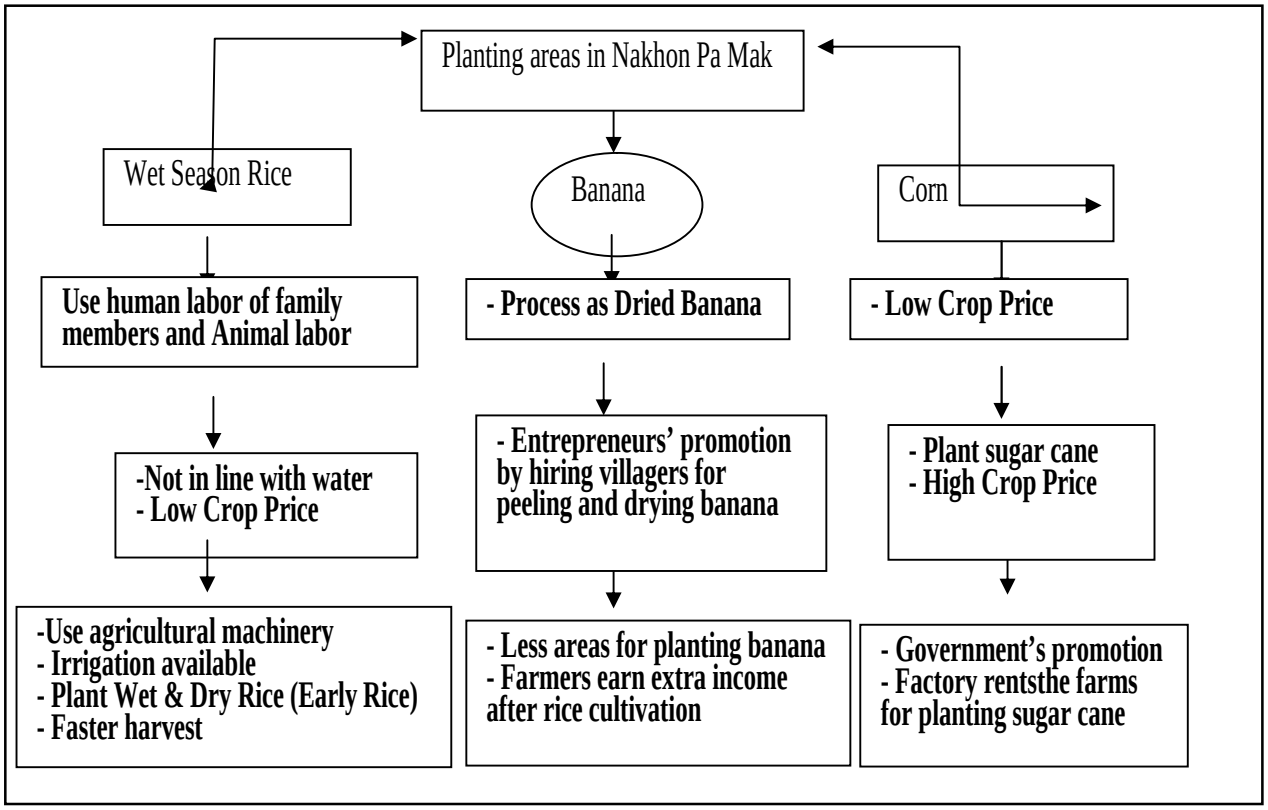


According to the rice market mechanism of the Wet and dry season of farmers in Nakhon Pa Mak Sub-district, after the harvest farmers will sell their paddy rice to the rice mills that join the government's Mortgage Scheme in the area of Bang Kratum District without drying them or nay management before. Therefore, it makes the high moisture of content and that result in low rice prices as the rice mills have to deduct depending on the moisture of content after fresh harvest.

The Mortgage Scheme for the Wet and Dry season Rice B.E. 2554 / 2555



Development of the Plantation in Nakhon Pa Mak Sub-district, Bang Kratum District, Phitsanulok Province



1. PRA Report

Regarding the agriculture in Nakhon Pa Mak Sub-district, Bang Kratum District, Phitsanulok Province, factors influencing decision making of farmers are various. For example, markets for selling crops, agricultural product prices and risk in flood encounter in the area as its terrain is affected by the flood for most of the time. Farmers in this area have to adjust their patterns of plantation to be related to the terrain and to reduce risks from the flood. So, they adjusted by planting the crops in relating to the soil conditions and its terrains, including the duration of plantation to be in line with the harvest before the flood will enter the area. Farmers therefore have the defense and adjustment in conducting the agriculture in order to prevent any problems that might happen to the crops they grow and reflective disadvantages to their own.

Agricultural Problems of Nakhon Pa Mak sub-district, Bang Kratum District, Phitsanulok Province

1. Agricultural areas in the sub-district often encounter the flooding in the rainy season and insufficient water in the drought.
2. Problem in low product prices.
3. Problems in outbreaks of diseases, pest and weedy rice.
4. Problem in renting the land for farming due to some farmers do not own the land.
5. Problem in the lack of money to run the agriculture.
6. High production costs and high hiring costs in the agricultural sector.
7. Lack of the soil nutrition and environmental conservation.
8. Chemical substances used in the agriculture flowing into the natural water resources in the community.

Approaches in the Development of the Agriculture of Nakhon Pa Mak Sub-district, Bang Kratum District, Phitsanulok Province

1. Dredging up the canals and public water resources in the area of the Sub-district.
2. The promotion for farmers to know how to plan the production for rice planting in order to reduce problem of the weedy rice.
3. Establishment of the Seed Bank and the Organic Rice Demonstration Plot.
4. The promotion for local farmers to improve the product quality to be in line with the market needs.
5. The promotion for the farmers to form in group for the production to be able to bargain in the product prices.
6. Arranging the community discussion forum on the rice management and value added rice in the community.
7. Arranging the discussion forum on the water management in the community and sub-district levels for the villagers and the RID officers.
8. The promotion for farmers to reduce the production costs by using the organic fertilizer and effective microorganisms (EM) to produce the organic rice.

Economy, Society and Culture

Nakhon Pa Mak Community primitively was called 'Pamak', named after the assumption that it was a community with the abundantly grown betel palm trees in the area and along the river bank. But another story said that the 'Pamak' was from the area in which abundantly full of standing timbers until it became the name of the community as 'Pamak –ป่ามาก [meaning in Thai, many forest or very wild]', and later was distorted to 'Pamak –ป่าหมาก [meaning in Thai, betel-palm forest]'. The settlement of the community originally was at the riverside of the Kwai Wang Thong River and Krong Kreng Canal and the very first community was believed that located in the areas of Ban Sam Ruan Village and Krungsri Charoen Temple in the present, during the year B.E.2390-2400 (A.D.1847-1857) and had been continually expanded. In B.E.2438 (A.D.1895), there was the establishment of the "Nakhon Pa Mak District" in the area of Nakhon Pa Mak Community in the present. It was considered as the area of prosper and civilization and being the big community of that period of time.

Around B.E.2441 (A.D.1898), there was the relocation of Nakhon Pa Mak District from Ban Sam Ruan Village to Talad Choom Sub-district at that time which later became Wang Thong Sub-district or Wang Thong Municipality Market in the present. The ancient houses and old ways of living along the riverside and clues of civilization still can be seen up to these days. One reason in moving the location of the district was that in the area of old Nakhon Pa Mak District or Nakhon Pa Mak Sub-district in the present was affected by the great flood with water inundation for a long period of time including the erosion until it damaged the District Office and caused difficulty for the services and transportation. Until in B.E.2471 (A.D.1928) the Royal Decree Establishing the Administrative Zone of King Amphoe Bang Kratum [a sub-amphur – an administrative office similar to sub-district but smaller in supervision or size] under the supervision of Muang Phitsanulok District. And transferring Nakhon Pa Mak Sub-district, Noen Kloom Sub-district, Phailom Sub-district and Bang Kratum Sub-district to be under the supervision of King Amphoe Bang Kratum, and relocated just in front of the Bang Kratum Railway Station. Later in B.E.2536 (A.D.1993) the office was relocated again in the area of Bang Kratum Sub-district as in the present.

In B.E.2474 (A.D.1931) the name of the district was changed by cutting the word "Nakhon" and remaining only "Pamak" District. Later in B.E.2485 (A.D.1942), Pamak District had changed to "Wang Thong District" and it was believed that "Wang" referred to many streams flowing to meet at this place, and the word "Thong" was expected from the excavation of gold found in the water resources in the area. It is therefore assumed to be the origin of the name of "Loom Wang Thong River" as well before later was changed to Wang Thong District in replacement of the name "Pamak District" which had been the name of this district since b.E.2438 (A.D.1895), in total 47 years of history.

Table 4 Development and Significant Events

Duration (B.E.)	Significant Events
2390-2400 (A.D.1847-1857)	Assumed to be the time of establishment the community from the evidence saying that primitively the community was named "Pamak – Betel Palm Forest" that was differed from the word "Pamak – Very wild", thickly wooded and fertile. On the other hand, the word "Pamak – Betel Palm Forest" also adopted from there were many betel palm trees in this area.
2448 (A.D.1905)	The Royal Decree establishing Nakhon Pamak District at that time was located in area of Nakhon Pamak Sub-district in the present. Very first communities were located at Ban Samruen Village, Krungsri Charoen Temple, Sam Ruan Temple (abbot Luangpor Bang, Prakroo Ransi Dharma Prapote and Prakroo Wiboon Dharma Chote).
2441 (A.D.1898)	Nakhon Pamak District at that time had been moved to Talad Choom Sub-district (or Wang Thong Sub-district in the present)
2468 (A.D.1925)	Establishment of the Wat Krungsri Charoen School to teach Dharma and local arts.
2471 (A.D.1928)	According to the Royal Decree establishing "King Amphoe (Sub-district but not Tambon, a part of district) Nakhon Pamak" with the grouping of Nern Kloom Sub-district, Pailom Sub-district and Nakhon Pamak Sub-district and relocating in the area of village Moo 4 of Bang Kratum Sub-district, opposite Bang Kratum Railway Station.
2485 (A.D.1942)	Name changed from "Nakhon Pamak District" to "Wang Thong District" and relocated to the current location in B.E.2522 (A.D.1979) up to present. Reason for relocating was that partly from the *heavy* flooding in the area and the erosion of the banks whereas another said that partly came from the *great* flood in the area and the erosion of banks.
2500-2510 (A.D.1957-1967)	- Rice planting only planted once a year for household and the rest is for sale or for trading with other food or appliances. - Raising number of cows and buffaloes for using as farming labors and for sale.
2520- 2530 (A.D.1977-1987)	Villagers began to plant rice 2-3 times per year due to more emerging agricultural equipment and technology than in the past. In the first stage, it was the emergence of the "*ควายเหล็ก (Kwuay Lek) – tractor* (literally translated as an iron buffalo)"; or walking tractor (two-wheel tractor); or some villagers called it "Kubota tractor". The tractor helped the planting process faster. Farmers therefore can increase their rice cultivation rounds as well as the rice variety
Duration (B.E.)	**Significant Events**
	improvement of Kor Khor variety which its outstanding property is drought tolerance and reducing the pests. These factors influencing farmers to adapt their production methods.
2538 (A.D.1995)	The flood happened in the area and damaged the rice fields, horticulture, some standing timbers died and that affected the loss of some garden areas and lands were adjusted to be more rice fields due to milder risks and shorter cultivation time than planting the horticulture.
2554 (A.D.2011)	The community all agreed that the flood that happened in this time was "the greatest flooding they've ever seen since they were born".

Education

Education of population in Nkhon Pama Community is divided into three sections, Prathom Suksa 3-4 (Grade 3-4) as the majority, followed by the upper secondary level, high vocational certificate and bachelor's degree.

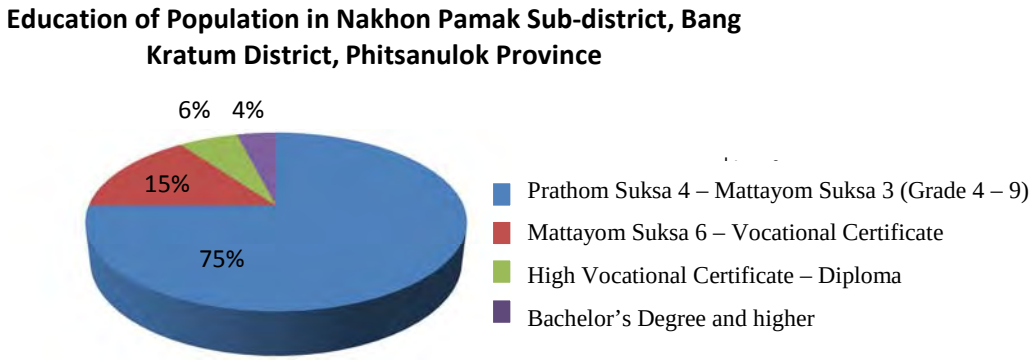


Chart 2 Proportion of the Population's Education

The education of population in Nakhon Pamak community has the majority of attainment in the Primary Suksa 4 (Grade 4) to lower secondary level due to most of the population maintain their rice cultivation as career since their ancestors up to the present. They attend the basic education in the local areas and some in other areas outside the community. The population attains the education in the upper secondary, high vocational certificate and diploma levels. Some pursue their higher education in the bachelor's degree and that tend to be found in the young children. This current generation carries out less rice planting career due to the low down on the family farms. The parents still can do rice planting due to using less labors but relying more on the agricultural machines and technology. Some of the new generations have never done the rice planting since the beginning. Parents have value to send their children to higher education in aspiring of getting good jobs. So, they have to send their children to attend educational institutes in other areas. It tends to make them work in other areas as well particularly for people who hold the bachelor's degree. The area has very little jobs availability for college or higher degree graduates so that it is necessary to work upon their fields of study in other areas or other provinces and periodically send money remittance or pay visits to their families.

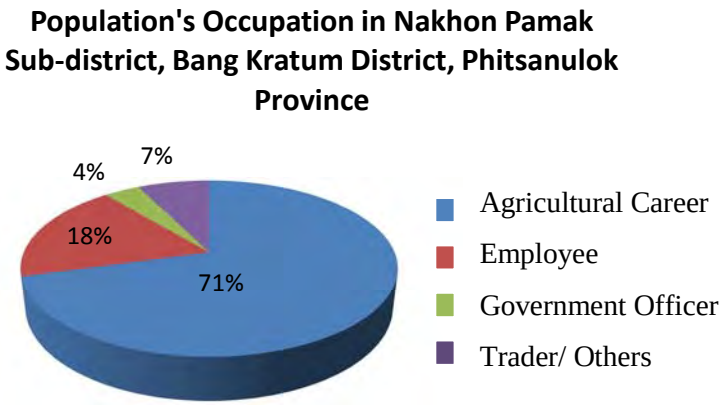


Chart 3 Proportion of the Population's Occupation

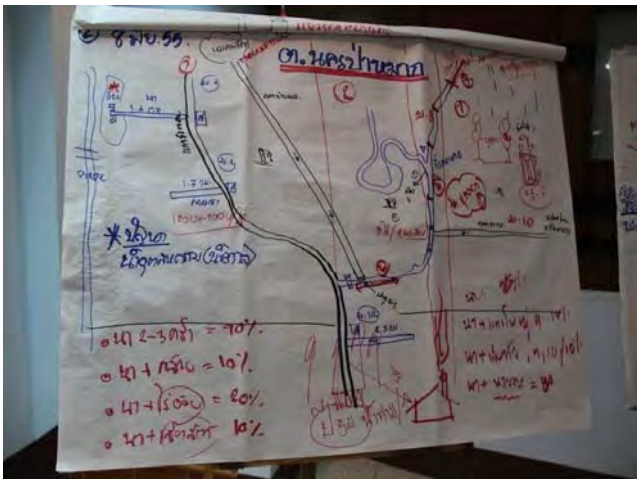
1. PRA Report

The occupation of people in Nakhon Pamak community can be divided into four main sections of careers. The first and major career is the rice planting. Farmers plant rice 2-3 times per year and sometimes they also plant banana, sugarcane and fruits in addition. The second section is employee that includes employees in agricultural sector in the area working on the planting procedures such as labors in spraying pesticides, sowing rice seeds, removing weedy rice, etc.; others are employed who own the agricultural tools such as tractors or combine harvesters, they will be hired by people in the area and nearby sub-districts the whole year long; and the rest are the employee during their free time of planting rice.

Most of the communities are located in the high land part of the sub-district which located in villages Moo 8, 9 and 10 and no water management system for plantation. Thus, rice planting can do only one round per year which is in wet season. In case of using water from the shallow wells or artesian wells, it has to be dug much deeper than in other sub-districts and that need much money for the digging and pumping work despite of the groundwater situated very deep approx. 50-60 meters.

Expenses spent in digging the artesian well add up the high production costs. By restriction in planting rice only one round per year causes some groups of people to find work outside the community in the off-rice season in Phitsanulok, Pichit and Nawa Nakorn Industrial Zone and return to rice planting in the common wet season. Turnover of labors in the areas that can plant rice just one time per year is higher than in the areas that can plant rice throughout the whole year long. The third section of career is government officer and the fourth is trader and others.

Although most of the villagers in Nakhon Pamak community have rice planting as career, with the physical terrain of this area makes rice planting differ. And the different terrains also define the production costs, production calendar and turnover and that will give impact on the incomes and debts of the farmers. Basically, “water” is the important factor in defining careers for people in Nakhon Pamak community.



In areas number 1 and 2 of the picture above, are the areas with water management or natural water resources for plantation. Farmers can plant rice 2-3 times per year depending on the height of the each rice fields. If the rice fields are not located in the flooding areas or not every year affected by the flood, then in such area can do plantation for three times per year. For the fields in flooding areas, partly adjust their planting rounds by omitting the wet rice planting during the flooding period and remaining other two planting rounds. And in the second round plantation, it is necessary to shorten the harvest time prior to the flooding. In some parts of this area is possible to dig the shallow wells up to 20-30 Wa (1 wa = 2 meters, 2.1782 yards sq. meter) to bring water for rice planting.

Apart from rice planting, villagers in Nakhon Pamak community also has other activities such as making dried banana, honey dried banana and three flavored dried banana as to its reputation in banana processing. People in Nakhon Pamak community could earn extra incomes from this banana processing activity both as entrepreneurs and workers in the production process. People in the community spend their leisure time from the main work to work with the banana processing and that give them different incomes depending on each stage of work.

Banana peeling will be paid per basin at the rate of 2-3 baht; banana drying on the bamboo slats will be paid 2-3 baht per basin; banana crushing by pressing the dried banana one by one will be paid 10 baht per basin; the drying banana after crushing will be paid 2-3 baht per basin. Some of banana used in banana processing are taken from outside the area. Banana processing activities operated by entrepreneurs and workers in the processing procedures – vendors from other areas invest, collect after all processing completed and pay the wages as per the agreement.

The banana processing mostly is operated in village Moo 2, Ban Bang Kra Noi village, which is also the well-known OTOP product of the ban Bang Kra Noi Banana Processing Group. The community also has other local products. For example, Pueng Noi (Little Bee brand) Dried Banana, Pueng Noi Germinated Brown Rice, Pueng Noi Bio-fertilizer Pellet, Pueng Noi Wood Vinegar, Pueng Noi Shampoo-Multi purposes liquid, preserved Garcinia, three flavored dried banana, butter coated banana, etc.

Besides, Ban Bang Kra Noi is also a model village of the self-sufficient economic development. Learning and on the job-training of people in the community are practical and effective with the knowledge contribution from the Office of Bang Kratum Sub-district Community Development. Then the knowledge body is taken into the community by organizing the trainings and spreading knowledge based on the principles of the self-sufficient economic theory to the outsiders and people of interest. The training courses managed with the learning objectives and having the knowledgeable persons teaching and demonstrating all involved processes. For example, money saving, reducing expenditures-increasing earnings, solving poverty, strong community management, non-toxic rice planting, community fertilizer production, etc.

Implementing the self-sufficient principles in rice planting will need only 2,000-2,500 baht per Rai as Mr.Samruay Khonlak, a farmer from village Moo 3 who had applied this principle into practice and later became a learning center for interest groups. He planted rice on his 60 rais, collected his own seeds and use only bio-fertilizers such as wood vinegar, fertilizer from worm manure so the production cost is quite low. When the community encountered the disaster, this farmer had fewer impacts than other farmers who planted rice by means of buying chemical fertilizers, pesticides and rice seeds.

In the year of no disaster encounter these farmers would have more earnings than others. Apart from low cost rice planting, this model farmer (Mr.Samruay Khonlak) had other ways of reducing expenditures-increasing earnings as well. For example, installing the bio-gas plant allows him to produce gas for his household use without buying, growing vegetables for household consumption and selling could earn some extra income for him apart from rice planting, raising pigs, and planting flowers and garden trees to sell to the visitors.

In conclusion, the house of "Uncle Samruay" becomes the learning center for the Self-sufficient Economy and a Home stay of Nakhon Pamak community. It is also called an another pattern of creating a stable life and reducing any kinds of disaster happening in the community.

Figure 17 Household Bio-gas Plant

Figure 18 Organic Vegetable and Garden Trees Farming for Sale

Apart from that, village Moo 2 and Moo 3 reduce the rice production cost as well as the use of chemical substances by setting up a group to produce the bio-fertilizer for the community use aimed at increasing the yields and reducing the expenses of buying chemical fertilizers. The bio-fertilizer sold to the members of the group only eight baht per kilogram. Members can use it with their own plots and that helps reducing the production cost varying on the ratio of the chemical and bio-fertilizers they mix. Some farmers use half and half while others might use bio-fertilizer 8 : chemical fertilizer 2, some farmers use solely bio-fertilizers. People will keep some portion of the rice for household consumption and another is separated for being the seeds for the next planting season.

Figure 19 Bio-fertilizer Production Group in Village Moo 2 of Nakhon Pamak Sub-district

Figure 20 The Community Rice Mill (Left)

Figure 21 The Community Rice Mill in Village Moo 2 Ban Bang Kra Noi Village (Right)

Besides the main occupation – farming, people in Nakhon Pa Mak community also have other jobs for earning extra incomes such as banana processing, frog raising, earthworm culture, fish farming, chicken raising, germinated brown rice processing for personal consumption and for commercial.

Figure 22 Raising the Native Chicken Breeds

Figure 23 Backyard Frog Raising

Figure 24 Worm Farming and Production of Germinated Brown Rice

Flood occurred in Nakhon Pa Mak community where its population growing rice as primary occupation and source of income, losses for the community were that the yields were unexpected as per the flooding took place before the harvest season, some partial loss in the paddy fields which located in the high lands and the early harvest or so called 'green harvest' or early harvest than the schedule due to the early warning and estimation about the flood before the harvest season. That affected the rice price to be lower than the common rate of 10,000 -13,000 baht and the rice harvested before its time could be sold at the rate of 3,500-6,000 baht per cart only. However, farmers had to harvest rice before time 'better than nothing' due to they need money for paying the debt and

reserving for the next planting round. It was better than taking risk and waiting for the flood in which they might have lost all for nothing.

If the farmers can keep their own rice seeds it will be able to reduce risks and impacts from the flood than relying on the seeds sold by the outsiders. They can also save money and have lower production cost due to no need to buy the seeds. After the water level reduced, they can start planting rice immediately. For the farmers who do not keep their own rice seeds, they cannot plant rice right away after the flood. There is high demand of the rice seeds in general not only in the areas affecting by the flood. So, it definitely affects to the production cost. In addition, the farmer stored seeds have more disease resistance than the purchased ones from the market. The old style rice barns could be seen in the villages Moo 2 and 3 of Nakhon Pa Mak Sub-district. Keeping the own seeds can reduce the production cost as well as it can reduce the expenses during the flood period that they do not need to buy rice for the family.

Figure 25 Barn and Boat still in Use in Nakhon Pa Mak Community

There is a saying “Failed rice farming just once but will be in debt for three years” that reflects the life of people in Nakhon Pa Mak community and clearly can see the how the flood affecting the incomes and security in life of the people in the community. This implies the significance of the lifestyle that mainly relying on the rice cultivation. Once the flood hit, it will cause debts from getting the loan to grow rice before the flood and they have to borrow money again for the next production round. There is no guarantee that next time they could get the satisfied amounts of yields or incomes from selling rice or joining the Rice Mortgage Scheme. Sometimes it does not affect to only one production rounds but more. Normally, a failed rice production round will be affecting to the next few times before farmers can clear all debts.

The debt problem is also another cause of losing the land right of the people in the community. The yield is not as they expected from various factors like flood, planthoppers, weedy rice, etc., including gaining the yields cost less than the production expenses due to expensive production materials. Costs

of fuel, pesticides, labor wages and rice prices are vary to the farmer's risk in loss. This affects to the ability in paying for the debts of the farmers. Once they face the losses in growing rice and overwhelmed with other factors, farmers could not pay the debts. Some of them have to sell their lands and some even lose their lands from guarantee the loan from the financial institutes. Bank of Agriculture and Agricultural Cooperatives (BAAC) is the main source of loans for farmers. Farmers who used to have lands then have to rent the lands for rice cultivation or some of them have to change career to general employee or industrial workers after all.

About the land right holding of farmers in Nakhon Pa Mak community, some who own the lands usually are residents who have been living in this area for quite a long time, some own the land but still not enough for rice plantation due to the family expanding and they have to share some plots for the family members. The next generation has to rent more lands. The last group consists of farmers who do not own any plot of the land, they rent the land for rice plantation. Some of them used to be farmers with own lands but then lost for some reasons, and others never own the land, some used to have their own land but damaged from the flood or pests and caused them lots of debts and expenses, as the result, they lose their plots of land.

The rent rate depends on the agreement between the tenant and the landlord. For example, ten buckets of rice per Rai per one production round, or costs 1,000 baht per Rai per year. For the rent farming lands if damaged by the flood the farmers who register with the government will get the compensation of 2,222 baht per Rai. Whether to share with the landlord depending on the agreement between the two parties.

หมู่	ชื่อหมู่บ้าน	จำนวนหัวเรือน	ที่ดัน		เช่า
1	บ้านบึงล้า	255	60	40	5/
2	บ้านเกาะนัด	145	60	30	10/
3	บ้านสามเรือน	120	50	40	10
4	บ้านเก่า	67	60	–	40
5	บ้านสามเรือน	59	40	–	60
6	บ้านโกรงเกรง	185	60		40
7	บ้านโกรงเกรง	147	70		30
8	บ้านโกรงเกรง	92	60		40
9	บ้านแหลมพะชาด	144	70		30
10	บ้านแหลมตรก	52	70		30
11	บ้านดงพยอม	188	70		30
12	บ้านสามเรือน	181	70		30
13	บ้านโกรงเกรง	90	70		30
		1,723			

Figure 26 Proportion of Land Holding of Nakhon Pamak Sub-district

Source : from the synthesizing group of the community

[Translation]

Village No.	Name	Households	Own Lands (%)	Own Lands + Rent (%)	Rent (%)	Remarks
1	Ban Bueng Lam	255	60	35	5	
2	Ban Bang Kra Noi	143	60	30	10	
3	Ban Sam Ruan	120	50	40	10	
4	Ban Kao	67	60		40	
5	Ban Sam Ruan	59	40		60	
6	Ban Krong Kreng	185	60		40	
7	Ban Krong Kreng	147	70		30	
8	Ban Krong Kreng	92	60		40	
9	Ban Laem Prathat	144	70		30	
10	Ban Laem Krok	52	70		30	
11	Ban Dong Payom	188	75		30	
12	Ban Sam Ruan	181	70		30	
13	Ban Krong Kreng	90	70		30	
		1,723				

As the matter of fact that the Nakhon Pa Mak community is regarded as the ancient community and still having the conservation of the cultural heritage and traditions up to the present. Information about the cultures and traditions has been compiled for the tourists to visit at the Folk Museum and Thai Music Conservation Center. The environment has also been conserved and proper dwelling of many aquatic animals particularly the teals. Visitors can visit the teals at Bueng Siew (Lake) through the whole year long. This is a kind of community tourism. The community also has implemented the Sufficient Economy and set up the Sufficient Learning Center to promote all agricultural activities such as organic rice farming, biogas plant, safety vegetables and self-reliance sufficiency of the community. The community has provided the home stay travel with the capacity of 150-200 persons. Activities can be designed to suit their needs as well as the visiting hours.

Table 5 Tourism Calendar of Nakhon Pamak Community

Activities	Location	Duration
Take the raft along the downstream to visit “fireflies” and ways of life of people along the Krong Kreng Canal and taste the river shrimps	Kwai Wang Thong River and Bang Kra Noi Canal	May - January
Drink sweet coconut juice and taste the butter-coated dried banana	Moo 1	All the year round
Visit the ringed teals at Bueng Siew Lake	Ban Sam Ruan Moo 12	All the year round
Folk Museum and Thai Music Instrument Conservative Center	Sam Ruan Temple	All the year round
Sufficiency Learning and Training Center, speakers are available for the visitors of sufficiency and home stay activities	Moo 2 Moo 3	All the year round

The ancient Nakhon Pa Mak community still reserves the traditions and customs up to the present. They follow the New Year merit making, pour water on the hands of revered elders and ask for blessing, merit making and listening to the Sermon of the of the story of the last incarnation of the

Buddha on the Enterring of Buddhist Lent and End of Buddist Lent Days. There is one important ceremony of the community is the "Luangpor Rang Ceremony" (Ceremony for the Priest Rang) who the community has paid respects since the past widely. The ceremony is host yearly in memory of the goodness of Priest Rang.

Table 6: Schedule of Festivals in Nakhon Pa Mak Community

No.	Festivals	Activities	Duration	Trend	
				continued	reduced
1.	New Year/ annual Merit Day	Merit making	January		
2.	Songkran Festival	Pour water on the hands of revered elders and ask for blessing	April		
3.	Senior Day/ Family Day	Pour water on the hands of revered elders and ask for blessing	Around June		
4.	Buddhist Lent Days	Making merit	Waning 1 of Month 8		
5.	End of Buddhist Lent Days	Listen to the Sermon of the story of the last great incarnation of the Buddha	Waning 1 of Month 11		
6.	Loy Kratong Festival		Full moon of Month 12		
7.	Luangpor Rang Ceremony		March		

3. Phenomenon, Impacts and Natural Disaster Management

Nakhon Pa Mak Sub-district has variety in terrains. There are highlands, plains and lowlands as combination. Therefore, it allows the disaster like flooding, drought and water shortage happen over and over again.

The big flood in 2011 affecting Nakhon Pa Mak Sub-district entered into the area from two directions: Wang Thong River and Chompoo Canal (Pink Canal) with origin flowing from the forest in the western Petchabun Mountain Range. Flood occurs at these two rivers every year as usual.

Flood in 2011 occurred due to the water volume in Nan River was too intense. So it pushed to flood over the villages Moo 6, 7, 8 as the dam and water gates could not resist the water power especially the Ta Na Dam. And the water normally conjoins the whole system with Nan River and Chao Phraya River. Duration of the inundation was 65 days from August to October. It was happened while the crops were not ready to be harvested, was only during the booting stage. It caused damages and direct impacts on the wide areas of crops in Nakhon Pa Mak Sub-district.

Impacts

Impacts on societal feature, traveling, transportation particularly on the main roads of the community were damaged, schools shut down during the flood, the ritual ceremonies and cultures had been changed. People in some communities lacked of the income as they were general workers and did not own the farming land.

Impacts on health: waste water can cause the risk of the outbreaks of diseases, the sanitation management and the lack of preparation.

For the agriculture: paddy fields, fruits, dry crops, standing timbers in all lowlands were damaged and resulted in debts for the next production cost. In 2011, flood affected the paddy fields in total number of 16,970.50 Rais with damage cost 2,222 baht per Rai accordingly to the government compensation rate or 37,708,451 baht in total; the dry crops damaged in total 1,140.75 Rais with the compensation rate of 3,150 baht per Rai or 3,593,362.5 baht in total. Apart from this, there were also other garden crops and other plants damaged in total area of 221.5 Rais and 829 farmers were affected.

When the flood damaged the roads, it caused inconvenient for the community transportation especially in the high level of flood. Some places needed to use boats and the boats were not adequate for the people in the community. Schools had to be closed during the flood season and students had to be substituted later. Flood also affected the traveling to merit making and doing some ritual ceremonies.

From the past flood with long inundation, there was high risk for the water turned to waste water, cause of mosquito and improper hygiene of excretion. If the toilet also flooded, it could cause the diseases easily. The adjustment of the production methods in order to be harvest in time will change the lifestyles of the people and they have less time for ritual ceremonies regarding their beliefs.

Lessons and Adaptation

According to the preparation of the people in the community, landfill, building houses with higher basement and some preparedness like preparing boats, moving the agricultural tools and equipment to the safe places, setting the disaster relieve center within the community, including the supports from the outside organizations for the community resilience.

4. Suggestions and Measures

Regarding the concept of storing water for the drought, it could be done by increasing the catchment areas, dredging the natural canals, building small weirs in Chompoo Canal and Wang Thong River, including the fast drainage of the inundation. The phrases “including fast drainage of the inundation” and the “escaping the flood and changing the production round” could be done by draining the water to pass through the areas of Nakhon Pa Mak Sub-district and adjusting the production schedule.

Suggestions

1. Dredging the canals, lakes, small streams, etc. making the small weirs in the Krong Kreng Canal, Nam Sai Canal and Chompoo Canal.
2. Water management is about the irrigational engineering management, designing the water gate, repairing the gate to function properly at all time, repairing the bending panels of Ta Na Dam,

manage the water at Ta Na Dam to suit the use during the flooded season and to design the Ta Na Dam to be related to the current situations.

3. For the people adaptation especially in the agriculture, changing the production schedule, planning and using the agricultural technology such as for the weedy rice, cost reduction for the rice production, development of the rice seeds to be in accordance with the climate change, establishment of the Seed Bank and demonstrating the organic rice plantation.
4. The economy, knowledge exchange for planning the management of agricultural products, paddy fields, drying yards, community rice mill, transportation, rice storage for consumption, barn system, etc.
5. Community potential development especially the adaptation to the natural disasters and the risk reduction in living.
6. Hosting the meeting or stages to discuss about the water management at the community and sub-district levels among the villagers and RID staff.
7. Constructing the electricity water pump station from Kwai Wang Thong River in
8. village Moo 1 east side to the village Moo 2 and 11 with the separated pipes to Ta Tarn Sub-district ending in the Krong Kreng Canal.
9. Construct the dikes along the low level roads to prevent the road flooding, or barrier dikes along the low areas, prevent the flood along the roads or shift up the roads to be barrier dikes to prevent the flood to enter into the areas.
10. Extend the drainage to be wider and construct the new ones for better efficient water management.

The adjustment of the community during the disasters (flood, drought) by means of storage, fast drainage, the whole system water management and including the community water management, farmer development and living in harmony with the disasters.

Meeting on the Presentation of the Nakhon Pamak Sub-district Participatory Community Study
Friday 8th June 2012 ; 08.30 – 13.00 hrs.
Venue: Meeting Room of Nakhon Pamak Sub-district Administrative Organization,
Bang Kratum District, Phitsanulok Province
Contributed by Ministry of Agriculture and Cooperatives and JICA

Attendants

Mr. Naeb	Aonchaona	Village Headman, Moo 6
Mr. Sommai	Naksap	Assistant Village Headman, Moo 10
Mr. Sunai	Noon-aon	Village Headman, Moo 2
Mr. Jaroon	Sladin	Assistant Village Headman, Moo 2
Mr. Preecha	Noon-aon	Sub-district Administrative Organization, Moo 10
Mr. Roong	Preechayot	
Mr. Banyat	Yaemyim	Asisstant Village Headman, Moo 1
Mr. Wanchalerm	Jitchan	Sub-district Administrative Organization, Moo 4
Mr. Nong	Klinchaona	Sub-district Administrative Organization, Moo 2
Mr. Somsak	Tamrabiab	Sub-district Administrative Organization, Moo 10
Mr. Prathan	Daengchaona	Sub-district Administrative Organization
Mr. Chalee	Saengduan	Chairman of the Council
Mr. Samroeng	Toeypramual	Sub-district Administrative Organization
Mr. Boonrod	Saengchaona	Sub-district Administrative Organization, Moo 13
Mr. Boontham	Saksuwan	Sub-district Administrative Organization
Mr. Charan	Boonseng	Sub-district Administrative Organization
Mr. Rian	Prombuenglam	Sub-district Administrative Organization, Moo 5
Mr. Sompong	Petchprakob	Village Committee
Mrs. Ramita	Suwannaampai	Assistant Village Headman, Moo 5
Mr. Boonsong	Ketchaona	Villager
Mr. Wiharn	Buasamran	Assistant Village Headman, Moo 11
Mr. Jamlong	Tokekuanheng	Village Headman, Moo 3
Mr. Chalor	Panboobpa	Assistant Village Headman, Moo 3
Mrs. Sinuan	Khamkhao	Sub-district Administrative Organization, Moo 2
Mr. Thonglor	Tokekuanheng	Sub-district Administrative Organization, Moo 3
Mr. Nitiya	Aimson	Assistant Village Headman, Moo 8
Mr. Manee	Pongpanich	Sub-district Administrative Organization
Mr. banchong	Machaosuan	Village Headman
Mrs. Sriampai	Tippayawan	Assistant Village Headman
Mr. Boonchuang	Sookchan	Village Headman

Nakhon Pamak Sub-district Study Team

Mr. Akkrawit	Muenkul
Mr. Sakorn	Songma
Mr. Nattawut	Uppa
Mr. Krittakorn	Noipin
Miss Siriratda	Thamratkool

Representatives from 13 villages consisting of sub-district headmen, village headmen, Assistant village headmen, Sub-district Administrative Organization members, village public health volunteers, Territorial Defense Volunteers, local intellectuals, community leaders, activity group leaders, district extension officers, Nakhon Pa Mak Sub-district Administrative Organization officers, Nakhon Pa Mak

Health Station officers and representatives from schools in the sub-district, in total there are 60 attendants.

Addressing the objectives of the meeting

- To participatory study Nakhon Pa Mak Sub-district
- To propose data to the community and to gain opinions and guidelines from the community
- To promote the collaborative learning in the study of Nakhon Pa Mak Sub-district

Opening the meeting by Deputy Chief of Nakhon Pa Mak Sub-district Administrative Organization

Everyone was invited to join this meeting, to be the representatives in the study of the community and to examine the guidelines for flood counter-measurements. Last Wednesday we had arranged the study tour for the representatives from each village and the Japanese experts on the survey of the canals and Watergates in the community. Today, it is a good occasion for us all to contribute your collaboration and suggestions that will be useful for further application in this area. I declare this meeting open now.

General Information of Nakhon Pamak Sub-district

Nakhon Pa Mak Sub-district is one of the sub-district (Tambon) in Bang Kratum District of Phitsanulok Province, located about five kilometers away from Bang Kratum District to the east with total area of 36,637 Rais, divided into 25,848 Rais as agricultural areas and 13,336 Rais as housing areas. Most of the lands are used for agricultural purposes. Nakhon Pa Mak Sub-district situated in the lower north of Thailand. Most of the terrains are plains and some are lowlands.

Boundaries

Nakhon Pa Mak Sub-district is located about 5 kilometers far from the district.

To the North connected to Ta Tarn Sub-district and Wang Thong District
To the South connected to Phailom sub-district
To the East connected to Wat Ta Yom Sub-district
To the West connected to Bang Kratum Sub-district

Total number of villages in Nakhon Pa Mak sub-district (based on the Civil-Registration information of Bang Kratum District)

Moo	Village Names	Population			Numbers of Households
		Male	Female	Total	
1	Ban Buenglam				255
2	Ban Bang Kra Noi				143
3	Ban Sam Ruan				120
4	Ban Kao				67
5	Ban Sam Ruan				59
6	Ban Krong Kreng				185
7	Ban Krong Kreng				147
8	Ban Krong Kreng				92
9	Ban Laem Prathat				144
10	Ban Laem Krok				52

Moo	Village Names	Population			Numbers of Households
		Male	Female	Total	
11	Ban Dong Payom				188
12	Ban Sam Ruan				181
13	Ban Krong Krang				90
					1,723

The average population density of 55 people / sq.km.

Area with the total area of 36,637 Rais, or equally to 58.62 sq.km.

Topography Most of the areas are lowlands with some rivers run through, that is, Kwai Wang Thong River but only for a short distance. Apart from that, there are also Krong Kreng Yai (Big) and Krong Kreng Lek (Small) Canals run through Nakhon Pa Mak Sub-district as well.

Economic Feature

Occupation Most of the residents have agricultural careers (Rice Planting) as a major occupation. Some are employees, merchants and entrepreneurs of household industry.

Physical Information of Nakhon Pa Mak Sub-district

Community Water Resources

According to groundwater resources, the Study Team had some remarks that why there was a 60 Wa-deep artesian well in village Moo 9, and why such the depths of the artesian wells within the same sub-districts areas are so different. From the study, it was found that due to the rivers run through the edge of the community (the community called 'canals') consisting of Kwai Wang Thong River passing through villages Moo 1, 2, 3, 4 and to other sub-district areas respectively. For the Krong Kreng Canal: the Krong Kreng Lek and Krong Kreng Yai canals running through the east before separating into the Kio Ko Ma (Contracted Dog Neck) or at the area of Krong Kreng Nua Canal.

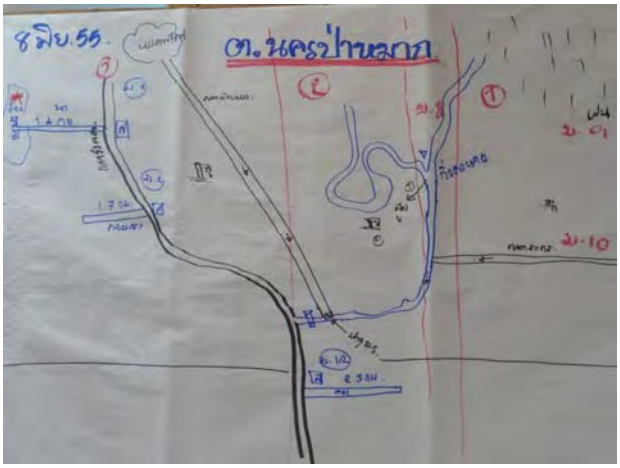
Water Management by the Department of Water Resources

For the water management in the community, it was found that the water management was separated into three parts with the assistance from the Department of the Water Resources in developing the canal electric pump station (pump) with pipes buried into the ground for 1,400 meters and releasing water into agricultural areas planting sugar canes and rice. There is also Wai Canal located in the area of village Moo 2 as the floating canal located in the west side of the community with the distance of 1,700 meters. In the area of village Moo 12 there is Kwai Wang Thong River flowing through the community as the floating canal with the length of 2,300 meters. So, the villages Moo 2, 1 and 12 can utilize the water resource from Kwai Wang Thong River and irrigation canal or so called "Nong Nam Dam Swamp" cut across the area of village Moo 9 with Ra Korn Canal as the catchment area from

Klong Wat Ta Yom Canal. For the other areas, there are natural public water reservoirs in all villages. Public water reservoirs namely as lakes, swamps, etc.

The JICA Study Team had raised the point that why there was no electricity water pump in the center of the community, or maybe because there was no water but the weirs. Where was the origin of the upstream entering the villages Moo 10 and 9?, Whether there was water available only during the rainy season so that we could use the rain water for agriculture during such season by pumping the water from the rivers. In the dry season, there was no sufficient water so the community had to build the artesian wells. Artesian wells can be in both big or small in size depending on the affordability of the individuals. So, what if the farmer lack of money for water management?

If we divide the area into three parts as below figure:



Part 1: falls in the areas of villages Moo 9, 10 and some parts of village Moo 8.

The study revealed that in the dry areas, people like to go work in Bangkok and be the general labor workers during the drought. There are high expenses for managing water for agriculture. Some villagers build their own artesian wells and have the water guarantee for 30 Rais but with the investment of 100,000 baht. They also dig wells in their own lands but still insufficient for the agricultural use (empty ponds, no water with the depth of 3-5 meters). These are the attempts of the local people in water management. The study also revealed that people try to plant the eucalyptus trees along their paddy farm dikes as per their dry weather resistance. They can sell them at the rate of 400 baht per ton. The reason of planting eucalyptus trees because they are easy to care for, fast growing and can be used in the household. The main occupation of the people are involved with planting rice and water melon in villages Moo 9 and Moo 10. Some families also raise cows for additional incomes. Their minor occupation is the general labor worker. People in the working ages normally go work in Bangkok or Nava Nakorn Industrial Zone.

Solely rice cultivation: 90%

Rice cultivation plus water melon planting: 10%

Raising animals: 20%

General labor work after the rice cultivation season: 90%

Part 2: (Middle/ Center) falls in the area of Ban Krong Kreng Village, terrain is similar to part 1.

Part 3 falls in the areas of villages Moo 1, 2 and 5. It is the most fertilized part of the community that can grow rice 2-3 times a year and can grow banana, sugar canes and animal raising like cows, grogs, etc.

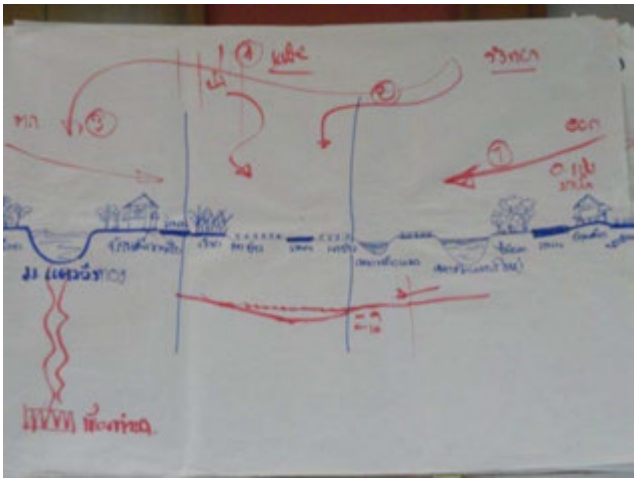
Planting banana and processing sun-dried banana: 10%

Planting rice 2-3 times a year: 90%

Planting sugar canes: 25%

Raising animals: 20%

For better understanding, the area of the community is presented in the **Crossed Section Picture** as below:



The figure shows that in the area of village Moo 9 and 10, the terrains are highlands, dry and can do only one round of rice plantation, planting water melon, raising animals for extra incomes and general workers. For the central area although the terrain is not high but it is the flooded area before flowing into the canals but the water becomes dry during the drought. This area is totally different from the areas close to Kwai Wang Thong River which having available water for all time. The cost for water pumping is not as high as other parts. The water management in the central part is practical but still not sufficient water. Swamps, lakes, etc, are still dried. Some people said they have to pump from different few sources before the water could be filled in their paddy fields. Although the canal dredging is deep enough, pumping the water to use needs high cost. From the interview with the villagers, it was found that the fuel used for water pumping for five Rais is about 1 gallon. So, how should we operate the water management for agriculture in the dry lands and insufficient water?

Water flew from Wang Thong District and Noen Ma Prang District had flown into the areas.

Flood in the area of Wang Thong District, partly comes from Kwai Wang Thong River and partly flood into the area of Krong Kreng Village.

The solutions for the water management during the flood season in August – October are as follows: where the water should go to? How should we solve the problem? Are such circumstances regarded as the causes of the flood?

Suggestions from the Meeting

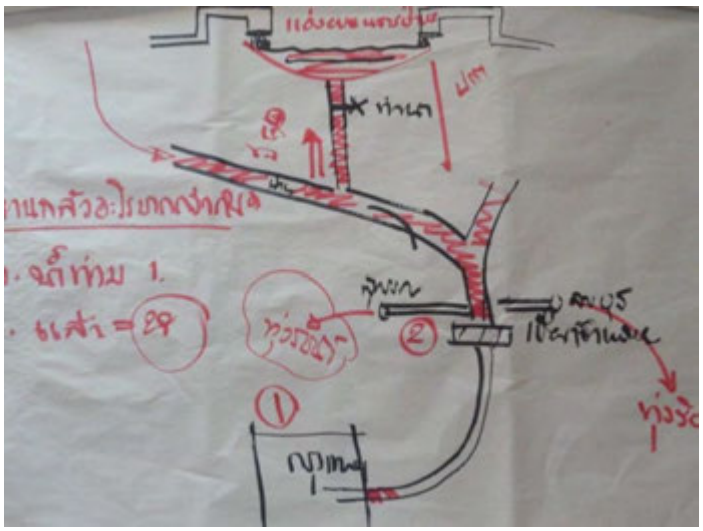
- Building the water reservoirs at the big public swamps
- Dredging the Krong Kreng Canal where it is shallow, starting from the area of water gate in village Moo 5 upwards
- Open the gates of Kwai Noi Dam during the dry season
- Pump water from the Kwai Noi River and Kwai Wang Thong River to Krong Kreng Canal (at Sam Ruan Gate)
- Dredging the Wang Nam Sai Canal to catch water from Kwai Noi River
- The sugar factory pumps water for their own use and releases waste water
- Make the barrier weirs in Krong Kreng Canal and leave proper distance between each other
- Problem of drought, we need water to be available throughout the dry season by dredging canals, make the additional gates in the Krong Kreng Canal to help the agricultural activities of people in villages Moo 9 and 10. Actually, we often face the flood every year so that 'we are not afraid of flood but drought'.
- Problem in unable to drain water if water pushing from Nan River…..without the Ta Na Dam, it cannot prevent water out. That's why Ta Na Dam is damaged every year.
- There are some problems in designing the Ta Na Dam because the dam must have the gates that can be opened and shut, but what we have in real are only sliding gates. Whereas at Wang Thong River is full of sand and needs to have the gate to take out the sand too. If the level of the dikes is higher than usual, flood can flow to damage the nearby paddy fields. There are a limitations in constructing the dikes about the engineering and areas of construction, they will operate the construction where they are allowed to do so.
- Whether the Ta Na Dam and Chao Phraya Dam in Bangkok related? How?
- Water level at the Ta Na Dam is quite full. Whether it is too intense when the water from the north arrive? Where the water will go then? Once the flood happens, we cannot open the draining gate at Ta Na Dam unless the Chao Phraya Dam gates opened, then where the water go? Whether the solution of this is at Ta Na Dam or where else?

Flood Situations

Every year the water stream flew downwards. But this year was worse flowing upstream. Water was pushed from Nan River upwards and entered the community in 2011. The big flood retained for three months. Villagers found difficulties in living, transportation, fields, etc. what are the impacts on the community?

1. PRA Report

Damaged paddy fields from the flood in every year mostly found in villages Moo 8, 7, 6, 4, 2 and 1.



- Damage rice fields. Normally the flood took place around end of August to beginning of October. They were amidst the wet season, not yet harvested but slightly before the harvest. Farmers grow rice the whole year long with the hope not to have flood but still in risk. If water volume is not too high, the yield will be harvested and vice versa.
- Damaged roads
- Some houses were damaged
- Damaged sugar canes particularly the small ones
- Damaged banana trees
- No feeding and hoiusing for animals: chickens, pigs, cows, buffaloes, etc.
- Students could not go to school. They had to make the substituted days
- No income, people capture fishes for food and waiting for the survival bags
- Somehow can still dry banana
- Difficult transportation. Transportation relies on plastic boat which costs 4,000 baht per each.

Positive impacts

- More fish varieties and amounts
- People in the community are more united and care for all
- Having more agencies contributing aids to the community

Adaptation

- Landfill for the accommodation
- Buying boats to handle the next flood
- Lifting the house
- Moving the engines, electrical appliances, cars to the higher places and moving to live on the second floor for some families
- Buying drinking water because the water supply is not clean, turbid and contaminated with rust sediments. Villagers dare not to drink rain water because there are numbers of pigeons living on the roof. They concern about the health. Some families invest 4,000-5,000 baht in buying the water purifier for the household use.

Agricultureal Information of Nakhon Pa Mak Sub-district

How can the community survive? What is the 'planting rice 1 year and being in debt for 3 years'? Why should we plant sugar canes or banana? Why other areas do not plant sugar canes or banana? Villagers use the chemicals in their rice cultivation while some areas conduct the organic rice cultivation (village Moo 2).

Production Cost per Rai per Round

- Plowing 240 baht
- Making the mire (preparing soil) 220 baht
- Seed sowing 50 baht/ rai
- Seeds 520 baht/ rai
- Weeds control 250 baht/ 1 bottle
- Labor cost for weed pesticide 50 baht/ rai
- Fertilizer 960 baht/ rai/ 2 times
- Taking off the weedy rice 80 baht/ rai
- Weedy rice pesticide 500 baht/ rai
- Harvesting wage 450 baht/ rai
- Artesian well pumping 600 baht/ rai
- Rent 1,000 baht/ rai
- Total.....6,200.....baht

Average yield is approx. 80 baht/ Rai ; wet season rice yield is 50 buckets per Rai, or 8,000 -10,000 baht per cart.

Risks in Rice Cultivation

- Water management: flood and drought
- Outbreaks of the diseases, aphids, larvae, etc.

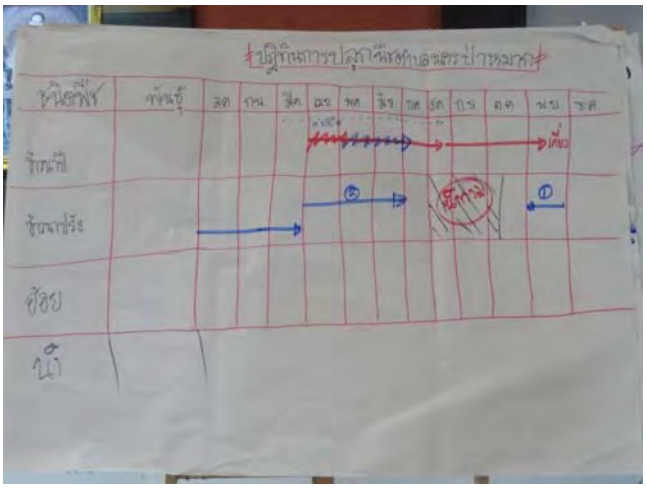
The most important problem influencing the rice planting in the community was about the weedy rice. The weedy rice had been spread into the community around 4-5 years ago but had no clue about its origin. The weedy rice can grow better than the rice, will boot and fall easier. It will keep spreading in the fields. Some farmers said the weedy rice came with the harvest machine. Once the rice seeds given by Lay Lai Forest Temple were not sufficient, farmers bought the seeds from the merchant and seeds were not examined for their quality before. So, the outbreak began since then. In some rice fields with sever outbreak of weedy rice, farmers had to plow the rice. The weedy rice can be alive in soil for ten years. Although plowing to destroy the weedy rice, it cannot absolutely solve the weedy rice problem.

From the survey in villages Moo 9 and 10, there was less weedy rice found. Villagers told that because in this areas people plant only the wet season rice, so the outbreak of weedy rice is quite mild. The meeting proposed the solutions on this matter as follows:

- Do the parachuting method or transplanting but this will cost higher for the labor with the rate of 1,200-1,400 but per Rai
- Stop the cultivation if found the weedy rice, plow them, do not let them grow grains
- Leave the weedy rice to grow grains before use the pesticide
- Reduce the production rounds to two, to reduce the outbreaks

According to the analysis of the rice production rounds of the farmers, between the one or two rounds or three rounds, which choice will allow farmers to have more remaining money at the end? One farmer from Ayutthaya Province shared that in the past they planted rice only one time per year, later it was expanded to two and three times respectively. Nowadays, it has reduced to two times again due to the big burden of production costs and risk in rice plantation. During the flood season they leave the water enter the paddy fields as the catchment areas. The water management is linked to the water management in Bangkok as well. There was the remark about how this area would be like if there was the flood prevention in Bangkok.

Production Schedule



From the above data, it was found that the flooding season was during August – October which was the booting stage of the rice, what shall we handle this? The community presented the principle of "escape the flood or fastening the production round". If the flood arrived earlier, the chance for the rice to be damaged was quite high. On the other hand, if the water arrived later, there was a chance to harvest the crops in time and with high yields. This circumstance is very important and influencing to the rice cultivation. To reduce the limitations, it can be done by adjusting the production rounds to two times per year (during the set season). For villages Moo 7, 9, 8, and 10, can do only one round rice

plantation. If we can fasten the production round earlier, then we can definitely solve the problem on flood management.

Information on the Economy and Society of Nakhon Pa Mak Community

หมู่	ชื่อหมู่บ้าน	จำนวนครัวเรือน	ที่ดิน		เช่า	
1	บ้านบึงลำ	255	60	40	5/	
2	บ้านบางกระน้อย	143	60	30	10	
3	บ้านสามเรือน	120	50	40	10	
4	บ้านเก่า	67	60	–	40	
5	บ้านสามเรือน	59	40	–	60	
6	บ้านโกรงเกรง	185	60		40	
7	บ้านโกรงเกรง	147	70		30	
8	บ้านโกรงเกรง	92	60		40	
9	บ้านแหลมพระชุ	144	70		30	
10	บ้านแหลมครก	52	70		30	
11	บ้านดงพยอม	188	50		30	
12	บ้านสามเรือน	181	70		30	
13	บ้านโกรงเกรง	90	70		30	
		1,723				

The land right holding of Nakhon Pa Mak Sub-district:

[Information in this figure is same as the above/ previous figure]

From the information of the community, it shows that the community tends to have less plots of the land due to people are being in debts and facing the flood and drought. Sharing some plots of land to the family members resulting in the lower rate of land right holding. Many of them share the land for selling. The rice price situation is also inconsistent. Farmers all reflect that the rice price is quite low while the production cost is increasing in every year and the household expenses are increasing too especially on the children's tuition fees. Many farmers have to get loans from the Bank of Agriculture and Agricultural Cooperatives (BAAC) because the external loans having high rate of interest, approximately 2-3 percent / month. In getting loan, farmers have to guarantee by properties like title deeds and resulting in losing the land at the end. Most of the pieces of the land now are in the hands of the investors both Thais and foreigners. How can we keep our farm land then?

Rice seeds are very important to the production for farmers. Where do the farmers gain their seeds? Can we find the rice seeds easily after the flood gone? It is found that it is difficult to buy rice seeds after the flood. The price of the seeds also costs expensive year by year. Communities in other provinces have suggested the community to operate the Seed Bank.

Pesticides or toxic chemicals contaminated in the soil and water, many farmers do no eat their own growing rice and dare not to eat fishes or other food from the paddy fields due to the high toxin. Such problems not only increase the production cost but also the risk to health for people in the community.

Drinking and consuming water.

Some people can afford to buy the water purifier whereas the others just simply use the alum to purify it.

Debt Cycle of the Farmers

Whether there should be the experiment to plant the Jasmine Rice in the areas of villages Moo 9 and Moo 10? As the case of Thung Kula Rong Hai with lots of eucalyptus trees due to the salty soil often turned to salt when affecting by water. So it is not suit for rice plantation. The rapid flow of the water is also another reason so planting the eucalyptus trees is the solution for the areas like this. The roots of the eucalyptus trees also very proficient in finding water resulting in the reduction of the salty soil. This is the innovation of Thung Kula Rong Hai model.

Economy, Society and Culture

Making New Year merit has less participants/ gained less attention due to most people are more interested in earning for their living.

Most of the Becoming the monk ceremonies will be taken before the entering of the Buddha Lent Days. Most of the men will become monks for seven or fifteen days as they are during their studying or working. It tends to have less monks.

Community Religious Ceremony depending on the schedule of the villages but normally will be taken place during January and April

Luangpoo Rang Ceremony during 28-29 January
Luangpor Sa-nguan (Priest Sa-nguan) Ceremony, March
The Monk-to-be Ceremony of Dong Sri Charoen Temple, during Songkran Festival (April)
Godfathers are still respectable

Some Importance Events of the Community

- 1847 – 1857, formed the community as assumed first establishment was at the area of Sam Ruan Temple
- Established Nakhon Pa Mak District, the Office of the District was at Kum Sri Charoen Temple
- Big flood, the water level was up to the tip of the pagoda and inundated for eight months
- 1888, relocated the District Office to the area of Wang Thong Market , same as in these days

- 1925, established the first school
- 1928, established the King Amphoe Bang Kratum (sub of sub-district), the administration was under the Bang Kratum District
- 1929, Luangpor Rang (Priest Rang) stayed at Sam Ruan Temple for another right years before appointed as the 'Monk Dean'
- 1942, changed the name of Nakhon Pa Mak District to Wang Thong District

Summary

- Water management can repair the Ta Na Gate or relocating it due to it has impacts on the community and the community above the Ta Na Gate
- Repairing the water gates and dredging Krong Kreng Canal and building a new water gate
- Dredging the public ponds for water storage
- Diverting water by pumping from the Kwai Wang Thong River and Krong Kreng Canal

Agriculture

- Adjustment the rice plantation to twice times per year: wet and dry rice seasons, and improvement the water reservoirs to be available if planting two times of dry rice.
- Groundwater contaminated by the rust sediments
- Surface water contaminated by chemicals, we have to find out how to purify the water for drinking and general consumption
- Areas for raising animals normally will be taken places in their own spaces, as a way of life
- Banana garden and processing of sun dried banana as additional occupation
- Promoting the sufficient economy in village Moo 2, it should be expanded to other areas as well.
- Artesian wells for agriculture is another way of reducing production cost for agriculture

Community Organizations

- Sufficient Home stay Village aimed at tourism. It is possible to develop this group as per its Sufficient Economy Learning Center located within the community
- Community development will be based on the terrains of the community which are divided into three parts. The past management was proper namely planting the Jasmine Rice in villages Moo 9 and 10.

Meeting dismissed at 01.00 PM

Report of the Preparation of the Strategic Planning for Flood Management at Nakhon Pa Mak Sub-district

Project on Flood Countermeasures for Thai Agriculture Sector (JICA)

During 27-31 August 2012

At Somapa Pasak Resort, Pattana Nikom District, Lopburi Province

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1. Opening Ceremony by Representative from Ayutthaya Agriculture and Cooperatives

Mr.Nakorn Najaroon, the expert reported about the project that the project had launched on the 1st of March, 2012. Five target areas in these following provinces were chosen: Ayutthaya, Pitsanulok, Pathum Thani, Nakhon Pathom and Chinat. The project had completed the participatory community study and invited the representatives of the target groups of those pilot projects situated in various sub-districts in order to work together in designating the strategic plans for flood management. The government agencies in each designed areas would act as the coaches. Participants were from three sub-districts approximately 80 persons who would work out together until August 31st, 2012. The theme would focus on the brainstorming and workshop in the involved areas. Later the representative from Ayutthaya Agriculture and Cooperatives addressed the opening ceremony as below:

Dear Representatives from various agencies, all participants. I was pleased that the seminar presided me as a chairman of the conference today. It was already knew that we had worked together to resolve the problems and remedies from the outside agencies as well during the flood occurred in the past year. However, it might not be enough to compensate the damages done by the big flood. Cooperation from the government, private agencies and people were contributed to solve the flood problems. However, we could not live without water too. What shall we do to manage the water proficiently? The JICA then had set the projects to study to find the measurements to reduce the impacts of flood on the agricultural sector. For the public sector, adults, young adults, youth and children all had provided their contribution. Without the financial aids we could also passed through the crisis. Today we joined together again to prepare the strategic plans for the sub-district level. There were representatives from Pitsanulok and Ayutthaya Provinces and it was the local public stage that people could work and find out the appropriate flood countermeasures for this area. Personnaly, I would like to convey my special thanks to JICA Study Team and taskforces. Ministry of Agriculture and the Office of Agricultural Economics worked as the coordinators for the project. Thank you to everyone who joined the project. Hopefully, we all can share our opinions and build the cooperation network. Suppose there were anything beneficial contributed by the JICA Study Team and the taskforces, shall you all try to learn as much as you can and transfer the knowledge to others who did not join the seminar as well. I wished the seminar will be successful and can achieve the objectives set. I now declared the opening of the seminar. Thank you.

Cooperation between JICA and Thailand by the Project Team Leader

This project consisted of three major concepts about the pasture restoration for livestock, irrigational system improvement and the community study to find out the measurement in the adaptation to live with flood and to reduce damages for the agricultural sector. In addition, JICA also supported the preparation of the Master Plan for Chao Phraya River basin Management. This seminar was the first seminar which that the participants were from government, public and private sectors from three sub-districts: Singhanat Sub-district, Ayutthaya Province, Nakhon Pa Mak Sub-district and Chum Saeng Songkram Sub-district from Pitsanulok Province to brainstorm and exchange knowledge about the flood countermeasures in this area. I would like to thank to you all who had participated this seminar.

2. Background of the Project by the Project Manager

These projects were based on the Component 3 of the Strategic Plan emphasizing on search of the guidelines for reducing the impacts of the flood. After the projects implementation in all concerned areas and upon the completion of the projects, the results of the study would be taken into the preparation of the guidelines for the public use and to be used in other areas suffering from flood. There was a term, the “Resilience of community”, or what we would call the rapid recovery from disaster. Many people might have heard about the biggest earthquake in March ever happened in Japan. Houses were damaged. Some villages even erased from the areas. There were no injuries in some community due to the people escaped to the mountains whereas some villages were totally damaged. That earthquake caused many deaths and damaged households. Nowadays, they could recover and live their lives as usual. Some communities needed to evacuate in other areas and still had no idea where and how to live and cope with the ongoing depression. We had found that under the same situation, some communities could recover fast while others were still difficult and even could not adjust themselves at all. Therefore, the community resilience was a matter that we would find out the solutions and suitable operations. Disaster could happen anytime without warning no matter by natural or God that we really could not tell. However, we should have the well preparation to cope with it. For example, once we faced the Tsunami, we would run to the highlands. This was well recalled by the people since 200-300 years of the story about how and where to escape the Tsunami. What we should learn from our past was how we could survive from the disaster. Then we should adjust what we had learned into our daily life.

For the communities with gigantic damages from the disaster, the issue was that how to recover and back to life again in the current days. One practical method to help the community can be recovered rapidly was that building the network with the external agencies. For example, Tsunami in Japan had assistance from over the world including Thailand. For this big flood in Thailand considered a very gigantic flood. For the flood in Japan, normally was flashflood and people could not prepare themselves to evacuate in time due to the terrain was mountains mostly. Last year the flood in

Thailand had caused big damage to the industrial zone and many Japanese companies were affected. First we thought the flood caused from flashflood like what happened in Japan. But after the study then we knew that the flood was not disaster for all the time. Sometimes when it was not flood, many communities might have worried. During the flood season they could capture lots of fishes for selling and for household consumption. After the flood reduced, the soil would be more fertilized and that could give better yields. However, everybody all said that big flood 2011 was the worst due to it hit earlier than its usual schedule, farmers could not harvest their crops before the flood and long period of inundation affecting the transportation and daily life. No one knew whether the big flood will happen again in the future. Worse than that, we also were facing the global warming, so the flood could happen again. The government was worrying about how the farmers could adapt themselves and cope with the flood. If we learned from Tsunami in Japan about how people recovered and restored their community, then this would help us reduced the damages had it happened again.

The project had been operating for months already. Selecting the areas to study and operate the participatory community using the instrument so called the “PRA” (Participatory Rural Appraisal).

From the study it showed that many communities already had prepared the flood countermeasures in some certain levels. The Japanese experts also had experienced in many ways that would be beneficial to give consulting for each community. Besides, the project also collected the good models and practices from various communities of the countries successful from adaptation to the flood. That was why we would demonstrate here for everyone to learn from it. For the matter of knowledge, each community already had knowledge at a certain level and plus the technical knowledge trained by the government agencies in the areas, from experts and other communities. We would combine all the good things and knowledge together for the project. The outsiders could not give you all the knowledge and techniques, however. The seminar in this time would bring you the knowledge exchange that you can adjust into your daily life. For the meeting we hosted this time, it was expected that it would bring about the strategies for the flood management. What could we do to be successful under the strategies we were about to set together for the project. We had an amount of budget to be given to support the operation as well as the academicians from Thailand and experts from JICA. There might be many activities emerged today but we would select some pilot projects to be implemented in the communities.

The JICA would support the activities with these characteristics: enhancing the awareness of the community toward the disaster countermeasures, building the groups/ organizations and networks in which focusing on the principles of public benefits and mitigation for both flood and normal circumstances, including the activities which did not need many budgets. Despite of the project’s limited budgets, if there were some projects that might be related to the government’s policies, then it is recommended to work in coordination together with the government agencies such as the Sub-

district Administrative Organizations (or the Tambon Administrative Organizations – TAO). The project of JICA was scheduled to be completed in March 2013.

3. Greeting and Self-introduction Session

3.1 Target Groups/ Attendants

3.1.1 Singhanat Sub-district, Ayutthaya Province, members included representatives from the District Agricultural Extension Office, Village Headmen, members of Singhanat Sub-district Administrative Organization (TAO), local intellectuals, soil experts, Organic Vegetable Group and Goat Raising Group.

3.1.2 Nakhon Pa Mak Province, members include representatives from the heads and the staff of the TAO, Head of Civil Work, Chief Executive of the TAO, Chairman, members of the TAO, Village headmen and deputy village headmen, farmers and members of the District Agricultural Extension Office.

3.1.3 Chum Saeng Songkram Sub-fidtrict, Pitsanulok Province, members include representatives from staff of the District Agricultural Extension Office, Disaster Prevention and Mitigation Department, Chief Executive of the TAO, Civil Works Technician, Thai Bang Kaew Dog Raising Group.

3.1.4 Representatives from the government agencies consisting of the Office of Ayutthaya Provincial Agriculture and Cooperatives, Director of the Office of Agricultural Economics Area 7 Chainat Province, Pitsanuloke Provincial Livestock Office, Ayutthaya Land Development Department, Lat Bua Luang District, Pitsanulok Royal Irrigation Department, Ayutthaya Rice Research Center and Ayutthaya Fisheries Office

3.1.5 Speakers

1.	Mr.Akkrawit Muenkul	Director of the Learning Center, Life University, Udon Thani Campus
2.	Mr.Sakorn Songma	Coordinator of Kon Phiang Prai Foundation
3.	Ms.Sirirasda Thammarasdikul	Assistant Director of Research Center for Community Development, Siam University
4.	Mr.Kittikorn Noipin	Academician at RID 13, Ratchaburi Province
5.	Mr.Sanya Soisena	Lecturer at Life University, Udon Thani Campus
6.	Mr.Nattawut Uppa	Project Coordinator in Pitsanulok Province
7.	Ms.Kanueng Wanwiset	Academician at Department of Environmental Quality Promotion, Pitsanulok Province

Facilitators

1.	Mr.Nakorn Najaroon	Disaster Management Expert
2.	Mr.Oda Tesuro	Project Manager for Strategic Planning for Flood Countermeasures

4. Knowing and Adjustment of the Expectations of the Seminar

4.2 Expectations of the Seminar

4.2.1 Nakhon Pa Mak Sub-district (Demands)

- In need of canals and lakes to store water during the drought
- In search of approaches to prevent flood and to store water for the use in the drought
- Knowledge to develop the villages
- Extra jobs and incomes
- Monetary and occupational supports
- Plants that can grow well with the local conditions
- Wanted to live with water without any problems
- Knowledge about water management and budget to be allotted for dredging the canals
- Solving the flood and drought problems affecting the farmers
- Construction of the dam with suitable capacity for the area
- Water gate repairing at village Moo 5 to be proficiently store water

4.2.2. Chum Saeng Songkram Sub-district (Demands)

- Guidelines for living with water
- Solutions for solving flood and drought problems
- Preparation for prompt assistance to the flood victims
- Knowledge and approaches for solving flood problems permanently and sustainably
- Guidelines for building water management network
- Wished that JICA can contribute helps people in the community to be able to live with water
- Knowledge for solving flood problems
- Wanted to accelerate the project to mitigate the drought and flood
- Wanted to develop the eco-tourism and agro-tourism attractions
- Wanted to develop the irrigation system to connect the Ping, Wang and Yom Rivers

4.2.3 Singhanat Sub-district (Demands)

- In need of drinkable water supply
- Wanted to get promoted in their occupations related to plants, animals and rice plantation
- Wanted the Reliance Center and the Nursing Center in the community
- Wanted mobile toilets for the community
- Promotion of the Sufficient Economy
- Survival Kit and dry food
- Dike for the Sub-district area
- Water gates at the irrigational canals to prevent flood

Summary of Expectations from the Seminar

1. **Knowledge about Water Management**
   - Knowledge about water management
   - Knowledge about solving the flood problems and living with the flood happily
   - Guidelines for income generating
   - Development the community tourist attractions
2. **Direction of Plan for Sustainable Flood/ Drought Countermeasure**
   - Flood/ Drought Management Plans
   - Preparation for the disaster aids
3. **Building Water Management Network**
   - Guidelines for building the networks and flood countermeasure
4. **Roles of JICA in Solving Flood Problems**
   - Concepts of Japanese people in solving flood problems
   - Budget support for improvement the water resources, dredging the canals and repairing water gates (weirs)

5. Purposes of the Meeting

1. To review the current situations and flood situations of each sub-district
2. To set the strategic plan in relieving the crisis and adjustment the lifestyle of living with the flood
3. To work on the activity and operational planning of the pilot projects in cooperation with the community and JICA study Team
4. To create an understanding of the project and to define the mechanisms at work and the cooperation between the community and the project

6. Meeting Schedule during 27-31 August 2012

Date	08.00-12.00 (AM)	13.00-17.00 (PM)
27	• Arrival at the accommodation	• Registration
28	• Opening ceremony/ Special lecture by Office of the Agriculture and Cooperatives • Understanding of missions of the Project by Mr.Oda - Project Manager • Clarify the expectations and objectives/ schedule of the seminar • Make understanding about the "Strategic Planning and the Power Building of the Community" By Acting Second Lieutenant Akkrawit Muenkul	Divided into 3 groups for data synthesis from the PRA to SWOT analysis • Current flood situations of the sub-district • Make the draft of the "Basic Vision" • Analysis of the internal factors: Strengths and Weaknesses • Analysis of the external factors: Opportunities and Threats
29	• Main meeting room: guidelines for planning the activities, strategies and visions of the flood countermeasure By Acting Second Lieutenant Akkrawit Muenkul	• Draft the Strategic Plan of the Sub-district's Flood Crisis Management (strategic vision, activity / project) • Prepare the pilot project activity plan

		• Plan the workshops
30	• Workshop at the New Theory Project od Mongkol Chai Pattana Ram Temple, Chaloem Phra Kiat District	• Workshop at the Pasak PathanaFarmer Group and Saraburi Networks
31	• Review the Strategic and Operational Plans of each sub-district (small meeting rooms)	• Set the format, mechanisms and roles in working together between the Project and the local agencies • Summarize and close the seminar

Build Up the Friendship Activity: Who are you?

□ Δ Z O

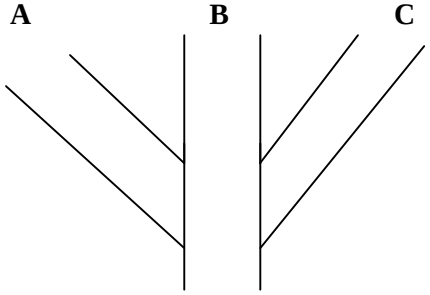
The speaker raised a question. Participants would have to raise their hands for the picture they liked the most.

- Square: there were three people who showed their hands for it, this picture represented that the person was quite cling to the stability of work and being orderly, neat and tidy.
- The letter Z: there were four people who showed their hands for it. It represented that they were quite interested in the income making and often thinking about how to obtain the goals.
- Triangle: there were seven people who showed their hands for it. It represented they were thorough, active, wise and loyal.
- The circle: there were more than half of the participants who showed their hands for it. It represented that they were fun loving, love to eat and drink and as well as the love of the music.

The speaker shared about the differences of the people. Most participants preferred the circle shape with lively characteristics. In working together often required teamwork members of different characteristics in order to blend the strengths and weaknesses. Thus, in working with the different types of people should connect some common shares and reserve some points. In the latter session, the speaker introduced to the content of the preparation of the strategy.

The Preparation of the Strategic plans and the Empowering the Community towards the Flood Management

The strategic planning primitively began by Volk. Such administrative tool was then brought into Thailand during the government reformation. Whether the strategic plan was the same common plan? The speaker presented the following figure:



Which direction that you would want to go? The participants had shown their opinions differently. For example, walk straight because it was the main way. However, there was no wrong answer for this question because we did not know where we were going. In the morning session, there was brainstorming on the expectation topic to find out whether people had the same expectations. It would be beneficial for adjusting the expectations to be the same. At the same time, there was a point to consider whether we had the same goals and understanding on the topic of flood management.

Impacts of Working without the Clear Purposes and Approaches

- The real problems and needs will not be resolved and taken any actions
- Worthlessly consumable budgets
- Use more man power worthlessly
- Waste the time
- Loss/ change resource as a result of the implementation of activities such as biological variety/ soil/ water/ forest, etc.
- ؞Lose feeling when have to work repeatedly about the same old things

Comparison of the Old and New Management Styles

Old Management Style	New Management Style
Inputs	Outcomes
Project	Outputs
Outputs	Project
Outcomes	Inputs

7. Strategic Planning

7.1 Definitions

7.1.1 Planning refers to the analysis of the current situations to predict the future and to set the best preparation or practices for the efficient operation.

7.1.2 Strategy refers to an operation which is not an ordinary one but with the special thoughts and designs to get only the best practices that can change all types of circumstances to be beneficial to the agencies, no matter that agency is amidst any kinds of situations, benefit or loss.

Therefore, the strategic planning is the current situation analysis by foreseeing, predicting and finding solutions in advance that can improve the situations.

7.2 Importance of the Strategic Planning

- Working as the concept “One who knows the enemy and knows himself will not be in danger in a hundred battles”
- The strategy initiates the certain clear-cut goal and with the vision, mission and strategy as the guidelines
- The strategy is the best practice for solving problems and leading to the success

- The strategy brings the obviousness to the missions and roles of the involved persons
- The strategy makes the clear guidelines for measurement and assessment

7.3 Principles for the Preparation of the Strategic Planning

1. Study the current status (Where are we now?)
2. Setting the direction (Where would we like to be?)
3. Defining the strategies (What issues do we need to address?)
4. Planning the operations (What actions we must take to get there?)

7.3.1 Study the Current status (Where are we now?)

- Study the internal factors:
  - Our strengths : what are our available capitals to be used to reduce he impacts from the flood
  - Our weaknesses: what issues are considered as our weaknesses?
- Study the external factors influencing the success and failure of the flood problem solving that we need to proceed the project

7.3.2 Setting the Direction (Where would we like to be?)

Study the external factors influencing the success and failure of the flood problem solving that we need to proceed the project, by consider:

- Our potential opportunities: consider which matters/ organizations. Policies/ situations that could be useful in the flood management for our community
- Our threats: consider what factors that obstructing the flood management and make the problem solving failed

8. Preparation of the Strategic Plans of Nakhon Pa Mak Sub-district

8.1 Review of the Participatory Community Case Studies

Development and history of Nakhon Pa Mak Sub-district, they were big flood every ten years and recently happened in the year 2011. That year the community faced the hardness and worse impacts than ever due to the support flood from the Nan River and Noen Ma PrangHill flew into the areas of the community. Most of the residents had the agricultural occupation. There were four main roads for road transportation within the community. The potential and significant water resources in the community consisted of Kwai Wang Thong river, Small Krong Kreng Canal and Big Krong Kreng Canal with conjoined at the village Moo 5 at Sam Ruan Gate before entering into the Nan River from Ta Na Gate.

From the study, it was found that the areas of the community could be divided into three groups: dry highlands in village Moo 9 and 10 that can plant rice just once a year, mostly relying on the rain although there were the attempts to make the artesian wells but it was too deep to do so. During the break from rice plantation, people would go work in Bangkok and the rest would do jobs

in general like being hired. The second group: the lowlands, this area can do rice plantation three times per year due to its fertility. Water gained from the canals, artesian wells and natural rain. The last group was the group where they can plant rice twice a year. Not much affected from the flood. People grew sugar canes and banana to supply for the sugar factory located in Phai Lom Sub-district. The yield was approximately 70-90 buckets per Rai. Problem found in rice plantation was that the Rice Mortgage Scheme was not related to the production rounds and flood season. Farmers later learned to adjust it by planting the short-aged rice but many pests like insects, worms and weedy rice, etc. Many farmers had to rent the plots so it costed them 5,600 baht per one Rai cultivation. Problems found in agriculture circle were: high production cost and increasing labor wages, lack of soil fertility and environmental conservation, chemicals used in agriculture contaminated in the community water resources, the outbreaks of the diseases in rice and pest, weedy rice, decreasing costs of the product, the agricultural areas often faced flood and water shortage during the drought, renting lad for the agriculture, etc.

From the brainstorming, suggestions for water management were as follows: improving the water management in the community by making dredging the Krong Kreng Canal for water storage, work in accordance with the local area on water management, adjusting the Rice Mortgage Scheme to suit the water availability, dredging the Wang Nam Sai canal and accelerating the irrigational project, establishment of the Seed Bank and demonstrating the organic rice cultivation, promoting farmers to unite for the power of bargain, etc. From the community case study, the JICA Study Team had proposed the suggestions to the community as following: promoting the small irrigation systems, preparation of the community disaster management plan, study on the rice varieties and crops to suit the community, development the personnel exclusively for the disaster management, hosting the meeting/ seminar to collect all suggestions and brainstorming from the community for the purposes of planning for development. Later the speaker led to the process of the designating the visions for the community by raising some questions and allowed the participants to refer their opinions. Details were as below.

8.2 Defining the Visions

Things that we would like to see and the image set for Nakhon Pa Mak sub-district

- Having adequate water for the dry season and having the water reservoirs in the community
- People in the community had made a career out of the flood
- Having the abundant sources of food, good road transportation and available infrastructure for people in the community
- Drinking and consuming water always available for people in the community
- People in the community were expected to be potential in water management

- People wished to have the proficient equipment and tools for the water management
- People wished to have the water management happened in the community

9. The Environmental Analysis of Nakhon Pa Mak sub-district

This could be done by using the brainstorming for ideas, data and the exchange of the knowledge.

Suggestions from the meeting were summarized as follows:

The Environmental Analysis of Nakhon Pa Mak Sub-district

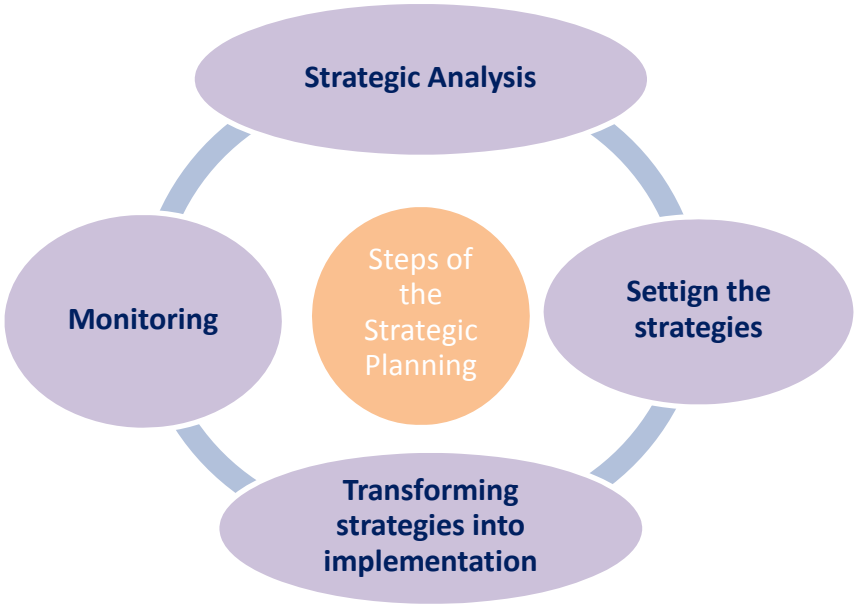
Strengths	**Weaknesses**
• Kwaei Wang Thong River, Small Krong Kreng River and Big Krong Kreng River flowing through the community and fertilizing the community. • People in the community were united, began to aware and alert about the flood, therefore they had adjusted the rice planting rounds to two times per year and the second round was during March-April • Local organizations and administrators, agricultural agencies in the areas gave priority in solving the flood/ drought problems • Having the model community/ groups/ organizations about the sufficient economy, home stay, saving group/ village funds, frog raising group, well-known sun-dried banana processing group in villages Moo 2, 11 and 13 • The sub-district was well-known as the source of the best Jasmine Rice in Pitsanulok Province • The community had the unity and the reliable **community leader/ backbones** • The community could plant rice many times per year approximately 2-3 times/ year • The community always had the abundant natural food resources	• Kwai Wang Thong River, Small Krong Kreng Canal and Big Krong Kreng Canal have been shallow and cannot store enough water • Kwai Wang Thong River did not have the catchment areas or areas for retaining water drained from Wang Nam Sai Gate • Sam Ruan Gate could not store water efficiently (RID already transferred the management right to the TAO) • The community could not manage flood and drought on their own (due to gate damaged and shallow canals) • **During the drought, the community did not have adequate water for rice farming particularly during the months of March-April (to plant rice prior the flood)** • Dirty and poor quality of water supply and not adequate for the consumption in the dry season around March-April. • The outbreaks of the weedy rice, aphids, and that affected the villagers to be unable to keep their rice seeds for next planting season. • After the flood, villagers lacked of the good rice seeds for the next planting season and could not plant in time • Budgets allocated from the local administrative organizations were not adequate to solve problems caused from flood, drought and development the road transportation. • Natural water resources contaminated toxic chemicals, villagers could not use water from those sources. • Lack of the water management contingent plan for flood and drought • Higher production costs especially the cost in water management during the drought
Opportunities	**Threats**
• The government emphasizes the water sources development and the flood/ drought problem solving policies • The policy of irrigational expanding of the Kwai	• The rounds of the Rice mortgage scheme did not related to the rice plantation during the flood • Marketing mechanisms that farmers do not

2. SWOT Analysis

Strengths	Weaknesses
Noi Dam (on process) to make available water during the drought • There are other outside agencies that provide cooperation and support involving the technical knowledge for flood and drought such as the JICA which provides the budget and Naresuan University. • The government's Rice Mortgage Scheme and high selling cost of rice approximately 10,000 baht per cart • Flood/ Natural Disaster Compensation Policy of the government • The media have publicized the big flood in Thailand and made the world recognize Thailand • Three-Year-Debt Moratorium Policy in compensation for the damages from the flood • Other NGOs can provide the budgets to the projects related to the flood/ drought management by the community • Wang Nam Sai Gate is the water storing area before draining to Kwai Wang Thong and Krong Kreng Canals	get fair shares from the middlemen such as the standard measurement of humidity and weighting. • Production materials such as fertilizers, pesticides, fuel, agricultural equipment, etc. are more expensive than before. • Flood occurred from flash flood flew from Noen Ma Prang Hill (Pink Canal) and and the high tide from Nan Province at the Ta Na Gate • Lack of information and participation in opening and closing tasks of Ta Na Gate • Support and assistance for flood/ drought management from involved agencies lack of the continuing • Unclear practices in the policy making. For example, in the catchment areas. • Unclear and unreliable information and communication about the weather • The Global warming affecting the weather changes and the rice plantation that cannot plan ahead (very cold in the winter, unusual raining, flood, etc.)

29 August, 2012

Review of the Preparation of the Strategy



The Tzun Wu's principle about the art of war meaning that we had to know the enemy as this had been implemented into the noodle selling as the example. The meeting had prosposted what we need to consider were as follows:

- Investment
- Tastes
- Target groups

- Adverting
- Shops/ locations
- Customer services

Suppose we were very good in making a noodle, used to work at the noodle shop in Nonthaburi Province which was located near the textile factory with the number of employees about 5,000 persons. Customers were interested in Nonthaburi noodle shops. But we did not have money to invest in open a noodle shop. There were already ten noodle shops at the factory canteen. Whether we open a noodle shop? What should be the criteria for decision making? Was this a good example of the strategy? Whether or not our noodle shop could get profit or loss? If we would ask a loan from the father-in-law, whether his answer would be yes? If we use the principle of considering the strength and opportunity, then it was called the proactive strategy. If our wife had 500,000 baht deposited in the bank, we would call it strength, whereas if our father-in-law had 10 million baht, then it was called opportunity. In case the noodle shop owner in Nonthaburi Province would have opened the opportunity for us and would have supported to expand the new shops in the community, these considered as the opportunity and it was called the strategic planning. When we had to analyze the strategy, we had to digest the information thoroughly so that we could find the answers and solutions for a certain problem. In conclusion, the strategic planning refers to the "information is power".

10. Defining the Strategies (What issues do we need to address?)

10.1 using the SWOT technique in defining the strategies

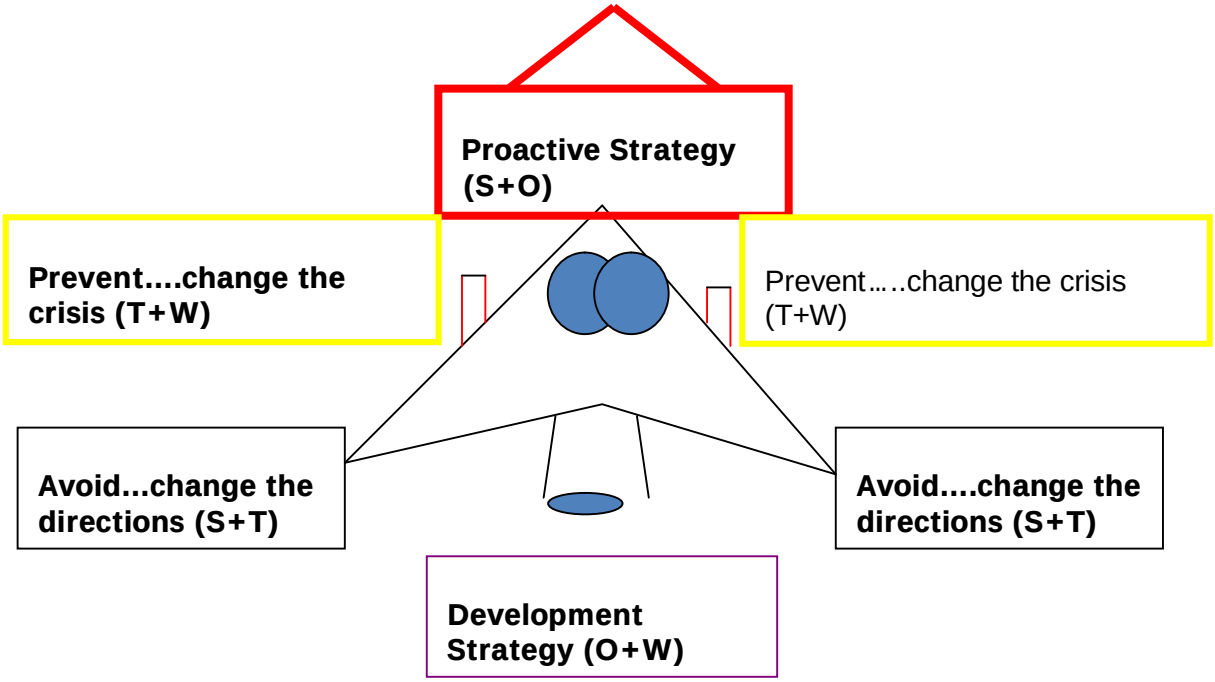
		Strengths (S)	Weaknesses (W)
Opportunity (O)	O1	S1	W1
		Which strengths can be used to create the opportunity (extending the opportunity) (S+O) Proactive Strategy	Use the opportunity to cover the weaknesses in order to create the success (O+W) (Development Strategy)
Threats (T)	T1	Preventive Strategy (S+T)	Avoidance strategy or try to make crisis opportunity (W+T)

Samples of the Strategic Defining

	S	**W**
	• Having good medical specialists • Acceptance of the works • Personnel unity	• The organization leaders cling to their own opinions • Few budgets, less citizens • Outdated tools • Administration system not transparent
O		
• Good economy in the district • Convenient transportation • External assessment system • Health promotion policy	• Expanding the specific medical cares	• Co-funding from the community or local organizations
T		
• The 30 baht health care	• Publicizing the hospital's	• Development the inter

scheme unfavorable • Policy of protecting the rights of patients • Politicians urges villagers to complain • Media proclaim the complaints	work operations	hospital transfer service

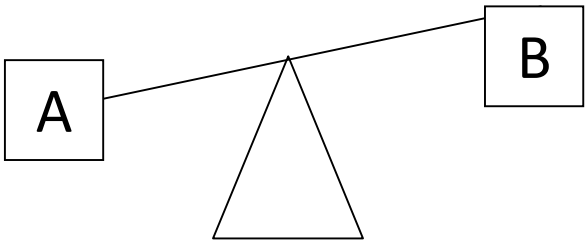
10.2 Strategic Plans



The leading strategy was the reconsideration of the opportunity and strength. The good strategic plan can be changed depending on the circumstances.

10.3 Strategic Planning Process

Creative Thinking



The speaker raised the question to the meeting "How to make A equal to B?". The meeting proposed as follows:

- Add weight to B
- Reduce weight of A
- A plus B and divided by weight
- Take A and B out of the scale
- Move the handle to A
- Take off the supporting post and place the A and B on the floor

  From the meeting there were some opinions had drawn attention from the participants. It was found that the last proposal to take away the supporting post is the most interesting idea. Therefore, creative thinking was practical and modern which was different from the past. In conclusion, the good strategy did not need to be the same but must be able to solve problems.

12. Review of the Environment and Sorting the Importances

After the brainstorming session for the environment analysis of the sub-district, the meeting had reviewed and concluded the Tambon environment once again in order to set the strategies as shown below:

Summary of the Environmental Analysis of Nakhon Pa Mak Sub-district

Strengths	Weaknesses
1. Kwaei Wang Thong River, Small Krong Kreng River and Big Krong Kreng River flowing through the community and fertilizing the community as well. The community is fertile and adequate water for every year and the villagers can grow rice 2-3 times per year. 2. Model community/ organizations operating about the sufficient economy as the home stay service, saving group/ village fund, frog raising group and sun dried banana making group in villages Moo 2, 11 and 13. 3. The community has cooperated and integrated to solve flood problems (villages moo 5, 6, 7, 8, 9, 10, 11 and 13) 4. The community has the abundant natural	**1.** Kwai Wang Thong River, Small Krong Kreng Canal and Big Krong Kreng Canal have been shallow and cannot store enough water for agriculture and rice farming especially during March-April (to plant rice farming to avoid flood). 2. Sam Ruan Gate (located at Big Krong Kreng Canal) has been damaged and could not store water efficiently. 3. The community does not have the water management plans for both flood and drought. 4. Water supply quality is not clean, bad quality and not sufficient for the community consumption of people in villages Moo 8, 3, 10, 11 and 13. 5. The outbreaks of the rice pests, weedy rice and aphids resulting in decreasing yields,

source of food for the community people throughout the whole year 5. People in the community contribute their unity, participation and adaptation, including the search for alternative lifestyles in the midst of the flood and drought 6. Local authorities, administrators and government agencies in the area give priority to the flood and drought management problems solving 7. In the area of Pistanulok Province, Nakhon Pa Mak Sub-district has reputation about the Jasmine Rice with Good Agriculture Practices (GAP) (Villages Moo 9 and 10)	higher production costs and farmers cannot keep rice seeds for the next round plantation. 6. Most farmers use high amount of chemicals in agriculture that affecting their health and environment in the community 7. Budgets of the local organizations are not sufficient for flood/ drought management and the transportation development. 8. Higher production costs particularly production materials such as fertilizers, pesticides, fuels for water management during the drought. 9. Natural water reservoirs are contaminated by chemicals. Villagers dare not to use water from those natural reservoirs. 10. In the area there are 20 public swamps but shallow and cannot store water.
Opportunities	**Threats**
1. There are other outside agencies that provide cooperation and support involving the technical knowledge for flood and drought such as the JICA which provides the budget and Naresuan University. 2. The government emphasizes the water sources development and the flood/ drought problem solving policies 3. The Provincial Administrative Organization has roles to support budgets in solving the flood/ drought problems 4. Wang Nam Sai Gate is the water storing area before draining to Kwai Wang Thong and Krong Kreng Canals 5. The policy of irrigational expanding of the Kwai Noi Dam (on process) to make available water during the drought 6. The media have publicized the big flood in Thailand and made the world recognize Thailand 7. Other NGOs can provide the budgets to the projects related to the flood/ drought management for the community such as the Thai Health Promotion Foundation, Hydro and Agro Informatics Institute (HAII), United Nations (UN) and Community Organization Development Institute (Public Organization) 8. Bang Kra thum District has reputation about the sun dried banana products 9. The government's Rice Mortgage Scheme and high selling cost of rice approximately 10,000 baht per cart 10. Flood/ Natural Disaster Compensation Policy of the government 11. Three-Year-Debt Moratorium Policy in compensation for the damages from the flood 12. The Rice Mortgage Scheme available two times per year	1. Flood occurred from flash flood flew from Noen Ma Prang Hill (Pink Canal) and and the high tide from Nan Province at the Ta Na Gate 2. Support and assistance for flood/ drought management from involved agencies lack of the continuing 3. Lack of information and participation in opening and closing tasks of Ta Na Gate 4. Marketing mechanisms that farmers do not get fair shares from the middlemen such as the standard measurement of humidity and weighting. 5. Production materials such as fertilizers, pesticides, fuel, agricultural equipment, etc. are more expensive than before. 6. Unclear and unreliable information and communication about the weather 7. Unclear practices in the policy making. For example, in the catchment areas. 8. The Global warming affecting the weather changes and the rice plantation that cannot plan ahead (very cold in the winter, unusual raining, flood, etc.) 9. Dirt and chemical particles contaminated in the air

1. Visions of Nakhon Pa Mak Sub-district

Nakhon Pa Mak will be the model of sufficient economy learning center and well-being with the stable organizations in proficient flood/ drought management, being the source of good Jasmine rice, including the secured and safety occupation for life under the abundance of the natural resources and good environment.

Setting the Proactive Strategies of Nakhon Pa Mak Sub-district

Strengths (S)	Opportunities (O)	Proactive Strategies
1. Kwaei Wang Thong River, Small Krong Kreng River and Big Krong Kreng River flowing through the community and fertilizing the community as well. The community is fertile and adequate water for every year and the villagers can grow rice 2-3 times per year. 8. Model community/ organizations operating about the sufficient economy as the home stay service, saving group/ village fund, frog raising group and sun dried banana making group in villages Moo 2, 11 and 13. 9. The community has cooperated and integrated to solve flood problems (villages moo 5, 6, 7, 8, 9, 10, 11 and 13) 10. The community has the abundant natural source of food for the community people throughout the whole year 11. People in the community contribute their unity, participation and adaptation, including the search for alternative lifestyles in the midst of the flood and drought 12. Local authorities, administrators and government agencies in the area give priority to the flood and drought management problems solving 13. In the area of Pistanulok Province,	1. There are other outside agencies that provide cooperation and support involving the technical knowledge for flood and drought such as the JICA which provides the budget and Naresuan University. 2. The government emphasizes the water sources development and the flood/ drought problem solving policies 3. The Provincial Administrative Organization has roles to support budgets in solving the flood/ drought problems 4. Wang Nam Sai Gate is the water storing area before draining to Kwai Wang Thong and Krong Kreng Canals 5. The policy of irrigational expanding of the Kwai Noi Dam (on process) to make available water during the drought 6. The media have publicized the big flood in Thailand and made the world recognize Thailand 7. Other NGOs can provide the budgets to the projects related to the flood/ drought management for the community such as the Thai Health Promotion Foundation, Hydro and Agro Informatics Institute (HAII), United Nations (UN) and Community Organization Development Institute (Public Organization) 8. Bang Kra thum District has reputation about the sun dried banana products 9. The government's Rice Mortgage Scheme and	1.Development the natural water management to reduce impacts on agriculture caused by flood and drought • Preparing the Master Plan for Flood/ Drought Management of the sub-district • Build a dike to store water in village Moo 12 • Sam Ruan Gate repairing • Dredging the public lake located in the community 2. Promoting and developing the tourism operated by the community • Promote and developing the capacity of the tourism operated by the community in villages Moo 2,11 and 13 • Hosting the "Boat Racing, Eating Fish-Dried Banana and Jasmine Rice 105 Nakhon Pa Mak Festival" 3.Promoting and developing the agriculture in accordance to the potentiality of flooded and drought areas and must not affect to the life and environment 3.1Promoting the organic Jasmine Rice planting • Developing the markets and Jasmine Rice processed products • Promoting and expanding the areas for Jasmine rice planting to produce rice seeds and for consumption • Seeking and building the network for organic Jasmine Rice both domestic and international

2. SWOT Analysis

Strengths (S)	Opportunities (O)	Proactive Strategies
Nakhon Pa Mak Sub-district has reputation about the Jasmine Rice with Good Agriculture Practices (GAP) (Villages Moo 9 and 10)	high selling cost of rice approximately 10,000 baht per cart 10. Flood/ Natural Disaster Compensation Policy of the government 11. Three-Year-Debt Moratorium Policy in compensation for the damages from the flood 12. The Rice Mortgage Scheme available two times per year	3.2 Reducing the use of the chemicals of the community • Hosting the campaign to reduce the use of hazardous chemicals for agriculture • Establishment the pilot groups of organic rice planting in village Moo 2 • Developing the Environmental Friendly Local Agriculture Curriculum in cooperation with the schools in the community 4.Reviving the nature and environment of the community • Extending the concept of water reservoirs and fish varieties in the community • Promoting the forest planting using the local plant varieties like “Kra Thum” *Neonauclea sessifolia* (Roxb.) Merr in the public areas and along the creeks

The Development Strategy of Nakhon Pa Mak Sub-district

Weaknesses (W)	Opportunities (O)	Development Strategies
1. Kwai Wang Thong River, Small Krong Kreng Canal and Big Krong Kreng Canal have been shallow and cannot store enough water for agriculture and rice farming especially during March-April (to plant rice farming to avoid flood). 2. Sam Ruan Gate (located at Big Krong Kreng Canal) has been damaged and could not store water efficiently. 3. The community does not have the water management plans for both flood and drought. 4. Water supply quality is not clean, bad quality and not sufficient for the community consumption of people in villages Moo 8, 3, 10, 11 and 13. 5. The outbreaks of the rice pests, weedy rice and aphids resulting in decreasing yields, higher production costs and farmers cannot keep rice seeds for the next round plantation. 6. Most farmers use high amount of chemicals in agriculture that affecting their health and environment in the community 7. Budgets of the local organizations are not sufficient for flood/ drought management and the transportation development. 8. Higher production costs particularly production materials such as fertilizers, pesticides, fuels for water management during the drought. 9. Natural water reservoirs are contaminated by chemicals. Villagers dare not to use water from those natural reservoirs. 10. In the area there are 20 public swamps but shallow and cannot store water.	1. Outside agencies contribute their cooperation and support about the technical knowledge on flood and drought such as JICA which has provided budgets, Naresuan University, etc. 2. The government gives priority to the water reservoir development and flood/ drought solving policies 3. Provincial Administrative Organization (PAO) is responsible for supporting the budgets in solving the flood/ drought 4. Wang Nam Sai Gate is the catchment area before the drainage into the Kwai Wangthong River and Krong Kreng Canal 5. The policy to extend the Kwai Noi Dam (on process) will facilitate the sufficient water during the dry season 6. The media have publicized the big flood in Thailand and made the world recognize Thailand 7. Other NGOs can provide the budgets to the projects related to the flood/ drought management for the community such as the Thai Health Promotion Foundation, Hydro and Agro Informatics Institute (HAII), United Nations (UN) and Community Organization Development Institute (Public Organization) 8. Bang Krathum District is well known for its sun dried banana products nationwide 9. The Rice Mortgage Scheme of the government and selling price costs high price approximately 10,000 baht per cart 10. The government's Compensation Policy for the damages from flood/ natural disaster 11. Three-Year-Debt Moratorium Policy in compensation to the flood disasters 12. The Rice Mortgage Scheme operates twice a year 13. Trends of health care of Thai people and the world's 14. The government's policy to promote the green market/ safety markets	1. **Promoting and developing the markets for community's quality products** • Seeking the markets for toxic chemical free products • Publicizing and supporting knowledge about planting the organic rice • Seeking the consumer and maker of safety food networks 2. **Developing the quality of drinking/ consuming water for the community** • Study to find the best practices for the development of the water supply to serve the community • Expanding the water supply in the villages facing the inadequate water availability • Promoting the safety drinking water for the community **3 Reducing the outbreak of the rice pests** • Study and development the methods to reduce the outbreaks of the weedy rice • Making the demonstrated plots or experimental plots in the community • Hosting the discussion panel to find the answers for the community • Making the experimental plots of short-aged plants during the break from the rice plantation

2. SWOT Analysis

Analysis of Preventive Strategy of Nakhon Pa Mak Sub-district

Threats (T)	Strengths (S)	Preventive Strategies
1. Flood occurred from flash flood flew from Noen Ma Prang Hill (Pink Canal) and and the high tide from Nan Province at the Ta Na Gate 2. Support and assistance for flood/ drought management from involved agencies lack of the continuing 3. Lack of information and participation in opening and closing tasks of Ta Na Gate 4. Marketing mechanisms that farmers do not get fair shares from the middlemen such as the standard measurement of humidity and weighting. 5. Production materials such as fertilizers, pesticides, fuel, agricultural equipment, etc. are more expensive than before. 6. Unclear and unreliable information and communication about the weather 7. Unclear practices in the policy making. For example, in the catchment areas. 8. The Global warming affecting the weather changes and the rice plantation that cannot plan ahead (very cold in the winter, unusual raining, flood, etc.) 9. Dirt and chemical particles contaminated in the air	1. Kwaei Wang Thong River, Small Krong Kreng River and Big Krong Kreng River flowing through the community and fertilizing the community as well. The community is fertile and adequate water for every year and the villagers can grow rice 2-3 times per year. 2. Model community/ organizations operating about the sufficient economy as the home stay service, saving group/ village fund, frog raising group and sun dried banana making group in villages Moo 2, 11 and 13. 3. The community has cooperated and integrated to solve flood problems (villages moo 5, 6, 7, 8, 9, 10, 11 and 13) 4. The community has the abundant natural source of food for the community people throughout the whole year 5. People in the community contribute their unity, participation and adaptation, including the search for alternative lifestyles in the midst of the flood and drought 6. Local authorities, administrators and government agencies in the area give priority to the flood and drought management problems solving 7. In the area of Pistanulok Province, Nakhon Pa Mak Sub-district has reputation about the Jasmine Rice with Good Agriculture Practices (GAP) (Villages Moo 9 and 10)	1. Preparation the Contingency Plan for flood and drought 2. Development the water reservoirs • Bueng Salu Monkey Cheek Project in villages Moo 8 and Moo 9 to catch water from Noen Ma Prang Hill (Pink Canal) 3.Seeking the methods of self reliance on production • Reduce the rice production cost and agriculture by promoting the use of the bio-fertilizer in rice plantation and agriculture • Improving potentials, knowledge and skills of farmers in the community • Strengthening groups/ farmer organizations, bio-fertilizer group in the community 5. promoting the conservation of the natural resources and environment in order to reduce the global warming • Expand and increase the forest areas and green areas for the community • Planting rice which reducing the global warming, reducing the straw burning, using the bio-fertilizer or composting • Publicizing the promoting the rice planting and Jasmine rice planting to reduce the global warming 6.Reviving the lifestyles of living, sufficient living to promote the self-reliance of the household and the community • Promoting the floating garden, hanging lemon grasses and sweet basil • Promoting the food crops planting for household consumption • Promoting the sustaining areas at the household, community and sub-district levels 7. Building cooperation with the factories in the areas to care more for life quality and environment for the people in the community • Requesting for the budget to produce safety drinking water in the community

Analysis of Avoidance Strategy or Turning the Crisis to Opportunity

Weaknesses (W)	Threats (T)	Avoidance Strategy to Turn Crisis to Opportunity
1. Kwai Wang Thong River, Small Krong Kreng Canal and Big Krong Kreng Canal have been shallow and cannot store enough water for agriculture and rice farming especially during March-April (to plant rice farming to avoid flood). 2. Sam Ruan Gate (located at Big Krong Kreng Canal) has been damaged and could not store water efficiently. 3. The community does not have the water management plans for both flood and drought. 4. Water supply quality is not clean, bad quality and not sufficient for the community consumption of people in villages Moo 8, 3, 10, 11 and 13. 5. The outbreaks of the rice pests, weedy rice and aphids resulting in decreasing yields, higher production costs and farmers cannot keep rice seeds for the next round plantation. 6. Most farmers use high amount of chemicals in agriculture that affecting their health and environment in the community 7. Budgets of the local organizations are not sufficient for flood/ drought management and the transportation development. 8. Higher production costs particularly production materials such as fertilizers, pesticides, fuels for water management during the drought. 9. Natural water reservoirs are contaminated by chemicals. Villagers dare not to use water from those natural reservoirs. 10. In the area there are 20 public swamps but shallow and cannot store water.	1. Flood occurred from flash flood flew from Noen Ma Prang Hill (Pink Canal) and and the high tide from Nan Province at the Ta Na Gate 2. Support and assistance for flood/ drought management from involved agencies lack of the continuing 3. Lack of information and participation in opening and closing tasks of Ta Na Gate 4. Marketing mechanisms that farmers do not get fair shares from the middlemen such as the standard measurement of humidity and weighting. 5. Production materials such as fertilizers, pesticides, fuel, agricultural equipment, etc. are more expensive than before. 6. Unclear and unreliable information and communication about the weather 7. Unclear practices in the policy making. For example, in the catchment areas. 8. The Global warming affecting the weather changes and the rice plantation that cannot plan ahead (very cold in the winter, unusual raining, flood, etc.) 9. Dirt and chemical particles contaminated in the air	1. Enhancing the participation of the community in water management: • Setting the Community Water Management Committee • Building the water management network called “Water Friends Network” • Conservation project for the Kwai Wang Thong River and Krong Kreng Canal 2. Demonstrated plot of the “Planting only once but harvest three times”

Pilot Project Plans of Nakhon Pa Mak Sub-district, Bang Krathum District, Pitsanulok Province

Strategies	Reasons	Activities	Contributed Agencies	Duration	Sources of Budget		Issues to be discussed and confirmed by the Community	Issues to be confirmed by the experts
					JICA	Domestic		
1. Promoting the participation of the community and networks/ flood or drought management groups of the community organizations		1.1. Planning the master plan for systematic flood/ drought management • Task force meeting • Meeting with related networks • Water management training		Sep.12-Mar.13	50,000			
2. Development the natural water resources to reduce impacts from flood/ drought		2.1 Sam Ruan Gate repairing		Depends on the technicians	500,000			
3. Development the agriculture related to the local potential and flood/ drought		3.1 Paddy demonstrating plots to reduce production costs and to solve the weedy rice problems: • Transplanting 5 Rais (Mr.Thanakorn) • Direct seeding 5 Rais (Mrs.Janthong) • Parachuting 5 Rais (Mr.Somchai)		Sep.12-Mar.13	15,000			
4. Reviving the sufficient living and self-reliance during eh flood/ drought		4.1 Preparation the Community Master Plan for Flood/ Drought Countermeasure 4.2 Building the sustaining areas (learning Center)		Sep.12-Mar.13 Sep.12-Mar.13	250,000			

2. SWOT Analysis

Strategies	Reasons	Activities	Contributed Agencies	Duration	Sources of Budget		Issues to be discussed and confirmed by the Community	Issues to be confirmed by the experts
					JICA	Domestic		
		• Two seed storage houses						
5. Promoting and development by the tourism by the community		5.1 Preparing the strategic plan for tourism development by the community 5.2 boat racing, eating fish and visiting Jasmine paddy fields		Oct.12 During flood	50,000			
6. Promoting the conservation/ restoring the natural resources and environment to reduce the global warming		6.1 Expanding green areas by planting the forest 6.2 Planting Vetiver grasses to prevent soil slide		Every Jul.-Aug. (s)	10,000			
7. Promoting and developing markets for the quality products of the community		7.1 Establishment of the Fish Processing Enterprise Group using the local knowledge • Workshop on the enterprise management • Establishing the fund for buying fishes • Fish tank water filter		Sep.12-Mar.13	15,000			

2. SWOT Analysis

Nakhon Pa Mak Sub-district as the model for sufficient economy and well-being learning center, with the support of the recognized organizations for the flood and drought management, source of good graded Thai Jasmine Rice, including the safe and secure occupations for living under the fertility of the natural resources and good environment

Promoting the participation of the people and community/ flood and drought management groups	Developing the natural water resources to reduce impacts from flood/ drought	Developing the agriculture systems related to the local potential and f.ood/ drought	Reviving the sufficient living and self-reliance concept during the flood/ drought	Promoting and developing tourism by the community	Promoting the conservation/ restoring the natural resources and environment to reduce global warming	Promoting and developing the markets for the quality products of the community
Strengthening the farmers in the community	Sam Ruan Gate Repairing	Promoting the organic Jasmine rice plantation	Seeking the methods of self-reliance on the production	Preparing the strategic tourism plan by the community	Reducing the burning of the straw and using the biological substances to reduce global	Developing the markets/ Jasmine Rice processing
Sub-district Water Management Committee	Building dam to store water in Village Moo 2	Use the bio-fertilizer for rice planting to reduce production cost	Disaster Resilient Plan	Developing the agro-tourism potential in the community	Campaign to reduce the use of chemicals in agriculture	Finding the networks of Jasmine Rice both domestic and foreign countries
Flood/ Drought Master Plans	The Salu Money Cheek Projects in Villages Moo 8 and 9	Expanding the planting areas and seed production of Jasmine rice	Promoting the sufficient family		Extending the concept of the water resource and fish conservation	
Setting the Water Friends Network	Dredging the lakes in 13 villages	Organic Rice Farming in 13 villages	Planting food crops for the family consumption	Boat Racing, Eating Fish and Visiting Jasmine Rice Field Festival	Expanding the forest and green areas in the community	Promoting the Jasmine Rice 105 Nakhon Pa Mak
Building cooperation with factories	Reducing the outbreaks of weeds rice pest	Publicizing knowledge about organic rice farming	Food Crop Seed bank	Developing the water quality and availability	Promoting the forest planting of the local trees (Anthocephalus chinensis (Lamk.) A. Rich. ex	Establishment of the fish processing groups
Requesting for the budget to proceed the safety drinking water in 13 villages	Research & development the methods to reduce the weedy rice	Promoting the use of bio-fertilizer/ organic substances	Floating garden, hanging lemongrasses and sweet basils	Conducting research and development on the water supply for the community	Local Curriculum "Environmental Agriculture"เกษตรสิ่งแวดล้อม	
Safety Drinkable Water enterprises		Demonstrated plot planting short-aged plants	Making the sustaining area/ evacuation center	Expanding the water supply availability in the area	Conservation project for Kwai Wang Noi River and Krong Kreng Canal	
		Demonstrated planting plots: planting 1 and harvest 3				

Suggestions for the strategic Plans of Nakhon Pa Mak Sub-district

The Strategic Plan should be taken for the public hearing in the community again in order to get suggestions and creating the community participation. From the four-day-meeting, the attendants had learned these following three matters:

- Water management in the areas that has prepared the Strategic Plans
- Preparation of the Strategic Plans
- Drafting the strategies for flood and drought management for this area

After the proposal of the strategic Plan, it is recommended to distinguish the creative matters that could be adjusted and improved as the lessons learned. However, the proposed ideas could be always revised as well as developing the new ones as to they are the tentative strategic plan.

Suggestion from JICA experts for the Strategic Plans at Sub-district Level

The Japan International Cooperation Agency (JICA) is the agency that supports the academic activities and connects all involved agencies like the Utikapat Foundation for the joint cooperation.

- Supports the workshop to initiate the learning for the communities
- Supports the training aimed at promoting the local economy. For example, the fish processing.
- Nakhon Pa Mak sub-district has its own concept about the development to be the subsistence areas and learning center. Activities are inspirational, interesting and creative for the area.
- For the exciting and creative activities like “boat racing, eating fishes, visiting the Jasmine Rice fields”, can be expanded and called for the cooperation with the other involved sub-districts, to change crisis to opportunities.
- Supports the tools, equipment, materials. For example, planting trays, seeds, etc.
- In case of the big development projects for the infrastructure which are not responsible by JICA, community should consult with the experts and involved agencies.
- The community can continue the operations and work in cooperation with the agencies in the areas to contribute supports and participation.
- The Strategic Plan should be taken to the ongoing public hearings in the areas as well as the good lessons and creative activities with the ongoing operations should be taken into the project extension in specific areas and lose communities.

Suggestions from the Utokapat Foundation under the Patronage of H.M. The King

There were three main issues concerned:

1. The most important thing in working is the data management. Tools used in analyzing data for the flood solving are: the use of data, the use of map and the community survey
2. Ongoing sustainable operations based on the ‘Understanding – Accessible –Development’ Principle
3. The support of the Foundation, the Foundation employs the participation as the key issue for the consideration to provide supports.

Strategy	Justification (Why Selected?)	Activity	Organization/ person in charge	Schedule time	Necessary inputs		Issues to be further	Issues to be confirmed
					JICA	Thai		
1 Promote People Participation on Water Management		1.1 Strenthen farmer groups 1.1.1 Establish water management committee 1.1.2 Preparation of master plan on flood and drought management 1.1.3 Establish Water Network **1.2 Cooperate with factory** 1.2.1 Request budget for drinking water sytem in 13 Tambon 1.2.2 Establish clean drinking water enterprise						
2 Natural Water Resources to reduce impact of flood and		2.1 Repare check gate 2.2 Construction of Weir in village number 12 2.3 Construction of Monkey Cheek Project of Bung Salu in village number 8 and 9 2.4 Bredgeing of community Pond in village number 13 **2.5 Improve water quality and quantity** 2.5.1 Study on quality improvement of dometic water supply 2.5.1 Expand dometic water supply ytem						
3 Develop Appropriate Agricultural System for flood and		3.1 Promote organic jasmine rice production 3.1.1 Use organic liquid to reduce input cost in rice production 3.1.2 Expand jasmine rice 3.1.3 Establih Organic Rice Farming Group in 13 villages 3.1.4 Promote Organic Rice Production **3.2 Promote the use of Compot and Organic materials** 3.2.1 Demontration of short duration crop between rice cropping 3.2.2 Demonstration of rice farming technique on "one cultivation for three harvests" **3.3 Reduction of weed and insect in rice** 3.3.1 Study on how to reduct weedy rice						
4 Establish Self Sufficient Area for Food during Flood and		4.1 Seek for self help production 4.1.1 Prepare disaster management plan 4.1.2 Promote self sufficiency family 4.1.3 Production of food at commmunity level 4.1.4 Promotion of floating garden and vegetable production 4.1.5 Establish of seed bank 4.1.6 Etablish food production area/ evauation area						
5 Prommote Community Tourism		5.1 Prepare Strategic Plan on Community Tourim 5.1.1 Improve capacity on agro tourism 5.1.2 Organize boat racing and eating Jasmine rice						
6 Promote environment and natural resource conservation		6.1 reduction of ricestraw burning 6.2 Reduce chemical use in agriculture 6.3 Conservation of water resource and fish 6.4 Expansion of forest area and green area of community 6.5 Promote planting of local tree 6.6 Establish local ciriculum on environment 6.7 Project on conservation of Kwai Wangthong and Klong Kongkeng						
7 Develop market chanels for community products		7.1 Develop market chanels for jasmine rice 7.1.1 Develop market for jasmine rice 7.1.2 promote jasmine rice of Nakhonpamak 7.1.3 Establish fish processing group						

3. Pilot Project Sheets

Tambon Nakhon Pa Mak, Bang Kratum District, Phitsanulok Province

		T. Nakorn Pa Mak (NPM), A. Bang Kratum	
Community Water Resources Management (WRM)	Preparation of Flood Hazard Map (HZDMP)	(1) Preparation of Flood Hazard Map	NPM-WRM-HZDMP-1
	Participatory Flood Monitoring/ Information Management (PFIM)	(1) Participatory Flood Monitoring	NPM-WRM-PFIM-1
	Water Management Facilities/ Equipments Improvements (WMFE)	(1) Drainage gate repair for monkey cheek development in community level	NPM-WRM-WMFE-1
Flood Damage Reduction in Agriculture and Livestock Sector (AGRI)	Paddy Cultivation Activities for Flood Adaptation(PADDY)	(1) Trials on Rice Transplanting Methods	NPM-AGRI-PADDY-1
	Good Paddy Seed Production/ Seed Bank (SEED)	(1) Good Paddy Seed Production/ Community Seed Bank	NPM-AGRI-SEED-1
	Crop Diversification and Food Security (CRDV)	(1) Safe Vegetable Promotion and Marketing	NPM-AGRI-CRDV-1
	Logistics and Market for Agro-produce (MKT)	(1) Green Market to Promote Safe Food Promotion (included in CRDV-1)	NPM-AGRI-MKT-1
Income Generation Activities towards Recovery of Rural Livelihood (iGEN)	Study on Fish Variety and Value in Flood Prone Area (FISH)	(1) Fish Survey (no project sheet)	NPM-iGEN-FISH-1
	Income Generation utilizing Local Resources (IGLR)	(1) Fish Processing	NPM-iGEN-IGLR-1

PILOT PROJECT SHEET

Project Code	Sector	Community Water Resources Management (WRM)
CPM-WRM-HZDMP-1	Program	Preparation of Flood Hazard Map (HZDMP)
Title	Preparation of Flood Hazard Map	
Purpose	- Prepare disaster mitigation plan for big flood by community initiatives based on government flood/water management plan and their own preparation. - Prepare flood hazard map in community level through participatory workshop to promote people's awareness and prepare future flood by community initiatives.	
Location	Tambon Nakhon Pa Mak, Amphoe Bang Kratum in Phitsanulok Province	
Beneficiaries	The entire population in Tambon	
Implementing Agency	T.Nakhon Pa Mak、Hydro and Agro Informatics Institute (HAII)	

Background/Concept

Community lives with flood in almost every year in this area and people know the way water comes from and where to evacuate by their experience. However, to avoid damage by unexpectedly big flood such as 2011 in rainy reason, it is necessary to organize information in a more easily readable and understandable format for community. For this purpose, preparing hazard map in community level is useful to organize information and to understand people their community clearly such as topography, location of infrastructures, hazard area, and evacuation route.

Hazard map should help people to evacuate in an expeditious way and also to make a disaster management plan preparing for future flood in community level. Moreover, to aware the community the warning water level and the timing of evacuation in flooding time, water level data measured by community will be shown on the hazard map by linking with "Participatory Flood Monitoring/Information Management".

Expected Outcome

- People can prepare for the future flood and evacuate promptly when big flood comes.
- Community can prepare disaster management plan by their initiatives for future flood.
- Guideline for the process of making hazard map

Component (Input/ Activities)

(1) Field survey to grasp the general condition of community
(2) Colleting data to be shown on Hazard map by using GPS device and input to GIS data.
(3) Input the survey result on "Participatory Flood Monitoring/ Information Management (PFIM)" to the flood hazard map and GIS data.
(4) The data to be shown on Hazard map is as follow.
  - Infrastructure (Road, water body, canal)
  - Administrative Boundary (Tambon, Moo)
  - Location of major buildings (TAO, Police station, School, Hospital, Water Supply, Evacuation Center, RID Facilities, etc)
  - Flood Flow, Hazard Area
  - Location of Staff Gage and water level data measured by community(by PFIM)
(5) Set up participatory design workshop to finalize flood hazard map, promote awareness for community's flood management and construct guideline for future flood.
(6) Distribute PR materials to the community to gain understanding of hazard map and promote their awareness to the flood.

Related Program, if any	Participatory Flood Monitoring/ Information Management	**Code** NPM-WRM-PFIM-1

Cost (w/ Source)

The contract has been made between HAII and the total amount includes PFIM in CSS and NPM..
The following items are a part of the total amount of the contract.

- Facilitation and organization of flood hazard map making(Personnel)	100,000
- Staff gage (12 stations)	60,000
- Information Technology (PC, GPS, etc)	90,000
Total	220,000 (THB)

Implementing Schedule

1. Data Collection	Sep 2012 to Jan 2013
2. Data Input for Hazard Map	Dec 2012 to Jan 2013
3. Finalize Hazard map by participatory workshop	Feb 2013

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Aug. 2012	- GIS training to CSS and NPM and explained how to read map, use GPS devise, explained about media box, its usefulness for water resources management.
Sep. 2012	- Organized Study tour to Community Water Management Project in Ban Nongyaplong, Tambon Chompoo, Nernmaprang District, Phitsanulok Province. - Water level monitoring
Oct. 2012	- Water level monitoring
Nov. 2012	- -Organized meeting for understanding the data collection process to create the water resources management. - -Organized meeting for understanding the data related hazard map making. - -Water level monitoring
Dec. 2012	- Collecting data for hazard map - Creating draft hazard map - Organized Study tour to Buri Ram community water resources management site. - GIS training has given to representatives of Chum Saen Songkhram - HAII and The Royal Thai Army had a meeting with CSK and NPM to set plans for rehabilitation of local construction and survey the area
Jan. 2013	- Collecting data for hazard map - Creating draft hazard map
Feb. 2013	- Confirmation of hazard map through the participatory workshop
Mar. 2013	

*Describe main findings about the project, including progress, problem, issues raised.

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	● The Flood Hazard Map prepared by the Project is easy to understand the direction of the flood flow, evacuation route and site for the villagers, so that villagers with animals could be easy to evacuate in accordance with the map . ● The flood observation web site has been set up for recording the staff gage water level data in Tambon to disclose the information to public. From this internet device the villagers are able to know the relation of water levels between staff gage in Tambon and gaging station in RID nearby Tambon. ● The relation of the water levels will be benefited to the villagers to know a warning water-level in flood period. ● However, after completion of the Project, TAO should take a responsibility to revise the flood hazard map at regular intervals continuously for community self-reliance flood warning.
Timing of Implementation (Pre-, During , Post-Flood)	● The Flood Hazard Map can be prepared during dry season.
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	● The community accepted the making HZDMP technique with participatory way, so they understood and realized how essential it is. At the same time, they learned the evacuation sites and routes through their own discussion as well as know the contact person in charge of the flood countermeasures during the flood period. ● However, it is not easy to carry out this work by the community itself even it takes not big budget. ● Provincial Disaster Protection and Mitigation Office (PDPM) should assist them to practice the process of the hazard map making through their normal rehearsal activity incorporated with other agencies concerned.
Replication and extension (role of stakeholder, cost share, etc.)	● PDPM should support the HZDMP preparation process to other risky impacted area in the future using the Manual, Guideline and Lessons learnt from Pilot Tambon regarding the Projects of Preparation of Flood Hazard Map and Participatory Flood Monitoring Activities prepared by JICA Study Team. ● Task Force Provincial Committee also should follow up and promote the map utilization in pilot Tambon and also disseminate the map to the other Tambons.
Sustainability (incl. O&M, benefit during normal time)	● After completion of the Project, HZDMP should be studied how to apply and utilize to the other Tambons and then introduced to the other Tambons with the lessons learned of pilot activities by PDPM. ● Large scale of A1 size HZDMP was printed and distributed to each village and Tambon. TAO should distribute the map to the public facilities such as school and hospital, etc. in order to remind their evacuation routes and sites. Sign boards also should be installed at the main public facilities.

PHOTOS

GIS Training in August 2012, HAII hold a seminar for how to use GPS and how to read maps

Participants for GIS training measures elevation and coordinate by GPS device

Staff gage reading training and water balance training

GPS device to collect elevation data from satellite

Staff gage installation work

Site visit to Ban Nongyaplong, Tambon Chompoo, Nernmaprang District, Phitsanulok.

PHOTOS

Site Visit to Ban Limthong community, Buri Ram province

Site Visit to Ban Limthong community, Buri Ram province

Discussion about water management by using map drawn by community in December 2012 at study tour to Buri Ram.

Community draw map of their tambon with infrastructures and water sources in workshop at study tour to Buri Ram.

Discussion about water management

Community people check and discuss about existing water resources.

PILOT PROJECT SHEET

Project Code	Sector	Community Water Resources Management
WRM-PFIM-01	Program	Participatory Flood Monitoring/ Information Management
Title	Participatory flood monitoring activity	
Purpose	1) To understand water levels in community area during rainy season 2) To learn how to monitor the flood level using staff gauge 3) To inform and educate local community for the flood event through the water level monitoring 4) To setup water level monitoring system	
Location	T. Nakhon Pamak, A. Bang Krathum, Phitsanulok	
Beneficiaries	T. Nakhon Pamak	
Implementing Agency	T. Nakhon Pamak、Hydro and Agro Informatics Institute (HAII)	

Background/Concept

After the 2011 flood event, the Thai Government responded with various near- and long-term measures. The strategy action plan aims to address long-term flood management strategy, urgent flood mitigation strategy and sustainable flood management strategy.

For the local community level, the community should be informed on the government plan and policy that may affect their community living, and participate on the government flood management. By understanding the flood nature and the national flood management, the local community could be adapted to it and prepared to the future flood through the monitoring the community water level data for minimizing the flood damage.

Through the participatory flood monitoring activities, participants discuss and evaluate the community water resources, and establish the community water resource management plan.

Expected Outcome

- To gain new skill about water level measuring method.
- To aware of the information of flood situation in community level.
- The collected data will be useful for the assessing the flood damage.
- Provision of flood based on monitored water level data by information system.
- Formulation of community water resources development plan by community

Component (Input/ Activities)

1) Inform the objectives and scopes of the project to the local community
2) Survey and assist local community to install water level indicator for the community
3) Give education to the community people, teachers and students in schools
4) Set up community meeting and event for promoting participatory flood monitoring
5) Improve the community communication for the flood warning and share the information with the government agencies
6) Obtain feedback from local community on their need from the government agencies

Related Program, if any	Preparation of Flood Hazard Map (HZDMP)	**Code** NPM-WRM-HZDMP-1

Cost (w/ Source)

Elevation survey 10 locations / 1 Tambon	1	lump sum	30,000
Staff gage installation (One sheet has 1 m long)			
Metal staff gage	1	sheet	1,200
Elevation tag (MSL)	1	Tag	60
Installation instrument and labor	1	sheet	1,100
RC column 0.15 x 0.15 m and 2 m long with foundation support	1	lump sum	5,800
Community website and data base system	1	lump sum	40,000
Monthly measurement and record	1	month	3,000

Implementing Schedule

September 2012 to March 2013

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Sep. 2012	- Community meeting about interview for 2011 flood experience, constructing a community map, field visit of water management structure and to meet local community on Moo Ban. - Field survey for staff gage installation - Survey and Bench Mark setting for installation of staff gage - Staff gage installation
Oct. 2012	- Monitor and record the water level data
Nov. 2012	- Monitor and record the water level data
Dec. 2012	- Monitor and record the water level data
Jan. 2013	- Monitor and record the water level data
Feb. 2013	- Monitor and record the water level data
Mar. 2013	

*Describe main findings about the project, including progress, problem, issues raised.

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	・ The community people can understand the meaning of MSL (Mean Sea Level of water) as well as importance of water levels observed by RID. ・ This monitoring activity shall be continually promoted by community. For instance, school is one of the choice to observe the water level at installed water level staffs in Tambon
Timing of Implementation (Pre-, During , Post- Flood)	・ Dry season is the best period to carry out the staff gage installation.
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	・ The community can learn how to install the staff gage and monitor the water level observation easily. ・ Villagers are able to know the relation of water levels between staff gage in Tambon and gaging stations in RID nearby Tambon. ・ The relation of the water levels will be benefited to the villagers to know a warning water-level in flood period.
Replication and extension (role of stakeholder, cost share, etc.)	・ The Provincial or District government agencies should introduce and disseminate “the participatory flood monitoring activity project” to other Tambons affected by flood.
Sustainability (incl. O&M, benefit during normal time)	・ TAO should support all activities comprising of water level recording, monitoring, maintenance, staff replacement (if it is broken). Some regular budget also shall be provided to the group for these activities. ・ The warning color indicator system in community level should be established in future.

PHOTOS

Set up community workshop

Benchmark survey tools

Installed staff gage

Staff gage reading training

Data collection of 2011 flood water mark by staff gage

Community draw map of their tambon with infrastructures and water resource

PILOT PROJECT SHEET

Project Code	Sector	Community Water Resources Management
WRM-WMFE-01	Program	Water Management Facilities/ Equipments Improvements
Title	Drainage gate repair for monkey cheek development in community level	
Purpose	By improving the SSIP drainage regulator, to store the flooded water during rainy season as a community level monkey cheek and utilize it for irrigation in dry season.	
Location	T.Nakhon Pa Mak, A.Bang Krathum, Phitsanulok Province	
Beneficiaries	Village No.5,6,7,8,9,10,11,12,13 Paddy field (5,000 rai)	
Implementing Agency	RID (Supervising of gate repair) TAO (Providing labor for installation of gates)	

Background/Concept

Ban Sam Ruean regulator is a small scale irrigation project (SSIP) facilities which was named Khlong Krong Kreng regulator. This regulator is located at Moo5, Ban Sam Ruean, and it was constructed in 1986. Currently, it has been transferred to T.Nakhon Pa Mak by Royal Irrigation Department (RID) since January 28, 2003.

This regulator has two functions, one is to prevent the flooded water comes from Nan river direction, and the other one is to store the water in upstream canal area during rainy season for utilizing as an irrigation water in dry season. But this gate has been partially broken and lack of above functions. And also there are no gate operational rules, and it has not been operated appropriately.

Through this pilot project, gate repair will be implemented, and water user's committee and gate operational rules will be established. Additionally, cooperation with canal dredging work around upstream area, this regulator has a big contribute to community level monkey cheek development.

Expected Outcome

- About 5,000 rai of paddy fields will get good impact especially in appropriate water management.
- Through the gate repair work, TAO has got the gate operation and maintenance skills.
- Utilize as a monkey cheek in community level because 6km of canal was dredged by RID in 2012 and swampy area will be dredged by Military in 2014 at upstream of the rehabilitated gate..
- To establish the water user's committee and gate operational rules.

Component (Input/ Activities)

- Cost estimation by RID provincial office.
- Supervising of gate repair by RID & TAO and providing labor for installation of gate repairing work by TAO.
- JICA Study Team provides gate repair materials.
- Set up workshop for establishment of water user's committee and gate operational rules.

Related Program, if any	Community water resources management plan	**Code:** NPM-WRM-CWRMP-1

Cost (w/ Source)

450,000 TBH (Material cost)
150,000 TBH (Labor cost and installation cost)

Implementing Schedule

Component	Nov	Dec	Jan	Feb	Mar
Workshop and site investigation	▬				
Design and cost estimation (already made by RID)					
Contract between JICA and Material supplier		▬			
Delivering of gate repair materials			▬		
Repair work implementation			▬		
Final Inspection				▲	
Establish of water users committee and gate operational rules				▬	
Support and training to strengthening the WUC by JICA				▬	▬ ▬

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Nov. 2012	- Workshop with TAO, RID, Village leader and JICA Study Team about the mutual understanding of existing broken gate and inappropriate operational situation. - Site investigation for the gate and surroundings of regulator and canal situation. -  - Cost estimation and design was already made by RID provincial office which was based on the request from TAO on March 2010.
Dec. 2012	- Request the quotation of the repairing gate cost to the contractors (at least 3 contractors) , - Selection of a successful contractor and negotiation & conclude the contract
Jan. 2013	- Explanation of gate repairing method for TAO and farmers by RID was held on 9th January 2013. - Delivering the gate materials to TAO by contractor. - Implementation of repair work supervised by TAO &RID and providing labor by TAO.
Feb. 2013	- Completion of repair work. - Final inspection for gate repairing work was carried out on 4th February..
Mar. 2013	

*Describe main findings about the project, including progress, problem, issues raised.

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	• About 5,000 rai (800ha) of paddy fields will get good impact especially in appropriate water management. • Through the gate repair work, TAO has got the gate operation and maintenance skills. • After JICA support of the gate rehabilitation, other agencies such as RID, Military and HAII has supported the flood mitigation measures. • A monkey cheek in community level is developed because 6 km of canal was dredged by RID and swampy area will be dredged by Military at upstream of rehabilitated gate. • Phitsanulok RID provincial office has continuously supported the technic aspect such as prevention of settlement and slope protection around the rehabilitated gate structure. • People in TAO have encouraged combating flood damage and a lot of activities have been carried out in a positive manner due to JICA support. •
Timing of Implementation (Pre-, During , Post- Flood)	• Dry season from February to April is the best timing for implementing the project.
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	• Through the gate repair work, TAO has got the gate operation and maintenance skills and experiences.
Replication and extension (role of stakeholder, cost share, etc.)	• It will be possible to rehabilitate similar irrigation facilities in TAO which are lot of but deteriorated and not well functional technical supporting by RID provincial office. • Rehabilitation of the irrigation facilities are small scale and project cost is not exceeded 500,000 Bt. Therefor TAO will be able to implement by his own budget. • Local administration promotion department is one of the source of funds to implement the similar projects.
Sustainability (incl. O&M, benefit during normal time)	• New community water management committee was established and criteria of gate operation and role of the committee will be soon decided. • To implement similar projects, support by Phitsanulok RID provincial office will be an indispensable. • In order to control water properly both flood prevention and irrigation use, gate operation system both rehabilitated this regulator and Thana regulator which is located about 7km downstream of Wang Tong river should be established.

PHOTOS

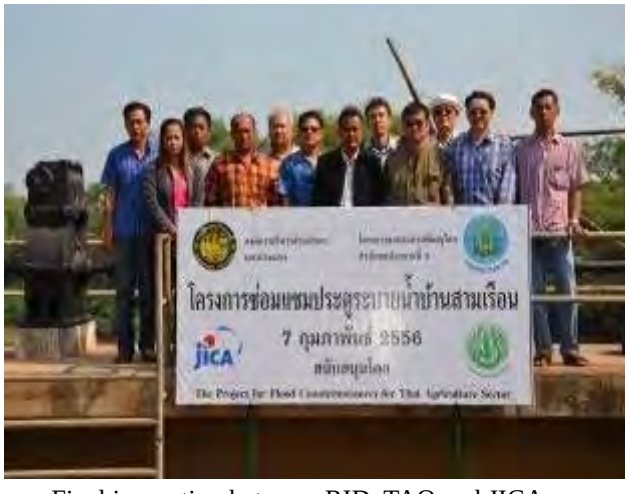
Gate and gear inspection

Interview to TAO staff about the problems of gate situation and operation

Workshop between TAO and JICA

Commencement of gate repair work by RID and TAO

Repaired gate



Final inspection between RID, TAO and JICA

PILOT PROJECT SHEET

Project Code	Sector	Flood Damage Reduction Measures in Agriculture and Livestock Sector
AGRI-PADDY-1	Program	Paddy Cultivation Activities for Flood Adaptation
Title	Trials on transplanting methods of paddy	
Purpose	*Overall*: Promote transplanting methods by machine or parachuting to shorten the cropping period, by which paddy can be harvested before flood comes. *Project*: Clarify the comparative advantages and applicability of transplanting methods by machine (TP) and parachuting (PC) against direct seeding method (DS).	
Location	T. Nakohn Pa Mak, A. Bang Krathum, PL	
Beneficiaries	Paddy farmers (4 model farmers)	
Implementing Agency	Rice Research Center (RRC), Tambon Administration Office (TAO)	

Background/Concept

To avoid flood, shortening the cultivation period is of the most effective countermeasure in paddy cultivation. In this end, two major approaches can be taken: use short-maturing varieties that can be harvested 90-100 days after sowing, and transplant seedlings. Transplanting can be managed by machine and parachuting methods. Transplanting machine can be used where service providers exist and the physical condition of paddy field is stable enough for machine to operate. If machine is not suited, parachuting is then recommended.

By transplanting, problems of Brown Plant Hopper (BPH) and weedy rice can be also addressed. As the growth stage of paddy already exceeds the weeds at the time seedlings are transplanted, they can easily surpass the growth of weeds. Also, as paddies are established with enough space to each other, application of herbicide and pesticide is easier and more effective than densely-established paddy under direct-seeding method. Applicability of transplanting may be challenged by its high cost. Therefore, at the end of the project, cost/benefit analysis is conducted to see comparative advantages of each method against conventional one.

Expected Outcome

- Cropping period is shortened where transplanting is applied
- Damages by weeds and pests are reduced by transplanting
- Quality of production is improved in transplanting plots
- Cost of each method is clarified
- Comparative advantages of transplanting methods are identified

Component (Input/ Activities)

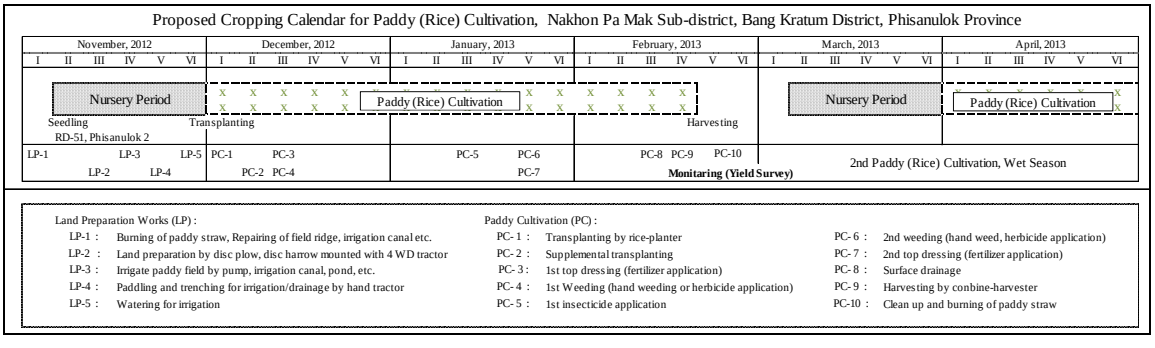
1) Identification of participants (4 farmers)
2) Detailed planning of activities and layout of the experimental plots (a total of 51.55 rai per 4 farmers)
3) Cultivation of paddies in three methods per plot (DS, TP, and PC)
4) Technical assistances and monitoring by Rice Research Center
5) Yield survey and cost/benefit analysis
6) Preparation of guideline

Related Program	N/A	Code:	N/A

Cost (w/ Source): *Family labor cost for ordinal maintenance of the field is born by the participants*

- Land preparation: 40,000Bt (JICA)
- Farm inputs: 100,000Bt (JICA)
- Monitoring (outsource): 30,000Bt (JICA)
- Media production: 20,000Bt (JICA)
- Yield survey(outsource): 20,000Bt (JICA)
- Total (approx.): 210,000Bt (JICA) *harvested rice is subject for cost sharing

Implementing Schedule: *November 2012 to April 2013*



RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Dec. 2012	- Not much problems have been observed for the first two weeks after sowing. - There have been some insects (rice caseworm and rice leaffolders) have been observed only some of Direct Seeding (DS) plots. Accordingly pesticide was applied. - Probably environment in DS field is more preferable to insects due to higher moisture, more hiding place, and less aeration.
Jan. 2013	- Some insects (Asian rice gall midge) have been observed only in DS plots. - As those insects move from one place to the other, pesticides were applied even in the plots for Transplanting (TP) and Parachuting (PC). - It was consulted that pesticides not be applied where appearance of insects is not significant as it is to compare each method. - Weeds especially weedy rice or Kow Dee Kow Daen have been observed especially in DS plots and some in TP plots. - Weeds have been stimulated only in DS plots because of less water depth kept in the paddy field especially at the germination stage of DS plots, while water depth is deeper in TP and PC plots that prevent the germination of weeds. - Weeds tend to grow where soil is under relatively dry condition; they grow where land preparation is not well facilitated even in TP field.
Feb. 2013	- The amount of weed in the N-2 farmer's direct seeding field was higher than other field. The farmer hired labors for weed cutting. - Through all farmers' field, the number of BPH in the direct seeding field was quite higher than other field. E.g. the number of BPH in direct seeding field was over 300 on average and transplanting and parachuting method were about 100.
Mar. 2013	- N1 and N2 farmer's field were harvested on 19th for direct seeding field and 25th for transplanting and direct seeding plot. - N3 farmer's field was harvested on 12th for direct seeding and 21st for transplanting and parachuting field. - N4 farmer's field was harvested on 9th for direct seeding and 20st for transplanting and parachuting field.

*Describe main findings about the project, including progress, problem, issues raised.

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	- Transplanting method and parachuting method could be shortening the period of the rice in the paddy field. - For the total period of rice cultivation, the direct seeding is shorter than transplanting or parachuting method about 1 week.
Timing of Implementation (Pre-, During , Post- Flood)	- Transplanting and parachuting method could be applied before flooding. -
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	- Transplanting and parachuting method could avoid weedy rice easily and could apply agricultural chemicals easily. - According to the result of the field trial, transplanting and parachuting field could get higher yield than direct seeding. Thus, farmers want to apply transplanting and parachuting method, continually. - Even use the direct seeding method, the farmer can reduce the amount of seed (25-30 to 20kg per rai) -
Replication and extension (role of stakeholder, cost share, etc.)	- At the moment, the weedy rice is the biggest problem of the area, transplanting method or parachuting method could be found weedy rice and remove it easily. Therefore, these methods will be expanding in the area. - Especially, some seed making group in the area has a role for planting. They accept the rice with transplanting method only.
Sustainability (incl. O&M, benefit during normal time)	- The rice growing of parachuting method was better than transplanting. Then, some farmer could get higher yield than transplanting method. - For parachuting field, should be applied 100-120 trays of seedling per rai. In usual case, farmer applies 150-200 trays per rai. - The field with transplanting method could be checked weed and applied fertilizer and agricultural chemicals easily. - The field should be flat for transplanting than other method. - If the field has large amount of weed rice, the field should be planted by transplanting or parachuting method. If it is possible, sometimes the farmer should wait for weedy rice germination or pass the cropping. -

PHOTOS

Transplanting by machine.
(Dec. 18, 2012)

Manual transplanting demonstrated in a small plot.
(Dec. 18, 2012)

Parachuting facilitated by a group of experienced farmers; they threw seedlings as like darting.
(Dec. 18, 2012)

Seedling on the ground just after parachuted; they will stand after a few days.
(Dec. 18, 2012)

In one hole of tray, 8-12 seeds were sown, as compared to 4-5 seeds per bunch recommended.
(Dec. 18, 2012)

Established paddies 20 days after sowing by broadcaster.
(Dec. 18, 2012)

PILOT PROJECT SHEET

Project Code	Sector	Flood Damage Reduction Measures in Agriculture and Livestock Sector
AGRI-SEED-1	Program	Good Paddy Seed Production/ Seed Bank
Title	Promotion of Community Seed Bank	
Purpose	*Overall*: Farmers become able to restart paddy cultivation as soon as flood ebbed *Project*: Establish a stock of paddy seeds ("seed bank") at a community level, which can be utilized to quickly replant paddy after severe flood.	
Location	T. Nakorn Pa Mak, A. Bang Krathum, Phitsanulok province (PL)	
Beneficiaries	Paddy farmers	
Implementing Agency	Rice Research Center (RRC), Tambon Administration Office (TAO), Department of Agricultural Extension (DOAE)	

Background/Concept

Negative effect of floods is not limited to a direct damage to crops but there is also a consequential effect. For example, farmers had suffered from a lack of paddy seeds after the flood of 2011. Although farmers would have liked to restart paddy cultivation as soon as flood ebbed, they could not do it due to a lack of seeds to be re-planted. Especially after a flood, paddy seeds become scarce in the market due to significantly increased demands.

Thus, it is better to maintain a certain amount of quality seeds for the purpose to replant in the event of big flood in the future. Those seeds can be also used in usual years. In an emergency case, it can be consumed at evacuation center too. To produce quality seeds, proper farm management is required to reduce the contamination of foreign substances such as weed seeds and seeds of wild rice, and also is a proper processing after harvesting.

Expected Outcome

- Quality paddy seeds are produced
- Paddy seeds are processed with a same standard as certified seeds (not for certification)
- Quality seeds are stored as a "seed bank"
- Rules of using seed banks are formulated

Component (Input/ Activities)

1) Identification of participants
2) Study tour to a paddy seed center in Chainat and Phitit

Related Program	Paddy Cultivation Activities for Flood Adaptation	Code:	AGRI-PADDY

Cost (w/ Source): *Family labor cost for ordinal maintenance of the field is born by the participants*

- Study tour: 30,000Bt (JICA)

Implementing Schedule: *November 2012 to April 2013*

- Dec. 2012: Main activity is to cultivate paddy under three planting methods (AGRI-PADDY)
- Jan. 2013: Planning of study tour to existing rice seed center(s)
- Feb. 2013 Study tour to existing rice seed center in Chainat (larger scale) and Phitit (smaller scale)
- Mar. 2013 Lesson learned workshop, preparation of media
- Apr. 2013 Final workshop

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Dec. 2012	- No activity was done as main activity in this period is to cultivate paddy (for more detail, see project sheet of AGRI-PADDY.
Jan. 2013	- No particular activity was done as main activity in this period is to cultivate paddy (for more detail, see project sheet of AGRI-PADDY. - A plan of study tour was drafted; joint study tour is to be organized inviting some farmers group from Tambon Gobchao and Tambon Sihanat-Ayutthaya province, Tambon Khao Kaew-Chainat province, Tambon Nakorn Pa Mak-Phisanulok province and Chainat Rice Research Center.
Feb. 2013	- The activity of study tour was done as main activity in this period is to prepare and coordinate with each organization that will be joined in this study tour. - Study tour established on 12-13 February 2013 at Nang Lue Tha Chai - Community Seed Center, Chainat province and Ban Bueng Pra Du - Community Seed Center, Phichit province. ❖ Activities at Nang Lue Tha Chai - Community Seed Center, Chainat ▪ Study and learn how to organize the Community Seed Center. ▪ Study about operation and management of the Community Seed Center ▪ Study about rule of the Community Seed Center ▪ Study about standard of good quality seed ▪ Study about visit to seed storehouse ❖ Ban Bueng Pra Du - Community Seed Center, Phichit province ▪ Study and learn how to organize the Community Seed Center. ▪ Study about operation and management of the Community Seed Center ▪ Study about rule of the Community Seed Center ▪ Study about standard of good quality seed ▪ Visit to paddy field that produce to provide rice seed for Community Seed Center ❖ T. Nakorn Pa Mak, Phitsanulok province ▪ Exchange opinion and experience between farmer from each Tambon and each province ▪ Summarize what is they obtain or receive from this study tour
Mar. 2013	

*Describe main findings about the project, including progress, problem, issues raised.

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	- The farms plan to separate their yield into 3 purposes; 1. For sell as of breeder seed (good quality seed) 2. For consumption in their household 3. For seed bank in their community
Timing of Implementation (Pre-, During , Post-Flood)	- During rice - growing season
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	- In this season of rice cultivation (started on 1o May 2013). The farmer of Ban Nong Kung, Moo.2, Tambon Khao Kaew, Amphur Sapphaya, Chainat province are used parachuting method and they also applied some technique that they know and learn from study tour.
Replication and extension (role of stakeholder, cost share, etc.)	- After study tour on intensive parachuting method at Nang Lue Tha Chai Community Seed Center at Chainat province. Ban Bueng Pa Du Community Seed Center at Phichit province. The farmers who join in this study tour are used parachuting method for rice cultivation in this season to reduce weedy rice and to produce good quality seed.
Sustainability (incl. O&M, benefit during normal time)	- During study tour, farmers are learnt about process of parachuting method. The farmers are known and understand how to prepare seedling for parachuting method and they also known some technique that made it easier for parachuting by pointing technic. - They know how to produce good quality seed for seed bank. - They know how to organize, set, operate and manage the Community Seed Bank in their community.

Nang Lue Tha Chai - Community Seed Center
Chainat Province

Ban Bueng Pra Du - Community Seed Center
Phichit Province

Brain Storming and Opinion Sharing
at T. Nakorn Pa Mak
Phitsanulok Province






Phitsanulok (PT)		Chainat (CN)		Ayutthaya (AT)		Pathumthani (PT)	Nakhon Pathom (NT)
CSS	NPM	WM	KK	GC	SHN	KH	

PILOT PROJECT SHEET

Project Code	Sector	Flood Damage Reduction Measures in Agriculture and Livestock Sector
AGRI-CRDV-1	Program	Crop Diversification and Food Security
Title	Safe Vegetable Production and Marketing	
Purpose	*Overall*: Diversify the types of crops to reduce the risk of complete loss under mono culture especially paddy; and introduce short-cycle crops, which enable generating quick cash or securing foods for home consumption. *Project*: Promote safe vegetable production for home consumption and for marketing.	
Location	T. Nakohn Pa Mak, A. Bang Krathum, PL	
Beneficiaries	Farmers' group (3 model farmers) and 2 secondary school	
Implementing Agency	Tambon Administration Office (TAO), Department of Agricultural Extension (DOAE)	

Background/Concept

As a means to reduce the risk of flood damage, it is recommended to diversify the farming portfolio of farmer household. It is well known that mono-cropping entails a certain level of risks, which may be incurred by a price fluctuation, outbreak of pest and disease, or natural calamities like flood. Diversification of crops is therefore recommended. In this program, some types of crops that can be cultivated in relatively short period are introduced.

After a flood, recovery process should be commenced as soon as possible. Although it is desirable to restart paddy cultivation for paddy farmers, it is not always possible due to a lack of funding, remained inundation in lowland, and lack of seeds and inputs. In this context, short-cycle crops such as vegetable, which also require relatively lower investment cost, can provide farmers with an opportunity to earn quick cash. By revolving such small but quick cash, farmers can strengthen their capital for re-cultivation of paddy thereafter. Introduction of vegetables can be a good source of income and home consumption even during ordinal years. If marketing channel is established, restart of vegetable production after flood can be smoothly facilitated.

Expected Outcome

- Farmers gain new skill on safe vegetable cultivation
- Farming portfolio of individual farmer household is diversified
- Household income is increased
- Marketing channel is established (MKT)
- Students understand on safety vegetable growing and vegetable is used for school lunch.

Component (Input/ Activities)

1) Identification of participants (3 model farmers and 2 schools)
2) Workshop for planning of safe vegetable production and marketing
3) Study tour to an existing vegetable-farmers' group near the area
4) Training on safe vegetable cultivation and marketing
5) Technical assistances by DOAE
6) Preparation of guideline

Related Program	Logistic and Market for Agro-produce	Code:	AGRI-MKT-1

Cost (w/ Source): *Family labor cost for ordinal maintenance of the field is born by the participants*

- Workshops:	10,000Bt	(JICA)	
- Farm input and material	150,000Bt	(JICA)	(materials for net houses included)
- Public relations	20,000Bt	(JICA)	
- Total (approx.):	180,000Bt	(JICA)	

Implementing Schedule: *November 2012 to April 2013*

- Dec. 2012: Planning workshop
- Jan. 2013: Construction of net houses, and training on seedling preparation
- Feb. 2013 Continued cultivation of vegetables, revision of cultivation plan (types of vegetables)
- Mar. 2013 Establishment of green market in the community, lesson learned workshop, preparation of media
- Apr. 2013 Final workshop

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Dec. 2012	- Meeting was conducted with farmers and school children to draft a plan of safety vegetable growing and marketing on December 19, 2012.
Jan. 2013	- Net house was constructed with type A (Village No.11), type B (Village No. 13) and type C (Village No.2/ Wat Rathsamosorn School/ Krung Sri Chjaroen School) - Training on seedling preparation was conducted with 37 farmers and students involved. - Result: 1) Construction of Type A, B and C net houses in 3 villages were completed except 2 Type C net houses in 2 schools. School directors committed to finish it within this month. 2) Because the cultivation media for nursery was not suitable for vegetable, seedling became too long. It was therefore concluded that the burned sugarcane residue is not suitable for vegetable seedling. 3) Farmers have not had enough understanding on production plan as to continue prepare seedlings weekly. The project should do more close monitoring in the project area.
Feb. 2013	- Preparation of group's members was conducted to search a source of insect repellent plants in the area of Tambon Nakhon Pa Mak. - Demonstration of vegetables cleaning prior to selling in green market was carried on. - Opening ceremony of "Tambon Nakhorn Pa Mak Sufficiency Economy Learning Centre Network" green market was organized at Sam Ruan monastery located at Moo3, Tambon Nakhon Pa Mak. on Feb.22, 2013 Result; 1) Chairman in the opening ceremony of green market included Nakhon Pa Mak TAO chief and the project representatives (Mr. Arai) by having a demonstration of fresh vegetables eating for building confidence to customers. 2) There were 12 network members from 4 villages attained a selling activity such as safe vegetables, native vegetables, eggs, bananas, native snacks and other native products. 3) Most villagers were interested in buying of safe vegetables because they were produced within their own areas, and it was found that all products were sold out within 2 hours. 4) A total of sale is approx. 3,000 baht
Mar. 2013	- Monitoring of activity on safe vegetables growing and green market was conducted as usual. - Lesson learned on safe vegetables growing and green market was organized on Mar. 8, 2013. - Training and study tour on making of insect repellent agents and bio composting were carried out at Tambon Ma Kham Soong Sufficiency Economy Learning Centre, Amphoe Muang in Phitsanulok on Mar. 9, 2013 with 9 participants from 3 villages. - The project joined activity to present a lesson at Tambon Nakhon Pa Mak level (Mar. 14, 2013). Result; 1) Green market could continue the implementation, but there was a problem of insufficient vegetable quantity and discontinuity. 2) Farmers gained knowledge and understanding from learning on making of insect repellent agents, bio-liquid fertilizer, and egg-hormone. Moreover, Non-Toxic Market Enterprise Network in Phitsanulok was introduced to farmers, which enabled to be connected on marketing in the future.

*Describe main findings about the project, including progress, problem, issues raised.

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	**Green Market** - Green market was opened only in the two-month period without delay from the original schedule due to clear understanding of the process shared by the participants, suggesting that establishment of small-scale green market is not so difficult for farmers. - For green market, farmers had already gotten confidence to continue. Now, they can sell much faster than other vendors, everything in two hours for example. It is because villagers already acknowledge the group selling safe vegetables. - In comparison between Klong Ha, urbanized area, and Nakhon Pa Mak, rural community, villagers in Nakhon Pa Mak rather maintain more consciousness on healthy life than villagers in Klong Ha. (It was assumed that urban people have more concern on health issue and spend much money for organic vegetables). - There is a big demand for leaf vegetables within the community as they are scarce as compared to fruits vegetable that can be brought from outside. **Seedling Preparation** - As of the seedling preparation, only one farmer out of three farmers who learned the new technology of preparing seedlings in tray continued the method. Because the quality of media used for seedling preparation was not as good as expected—in general, a lack of nutrition. On the other hand, according to the cultivation in a school plot, the seedlings prepared in tray had actually outperformed the ones prepared in seedbed, implying that seedling preparation in tray can be further promoted given the media further improved. - Yet, there are types of vegetables suited to direct seeding on the seedbed, such as Green Pak Choi, Pak Choi, and Kale, and broad casting, such as Morning Glory and Coriander. **Nethouses** - Type-B and C had been given credit due to better ventilation as compared to type-A that closes the surrounding of the house by plastic net. - On the other hand, type-A has better performance in terms of insect prevention and weed control than other two types. Yet, even the type-A net house could not prevent small insects such as aphid. Also, high investment cost is a negative point of type-A. - Type-A is suitable for quality seedling preparation—can also be a learning center. - It was concluded that type-B and C can be well replicated due to good cost effectiveness. In fact, Ms. Oi in village No. 13 had already started establishing another net house. - Based on the experience in the Northeast, type-B is functional especially during rainy season. - Farmers can work whole day under net house. **Bio-extract as a natural repellent** - Making and using of bio-extract, a newly introduced technology, had gotten much popularity. One claimed that DOAE has promoted vegetable cultivation in general but they did not come with such a new technology useful. - There might be different technologies required for different soil types, season, and water availability. Thus, DOAE should have a comprehensive technical package including bio-extract. - Proportion of materials of the bio-extract can vary from place to place. It is a key point asking farmers what kind of plants have less insects in nature and use it as a material for bio-extract. Also,it is better to make it in the community rather than buying from outside. - Rather than showing very precise information what are included in a standard extract, it is better to encourage farmers to try using something available with such characters: 1) bitter, 2) sour, 3) strong smell like tobacco, and 4) irritating smell like lemon grass. - DOA is trying to analyze the function of each herb included in the extract.
Timing of Implementation (Pre-, During , Post- Flood)	- **Impact during flood** - Vegetable production is essential especially during flood as villagers have to go to buy by boat. - Ms. Oi, a participating farmer,now gets at least 100 Bt every day by selling safe vegetables in the community. At the time of green market, she can expect 400-500 Bt/time every week.

by community (cost, benefit, easiness, relevance to	- Safe vegetable cultivation should be done in normal time before flood comes, by which farmers can, first of all, enjoy an additional income from vegetable cultivation. - During flood, it is highly beneficial for farmers both for home consumption and selling because it is difficult to purchase vegetable and the price becomes quite high. - As many farmers cultivate paddy as primary crop, vegetable can be a good income source for starting up after the flood too.
Replication and extension (role of stakeholder, cost share, etc.)	**<u>Learning Process</u>** - The activity was organized as a learning process wherein project team had provided technical know-how to the farmers and farmers gradually obtained clearer vision of what they can do and they should do through tries and errors. - It was initiated with an opening discussion on those topics: 1) usefulness of vegetable cultivation, 2) process of implementation, 2) effectiveness of net house and its types, 3) importance of cultivating vegetables throughout the year, 4) challenges in hot summer and rainy season wherein net house is useful, and 5) introduction of elemental technologies such as bio-extract, compost, and seedling preparation. **<u>Development Approach (combination with green market)</u>** - It was far effective to combine safe vegetable cultivation and establishment of green market as the sales of vegetables well motivate the farmers to continue cultivation. **<u>Prior experience</u>** - While farmers in Klong Ha of Pathumthani did not have prior experience in vegetable cultivation so much, participating farmers in Nakhon Pa Mak (NPM) had some experiences, resulting in some differences in the performance of vegetable cultivation. For example, some member farmers in NPM had installed sprinkler without any instruction by the project team. - Although sprinkler is not much expensive, Ms. Oibelieves watering by hand is better. - Even with prior experience in vegetable cultivation, they do not necessarily know everything. As for watering, for example, they did not know that spinach does not like to have much water—their knowledge is specific and limited. - Prior experience also caused some difficulty to monitor the activity. In addition to compost suggested by the project team, some farmers seemed to have applied chemical fertilizer, resulting in huge size of leafs. **<u>Learning by Group</u>** - In Nakhon Pa Mak, participating farmers were relatives. By working as a group, farmers were able to learn from each other. It is far effective than learning individually. **<u>Investment Cost</u>** - Required cost for initial investment is not much (2,500Bt), in which saran net alone costs about 1200-1600Bt/saran net, depending on the size of the house. - Even with a small investment cost, farmers can fetch a certain amount of income from vegetable cultivation. For example, a farmer in Gop Chao gets 1,200Bt/9m^2/time. After only a few times of selling, initial cost can be easily returned. - Now, farmers have much confidence to start themselves. **<u>Type of Vegetables</u>** - Fruits vegetables are not suitable under saran net as they require more sunshine as compared to leaf vegetables.

Sustainability (incl. O&M, benefit during normal time)	- Other farmers already started net house vegetable cultivation at small scale (for example 4m by 8m). There are already three to four cases of type-C net houses in village No. 13. - It was found that one of new farmers uses a saran net with a shading rate at 70% (by which only 30% of light can transmit through the net). It is not suitable for vegetable cultivation. Thus, for the further extension of the technology, leader farmers should be able to provide technical guidance to other farmers. - During the trial, many villagers had asked if the net house is a chicken house or alike and observed inside to learn what is being done. It was proved that installed net house is functioning as a demonstration plot. **Linkage with existing group** - In the study tour conducted by the pilot project, member farmers visited Ms. Nit who sells vegetable to provincial hospital as much as 15,000 Bt/day in Phitsanulok. As a result of discussion, she suggested farmer leader to ship banana flower and other vegetables to her place and she will sell them in the hospital. The members are satisfied with the price offered which is higher than market. **Role of Agencies** - Tambonadministration office (TAO) usually keepsa certain amount of budgetevery year for the promotion of sufficiency economy concept. Thus, safe vegetable cultivation can be promoted using this budget. - In the pilot project, a secondary school was also involved in the safe-vegetable cultivation activity. In the long run, education of young generation on the topic of safe vegetable cultivation as a means for sufficiency economy is useful for wider extension. - Extension of the green market should be done in two steps: 1)a study tour to see the existing market, and 2) support starting up of the green market. - To do so, leaflet can be a useful medium to introduce basic function of net house vegetable cultivation—advantage of roof shape, applicable types of vegetables, etc. - DOAE has a program to promote green market.

PHOTOS (1)

Kick-off meeting organized in the office of TAO. Outline of net houses was explained using a guideline which was produced in another JICA project.
(Dec. 19, 2012)

In the meeting, development concept was explained in a way everyone can easily understand.
(Dec. 19, 2012)

Two primary schools joined the program for education of sufficiency agriculture to young generation.
(Jan. 4, 2013)

School children also participated in the construction process of net house.
(Dec. 23, 2012)

A Type-A net house, a complete set made of steel pipes and plastic sheet, was constructed.
(Jan. 24, 2013)

Outward appearance of the Type-A net house; it can prevent insects, mitigate strong sunshine, and avert excessive rainwater during rainy season.
(Jan. 24, 2013)

PHOTOS (2)

Another type of net house, called Type-B was constructed; main structure of which is made of what is locally available with cheap price.
(Jan. 24, 2012)

Type-C is made of saran net for roofing. This particular one has a surrounding walls made of plastic net for insect prevention. (Jan. 24, 2013)

Seedling preparation is of the most important steps of safe vegetable cultivation.
(Jan. 24, 2013)

Wife and husband, together, work on transplanting of seedlings in the net house; net house would cultivate a good relationship too?
(Jan. 24, 2013)

A young couple works on the mulching using rice straws; it effectively prevents the emergence of weeds.
(Jan. 24, 2013)

Green market at regular rotating market in the Tambon. Fresh vegetables and fish products are popular.
(Mar. 2, 2013)

PILOT PROJECT SHEET

Project Code	Sector	Income Generation Activities towards Recovery of Rural Livelihood (iGEN)
iGEN-IGLR-1	Program	Income Generation Utilizing Local Resources
Title	Fish processing utilizing local fish resources for income generation	
Purpose	To utilize local fish resources available in flood period for income generation in community people	
Location	Tambon Nakhon Pa Mak, A. Bang Krathum, Phitsanulok Province	
Beneficiaries	Fish processing group in Nakhon Pa Mak; Before visiting CSS workshop, unidentified exactly; finally after observed a namprik processing at CSS, they decided to cook the same thing as CSS; namprik pla-yang on 13th March 2013.	
Implementing Agency	Naresuan university, local FDA, Industrial standard office, community development office	

Background/Concept

In order to improve community resilience for natural disaster such as flood, it might be effective to diversify resources of cash income in communities. Through the PRA workshops in the model area, based on that concept, it was proposed to utilize community available resources for income generation, especially fishes available during flood. Through the activity, JICA team and Naresuan University support community food processing group to utilize local fish resources and improve their product quality.

Current situation, the group or individual characteristics mainly have some technical skills in drying and fermentation, have providing the fish raw material or/and being fish processor or related products and may have their own products currently available for sale in the market or sale at home or having potential to launch their products to the market.

Expected Outcome

- To specify potential local resources/products in model area
- To improve techniques for food processing
- To improve marketing activities of community food processing product

Component (Input/ Activities)

- To identify interested person in local resource utilization (food processing) activities including existing groups according to the survey result in the community.
- To discuss with the community for confirmation of members, product and components of activity.
- To prepare materials of trainings for the community food processing group as follows: 1) product development in general: guideline how to generate the new product ideas and screen the ideas to meet the need of consumer, 2) general guidance to food product processing mainly fermented food, including safety and quality concern, and 3) packaging, labeling and marketing strategy
- To demonstrate food processing utilizing local resources from selected producer
- To provide to technical trainings for select participants

Related Program, if any	**Green Market to promote safe food promotion** **Fish Resource Survey**	**Code: AGRI-MKT-1** **OTHER-FISH-1**

Cost (w/ Source) for 2 Tambon

1) Equipment/facilities for food processing
   TOTAL 25,000 Baht
2) Trainings
   TOTAL 60,000 Baht
3) Other cost
   - Food processing group for materials 25,000 Baht

Implementing Schedule: *November 2012 to April 2013*

- 24th Dec. 2012: Fish resource survey in local area
- 24th Dec. 2013: Survey of community food processing activity
- 6th Feb. 2013: Confirmation meeting of activity, starting improvement of product
- 16th Mar. 2013: Study tour to NPM for workshop on new product
- 23-24th Mar 2013. Workshop of production development and improvement
- Apr. 2013 Final workshop

RESULT OF MONTHLY MONITORING

<table>
<tr><th>Term</th><th>Findings (Progress/ Problems/Other Issues)</th></tr>
<tr><td>Dec. 2012</td><td>- Monitoring, progress, problem etc.
- Some of NPM members influence the group.
- Target group must be carefully screened to participate in the next activities.</td></tr>
<tr><td>Jan. 2013</td><td>- Report preparation was on going.</td></tr>
<tr><td>Feb. 2013</td><td>- Meeting on the 6th Feb 2013, group couldn't decide the processing place in tambon.
- Community school, the director and Chief village Moo 2, Mr.Sompong On-chao-nar is a target location.
- Processing date was not exactly decided, but the beginning of March on site and middle of March at NU.
- Mr. Thanakorn will cooperate with the group and make appointment with the group for the training on site and at NU.</td></tr>
<tr><td>Mar. 2013</td><td>- Eight participants from NPM were attended the activity at CSS Fish processing with the combination of pla -yang and namprik on the 6th March 2013.
- Firstly, NPM participants were uncomfortable to have their own activity in NPM. After observing namprik pla-yang processing at CSS they feel more confident and promised to run the same activity on 13th March 2013 and invited CSS member to be the guess and the mentor.
- On the 13th March 2013; to convince the same procedure of fish processing in NPM with the combination of pla -yang and namprik. (6 participants)
- Sa-ngeam Piathong (เสงี่ยม เปียทอง) was also at NPM to consult the NPM member.
- Workshop on Nampric Processing and canning at NU on 23-24th March with 9 participants

<table>
<tr><th>รายการวิเคราะห์
Lists of analysis</th><th>วิธีวิเคราะห์ Analytical method</th><th>ผลการวิเคราะห์
Results</th></tr>
<tr><td>1. Total Plate Count</td><td>FDA BAM (2001),Ch.3</td><td>5.40x10 5 cfu/g</td></tr>
<tr><td>2. Yeast and Mold Count</td><td>FDA BAM(2001),Ch.18</td><td>< 100 cfu/g</td></tr>
<tr><td>4. E.coli</td><td>FDA BAM (2002),Ch.4</td><td>< 3 MPN/g</td></tr>
</table>

Workshop program at NU 23rd – 24th March 2013
23rd March 2013
08.00-08.45 Register
08.45-09.00 Opening remark
09.00-10.30 Introduction for can processing
10.30-11.00 Coffee break
11.00-12.00 Demonstration of can processing
12.00-13.00 Lunch
13.00-14.30 Namprik narok processing
14.30-15.00 Coffee break
15.00-16.30 Namprik narok processing (cont.)
24th March 2013
08.00-09.00 Register
09.00-10.30 Discussion: Can processing
10.30-11.00 Coffee break
11.00-12.00 Discussion: Can processing (cont.)
12.00-13.00 Lunch
13.00-14.30 Discussion: Namprik narok processing
14.30-15.00 Coffee break
15.00 End of the workshop</td></tr>
<tr><td>April 2013</td><td>- Prepare for participating in marketing activities</td></tr>
</table>

*Describe main findings about the project, including progress, problem, issues raised.

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	- More fish resources will be in consideration among villages and tambons if they success in group set up, produce varieties of good taste fish products and more networking.
Timing of Implementation (Pre-, During , Post- Flood)	-
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	- Community member is able to control a good quality of pla-ra. They even know how to buy good quality of ingredients. - NPM feel more confident to form network and generate the new products in the near future. - More confident that they can earn more income from these activities.
Replication and extension (role of stakeholder; cost share, etc.)	-
Sustainability (incl. O&M, benefit during normal time)	- Networking and, training person for marketing with TOA, Community Development office, etc. - Good relationship and networking among Naresuan University, government authorities and producers. - Understanding of good practice in processing and using more advance technology in preserving fish. - More confident to set up the group and network and to generate the new products in the near future. - More confident that they can earn more income from these activities.

PHOTOS
13th March 2013 workshop at NPM

Cooking activity at NPM

CSS members were invited to NPM

Mixing

Mince and mix

Product in plastic bag
Sampling for microbial analysis at NU laboratory

23rd -24th March 2013 workshop at NU

Community Development officers were invited to observe activity and guide how to apply for OTOP and marketing.

Workshop of namprik na-rok processing by Ms.Tawee and her team from Tha-pho Group

Demonstration of canning process of fish products

Provide equipment for food processing to NPM

Provide handy-mixer to NPM

3. Pilot Project Sheets

Tambon Wang Man, Wat Sing District, Chainat Province

Sector	Model Area / Program	Chainat Province (CN)	
		T.Wang Man (WM), A.Wat Sing	Project Code Number
Community Water Resources Management (WRM)	Community Water Resource Management Plan (CWRMP)	(1) Community Water Resources Management PlanInter Tambon	WM-WRM-CWRMP-1
	Water Management Facilities/ Equipments Improvement	(1) Improvement of Dike along Irrigation Canal	WM-WRM-WMFE-1
Flood Damage Reduction in Agriculture and Livestock Sector (AGRI)	Crop Diversification and Food Security (CRDV)	(1) Promotion of Sufficiency Economy	WM-AGRI-CRDV-1
	Small-scale Livestock and Pasture Development (LVS)	(1) Feed Production and Storage (2) Training for Livestock Production (3) Installation of Bio-gas Facility (4) Silage storage at sub-center under DLD	WM-AGRI-LVS-1WM-AGRI-LVS-2 WM-AGRI-LVS-3 WM-AGRI-LVS-4
Networking, Supporting and Institution for Community Strengthening (NET)	Networking with Neighboring TAOs (NET)	(1) Inter Tambon Network for Flood Management	WM-NET-NET-1

Phitsanulok (PT)		Chainat (CN)		Ayutthaya (AT)		Pathumthani (PT)	Nakhon Pathom (NT)
CSS	NPM	WM	KK	GC	SHN	KH	

PILOT PROJECT SHEET

Project Code	Sector	Community Water Resources Management (WRM)
WRM-CWRMP-01	Program	Community Water Resources Management Plan (CWRMP)
Title	Community Monkey Cheek Development Plan in Small Watershed	
Purpose	1. To identify the existing water resources and facilities of Tambon and prepare water resources map 2. To discuss possible improvement of water network system in order to prevent flash flood from mountainous area. 3. To discuss with neighboring Tambons on inter Tambon water management plan	
Location	T.Wang Man, A. Wat Sing, Chainat Province	
Beneficiaries	Community people in Wangman	
Implementing Agency	T. Wang Man with RID and PAO	

Background/Concept

Tambon Wang Man suffers from flood caused by mountainous runoff during wet season especially in the lower part of the Tambon. In 2012, 359 farmers lost their crops (5,751 erai of rice, 489 rai of cassava and 1,494 rai of surarcane). Similar flood occurs almost every year. On the contrary, drought occurs in the most part of Tambon in dry season. Dry season cropping is so often damaged by insufficient water. Main issue is how to balance these contradictory situations. During the PRA survey and field visit of the JICA Study Team, it was observed that there are some existing ponds and canals. These ponds were constructed by different government agencies such as Land Development Department, Water Resources Department, etc. but not functional well at present.
It found that identify the potentiality of water resources and improve the ponds and canals with the participation of the people, so excessive water in wet season could be stored in the ponds and utilized in dry season.Since the water resources of this Tambon connected to the upstream Tambons, representatives from other Tambon will be invited to the workshop to discuss possible cooperation as micro watershed monkey cheek development

Expected Outcome

1. Water Resources and these facilities are identified by local people with participatory manner
2. Tambon Water Resources Map is prepared.
3. Possible options for water resources improvement are discussed.
4. Six Tambons sign memorandum of understanding for water resource development
5. Chainat governor assigns task force at provincial level to support the activity
6. Water Resource Development Plan of six Tambons is supported technically and financially by government agencies at provincial level.

Component (Input/ Activities)

1. Village leaders make survey of community water resources facilities in their own villages
2. GPS survey for water resources and irrigation facilities and prepares community water resources map.
3. Study tour to the advanced TAO of inters communal water development activities.
4. Organize workshop to discuss possible improvement of community water resources as monkey cheek.

Related Program, if any	**Networking with Neighboring TAOs (NET)**	**Code NET-NET-1**

Cost (w/ Source) 100,000 TBH

Water Resource Survey by JICA Study Team and Wang Man TAO, 20,000TBH
GPS survey and Water Resources Map preparation 90,000TBH
Study tour to the advanced TAO of inters communal water development activities, 440,000TBH

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Feb. 2013	Field survey was carried out on 7th February in the presence of TAO staff and JICA Study Team.
Mar. 2013	Discussion with Chiant RID province and JICA Study Team regarding the water resource development in Wang Man and neighboring Tambons on 7th March 2013. Water resources confirmation Workshop was held on 8th March 2013 in the presence of representatives of villages and the participants understand that micro watershed development as monkey cheek is necessary to reduce flood and drought damages. Lessons learnt work shop was held on 13th Mar. 2013 at TAO conference room and the household of pilot activity for economy efficiency. Development of water resources in TAO were discussed with all participants including Chainat RID provincial officer. GPS survey was carried out during 17th and 20th March and water resources map was prepared.
May 1,2013	JICA study team visit Tambon network in Traknpuphon district, Ubonratchathani province to learn about inter Tambon water resource development (previous JICA project area)
May 24-27,2013	Study visit was organized for 6 Tambons and government agencies from Chainat province to visit inter Tambon network in Ubonratchathani and Buriram province. - Participants understand the benefit of inter Tambon water resource development network and will establish similar network in Chainat province. - Water resource of each Tambon will be surveyed, improvement work will be identified and prioritized with people participation. - Technical and financial support at provincial and national level will be discussed.
June,2013	JICA study team visited Chainat provincial governor to request for setting task force to support the activity. - Task force will be establish to support the activity

*Describe main findings about the project, including progress, problem, issues raised.

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	1) All Tambons will develop and improve water resources such as ponds, reservoirs to store water during flood period. This can reduce the excessive amount of water from running down to Wangman area. 2) All water resource development projects of government and private sector in the area will be explored and integrated.
Timing of Implementation (Pre-, During , Post- Flood)	1) Site survey and planning for water resource development by each Tambon should be implemented during August to September 2013. 2) Prioritize of activity and integration at inter Tambon level finalized in October 2013. 3) Seeking for financial support at provincial and national level starts from November.
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	1) All Tambons accept that inter Tambon network for water resource development is useful. 2) Presently the Department of Local Administration Promotion sets the inter Tambon activity as indicator for promotion of government staff.
Replication and extension (role of stakeholder, cost share, etc.)	In the area where disaster cannot be solved by on administrative unit like Tambon, inter Tambons cooperation should be discussed. Since structure of local administration is the same in every province, replication of activity could be done without any modification of the local set up.
Sustainability (incl. O&M, benefit during normal time)	Development of water resource is a long term benefit of local communities. They need to operate and maintain those water resources. The water will be used for crop production in dry season. Livestock production which is one of main income of farmers in this dry zone will benefit of pasture around the ponds. It is expected that flood at Wangman TAO will be reduced if water resources are fully developed in the neighboring Tambons located upstream.

PHOTOS

The Project for Water Resources Conservation and Restoration Feb 7th 2013

Slope of the pond is not well constructed.

Sugarcane Field

Nong Sano Ponds, constructed by Land Development Department, No intake facilities

Intake facility constructed by SSIP in Muban 5 in Wang Man Canal

A part of slope protection was collapsed.

Nong Ruang Pond constructed by Department of Water Resources

Dredging is necessary 7th Feb 2013

Discussion with Chainat RID Provincial Officer about Development of Water Resources in Wang ManTambon and neighboring Tambons Mar 7th 2013

Small Scale Irrigation Project Wang Man Pipe Regulator Mar 7th 2013
Weed ridden canal and not well maintained

Bang Nong Mai Koen reservoir and intake facility which is
Small Scale Irrigation Project of Nong Mai Kaen Weir constructed by RID in Sep.2000

Workshop for confirmation of existing water resources and cause of flood & drought was held on 8th March2013

Representatives from 6 Tambons and government agencies from Chainat province visit successful Inter Tambon cooperation on water resource development during May 24-27,2013.

Chinat RID provincial director explained the necessity to develop micro watershed water resources at Lessons Learned WS on 13th Mar. 2013.

PILOT PROJECT SHEET

Project Code	Sector	Community Water Resources Management (WRM)
WRM-WMFE-01	Program	Water Management Facilities/ Equipment Improvement(WMFE)
Title	Improvement of Dike for prevention from Flood damages	
Purpose	To prevent flood damage to the paddy fields occurring every year dike raising by the dike crest.	
Location	T.Wang Man, A. Wat Sing, Chinat Province	
Beneficiaries	88 Households in Normal flood season 184 Households in Big flood season	
Implementing Agency	T. Wang Man	

Background/Concept

The Thun Watsing irrigation canal with drainage canal pumping up from the Chao Phraya river runs from north-northeast to south which had constructed by RID more than 30 years before. T. Wang Man located at right bank side of the canal and irrigation for paddy fields, about 3,400rai are practiced which is the only one large scale irrigation system in this TAO. In 2011 Flood, about 7,700 rai or 184 farm households of paddy, sugarcane and casaba fields were damaged due to overflowing from the lower part of drainage canal dike. However the paddy fields of said about 3,400 rai or 88 farm households are damaged by flood every year. People and TAO officers in the Tambon were given a high priority to rehabilitate the dike in cooperation with JICA Study Team when the Participatory Disaster Resilient Planning Workshop was held in September 2012.

Expected Outcome

About 3,400rai or 88 farms household of paddy fields will be protected from the annual flood by raising the dike crest of drainage canal. And also through the implementation of the dike repairing, ability of TAO offices for management of work and quality control of embankment will be enhanced through On-the Job-Training.

Component (Input/ Activities)

1. TAO Wang Man has a responsibility to supervise the dyke repairing work.
2. JICA Study Team provides rental fee for necessary construction equipment and advise the construction manners to the TAO

Repairing of dike consists of the following 3 items.

(i) Stripping of dike surface, about 5,200m^2

(ii) Embankment of dike which is lower portion of 1.3km out of 6.4km, embankment volume is about7,400m^3.

(iii) Pavement of laterite, about 399m^3.

Related Program, if any		**Code**

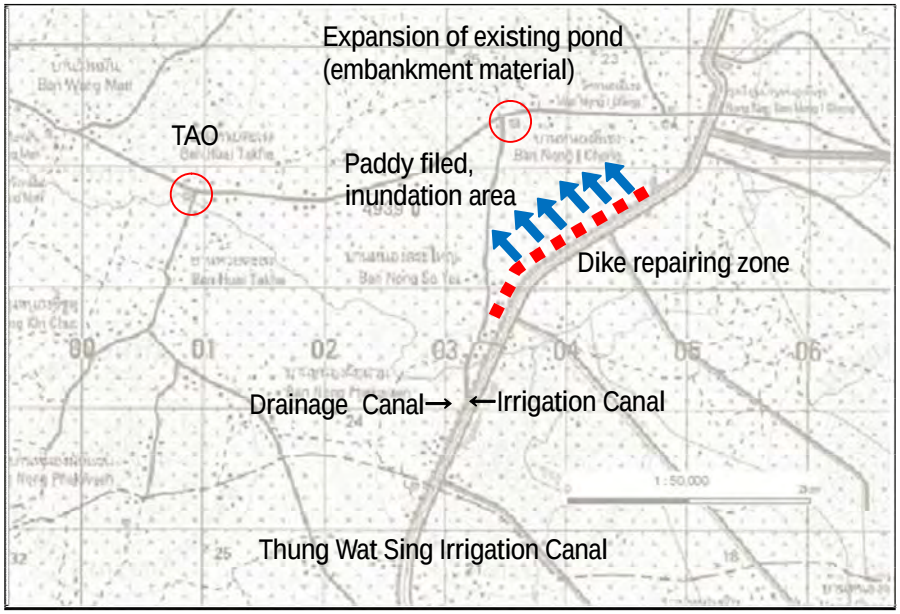
Cost (w/ Source)

500,000TBH

Implementing Schedule

Component	Dec	Jan	Feb	Mar
Preparation of design, construction schedule and cost				
Agreement between JICA ST & Supplier				
Implementation				
Final Inspection				
Technology transfer to the TAO staff				

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Dec. 2012	
Jan. 2013	
Feb. 2013	Discussion of the detail design of dike repairing and cost sharing among TAO, Beneficiaries and Study Team on 6th and 14th Feb. 2013 at TAO office.. Site investigation of borrow pit area (existing TAO pond and proposed construction site with TAO staff. Construction schedule was decided.  Under construction of the embankment of the dike, a unit of backhoe and 3nuits of dump truck were operating from the end of February 2013.
Mar. 2013	Lessons learnt work shop was held on 13th Mar. 2013 at TAO conference room and the household of pilot activity for economy efficiency. Final inspection was carried out in the presence of TAO civil staff and Study Team on 20th March 2013. Thickness of 20cm laterite pavement was completely done. Both parties have confirmed that TAO has a responsible for maintenance of laterite pavement and slopes of embankment.

*Describe main findings about the project, including progress, problem, issues raised.

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	The Wang Man TAO and beneficiary farmers had requested to repair the dike to the related agencies so many times so far, but not realized. Under this situation, JICA supported the implementation of the Project quickly and people in TAO have appreciated the JICA support too much. Through the planning, making a cost estimation and implementation, impacts of the project were found as below. i) Through the planning to implement the project, ability of TAO staff for management of work and quality control of embankment was enhanced. ii) Additional water resource was developed because existing TAO farm pond was used as borrow pit area. iii) About 3,400rai or 88 farms household of paddy fields will be protected from the annual flood. iv) Provincial RID suggested that additional flood protection measures will be necessary to prevent flood flow from western part to the Thun Watsing irrigation canal v) Solidarity among TAO staff and peoples in TAO was strengthened concerning the flood countermeasures. vi) People in TAO has much more interested in the water resources development to mitigate flood and drought problems due to JICA support to the project.
Timing of Implementation (Pre-, During , Post- Flood)	Implementation of the project and similar projects should be done during pre-flood period of February to March.
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	TAO civil engineering section staff was easy to make a plan and supervising the Project because the component of project was simple, only embankment works. Due to above mentioned reason; the project was quickly completed within one month. TAO civil engineering staff found that at least 3m width of dike crest is necessary for transportation of agricultural production and maintenance of the dike,
Replication and extension (role of stakeholder, cost share, etc.)	In the TAO, there are 3 natural rivers and different type of many ponds. To develop water resources in the TAO, dredging of canals and ponds, heightening the dike, and expansion/construction of these facilities are only countermeasures to secure water or flood protection. Realization of the dike repairing quickly and series of the workshop, people in TAO has understood how to mitigate flood and draught damage and also they want to promote the water resources development by themselves. So that the similar project will be expected to be extended.
Sustainability (incl. O&M, benefit during normal time)	Responsibility of the maintenance of dike/road is TAO with beneficiary farmers, so that there is no problem. Similar simple project will be easy for TAO to implement and maintain the facilities but construction or repairing the gate and weir which are necessary to technical knowledge and experience, assistance of RID provincial office will be essential.

PHOTOS

Meeting and discussion with TAO officer on 8th December 2012

Drainage canal
6ht February 2013

Site of repairing dyke, 6ht February 2013

Borrow pit area of the existing TAO pond, 6ht February 2013

Repairing dike
Left; drainage canal, right; paddy field where is damaged by overflowing from drainage canal annually., 6ht February 2013



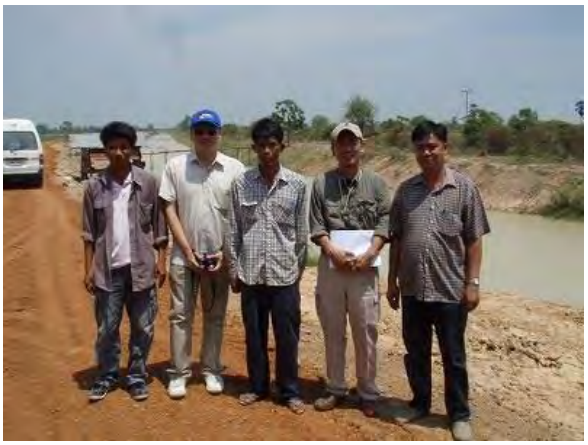
.Under construction of embankment work on 23 February 2013


.Under construction of embankment work on 23 February 2013

Final inspection was carried out in the presence of TAO staff and JICA Study Team on 20th March 2013.

Lessons learnt workshop was held on 13th March. The participants visited the dike heightening site and TAO staff explained the effectiveness of the project.

The length of 1.3 km laterite pavement with 10 cm thickness was paved completely.



After inspection of the repairing of dike, both parties confirmed TAO has a responsibility to maintain the dike.

PILOT PROJECT SHEET

Project Code	Sector	Flood Damage Reduction Measures in Agriculture and Livestock Sector
AGRI-CRDV	**Program**	Crop Diversification and Food Security
Title	Promotion of Sufficiency Agriculture	
Purpose	*Overall*: Diversify the types of crops to reduce the risk of complete loss under mono culture especially paddy; and introduce short-cycle crops, which enable generating quick cash or securing foods for home consumption. *Project*: Promote safe vegetable production for home consumption and for marketing.	
Location	Tambon Wang Man, Amphoe Wat Sin, Chainat Province	
Beneficiaries	The entire population in Tambon	
Implementing Agency	Tambon Administration Office (TAO), Department of Agricultural Extension (DOAE)	

Background/Concept

As a means to reduce the risk of flood damage, it is recommended to diversify the farming portfolio of farmer household. It is well known that mono-cropping entails a certain level of risks, which may be incurred by a price fluctuation, outbreak of pest and disease, or natural calamities like flood. Diversification of crops is therefore recommended. In this program, some types of crops that can be cultivated in relatively short period are introduced.

After a flood, recovery process should be commenced as soon as possible. Although it is desirable to restart paddy cultivation for paddy farmers, it is not always possible due to a lack of funding, remained inundation in lowland, and lack of seeds and inputs. In this context, short-cycle crops such as vegetable, which also require relatively lower investment cost, can provide farmers with an opportunity to earn quick cash. By revolving such small but quick cash, farmers can strengthen their capital for re-cultivation of paddy thereafter. Introduction of vegetables can be a good source of income and home consumption even during ordinal years. If marketing channel is established, restart of vegetable production after flood can be smoothly facilitated.

Expected Outcome

- Farmers gain new skill on safe vegetable cultivation
- Farming portfolio of individual farmer household is diversified
- Household income is increased
- Marketing channel is established (MKT)
- Students understand on safety vegetable growing and building the food sources such as raising chicken, fish, frogs, etc.

Component (Input/ Activities)

1) Identification of participants (7 model schools)
2) Workshop for planning of safe vegetable production and marketing
3) Study tour to an existing vegetable-farmers' group near the area
4) Training on safe vegetable cultivation and marketing
5) Technical assistances by DOAE
6) Preparation of guideline

Related Program	Logistic and Market for Agro-produce	**Code:**	MKT

Cost (w/ Source): *Family labor cost for ordinal maintenance of the field is born by the participants*

- Workshops:	10,000Bt	(JICA)	
- Farm input and material	150,000Bt	(JICA)	(materials for net houses included)
- Public relations	20,000Bt	(JICA)	
- Total (approx.):	180,000Bt	(JICA)	

Implementing Schedule: *November 2012 to April 2013*

- Dec. 2012: Planning workshop
- Jan. 2013: Construction of net houses, and training on seedling preparation
- Feb. 2013 Continued cultivation of vegetables, revision of cultivation plan (types of vegetables)
- Mar. 2013 Establishment of green market in the community, lesson learned workshop, preparation of media
- Apr. 2013 Final workshop

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Dec. 2012	- Meeting was conducted with farmers and school children to draft a plan of safety vegetable growing and marketing on December 19, 2012.
Jan. 2013	
Feb. 2013	
Mar. 2013	

*Describe main findings about the project, including progress, problem, issues raised.

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	
Timing of Implementation (Pre-, During , Post-Flood)	
Acceptance of technique by community (cost, benefit, easiness, relevance to	● The community accepted the project with the hope to reduce impacts from the flood proficiently and conveniently than in the past. ● Community will maintain the continuing lessons learned and development. ● Training about the utilization of the communication equipments will be performed regularly to the community.
Replication and extension (role of stakeholder; cost share, etc.)	● Involved agencies should continue financial aids if necessary for the extension of the project. ● Finding more markets to sell products of the community. ● Agricultural food processing should be extended to more activities for various sources of additional incomes.
Sustainability (incl. O&M, benefit during normal time)	● After completion of the Project, the communication system should be studied how to apply and utilize to the other Tambons and then be introduced to the other Tambons with the lessons learned of pilot activities by involved agencies. ● Joining with the other market networks and extending the areas of sustaining.

PHOTOS


Visiting the model farmer of the sufficient agriculture, activities are raising fishes, growing vegetable, etc.


A bio-gas plant in the model farmer house and sample of in-house food made by the gas from the bio-gas plant


Lesson learned meeting with the community and involved agencies

PILOT PROJECT SHEET

Project Code	Sector	Flood Damage Reduction Measures in Agriculture and Livestock Sector
WM-AGRI-LVS-1	Program	Small-scale Livestock and Pasture Development
Title	Feed Production and Storage	
Purpose	To strengthen animal feed production and its storage to cope with the disasters of flooding/drought	
Location	Tambon Wang Man, Amphoe Wat Sin, Chainat Province	
Beneficiaries	Livestock farmers in Tambon Wang Man	
Implementing Agency	TAO, DLD	

Background/Concept

The most serious issue on livestock farmers during last flood in 2011 was shortage of animal feed according to the results of the monitoring survey conducted from June to July in 2012 by JICA Study Team on distributed fertilizers and seedlings distributed through JICA and DLD. To keep livestock healthy and productive, it is very important to supply feed even during and after flooding. To cope with the issue, it is proposed to produce more forage and keep them in the form of hay/silage at each community level. Tambon Wang Man was selected as a model area.

Expected Outcome

- Livestock farmers in Tambon Wang Man could cope with flood/drought by producing forage and hay/silage
- Livestock (cattle and goats/sheep) will be able to keep healthy and productive even during flooding/drought
- Farmer's income can be secured by storing forage
- Livestock farmers will be aware of importance of storing animal feed against disaster

Component (Input/ Activities)

Input : Construction of feed storage and provision of machinery to produce forage crops and hay/silage.

Activities :

- Construction of a feed storage for communal use
- Procurement and provision of machinery and equipment to produce forage and to keep hay/silage in the feed storage, and
- Monitoring and support activities

Items	Qty	Specification
Feed storage	1 place (121㎡)	121㎡ x 4.0(H) m
Mower	1 unit	P2005H(2 wheel mower)
Grass chopper	1 unit	P1133H(chopper)
Vacuum blower	2 unit	Electirc cleaner
Plastic container	30	40kg capacity container

Related Program, if any		**Code:**

Cost (w/ Source)

Items	Qty	Cost (THB)
Feed storage	1 place (121㎡)	266,200
Mower	1 unit	94,000
Grass chopper	1 unit	54,000
Vacuum blower	2 unit	4,000
Plastic container	30	9,000

Implementing Schedule

	2012	2013		
	Dec	Jan	Feb	Mar
Construction of feed storages		■		
Provision of machinery		■		

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Dec. 2012	- The site for feed storage was confirmed by the sub-contractor. - The site for feed storage is located at Wang Man nursery, Moo 4, Tambon Wang Man, Amper Wat Sing, Chainat province. - Procurement of mower and grass chopper was ordered to the manufacture. - Procurement of hay baler was ordered to the manufacture. - Farmers in Tambon Wang Man and Tambon Singhanat refused to accept hay baler. - Hay baler was transferred to Chainat Animal Nutrition Research and Development Center. - 2 units of blower were provided to beneficiary group. - The contractor was surveyed and verified by sub-contractor.
Jan. 2013	- Mower and grass chopper were provided to the beneficiary group. - The contractor has been selected and signed the contract. - The construction of hay/silage storage was started. - The construction of hay/silage storage was completely finished. - 30 units of plastic case were provided to the beneficiary group.
Feb. 2013	- Wang Man TAO has a plan to expand building to keep mower and grass chopper by their budget.
Mar. 2013	- Constructed feed storage, biogas facility and provided machinery (mower and chopper) were confirmed by the participants/beneficiaries concerned during the lesson leaned workshop held on March 13.

*Describe main findings about the project, including progress, problem, issues raised.

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	1. The activities relieve feed lacking problem in disaster period. 2. Farmers know how to make feed for many ways. 3. Feed storage can be used as evacuation center on disaster period.
Timing of Implementation (Pre-, During , Post- Flood)	The best timing of all activities should be in March to May (3 months).
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	1. Farmers can apply material in their area to make feed for their animals. 2. The feed storage benefits community because it can store both of hay and silage. Cattle or buffalo have feed to eat all the year. 3. Feed reservation technique can apply to use with many kinds of animals
Replication and extension (role of stakeholder, cost share, etc.)	1. The group cooperates with related agencies on the promotion of feed reservation. 2. Community establish a group and committee including fund raising 3. The group promotes farmers to join the group. 4. The group manages feed storage as role model for replication of other communities. 5. The group manages feed storage as learning center. 6. The group extends knowledge to others. 7. The group establishes network and continually extend members.
Sustainability (incl. O&M, benefit during normal time)	1. The group manages feed storage by assign a supervisor from the committee. 2. The group provides feed (hay / silage) for reserving feed in feed storage. 3. The group looks after, maintains and repairs feed storage. 4. The group continually evaluates and follows up the activities of feed storage. 5. The group promotes feed reservation to farmers.

PHOTOS

Feed storage under construction

Feed storage under construction

Grass chopper

Two-wheel mower

Completed feed storage

2 units of blower provided to beneficiary group

PILOT PROJECT SHEET

Project Code	Sector	Flood Damage Reduction Measures in Agriculture and Livestock Sector
WM-AGRI-LVS-2	Program	Small-scale Livestock and Pasture Development
Title	Training for livestock production	
Purpose	To strengthen livestock farmers in: - Forage production - Forage storage in the form of hay and silage to cope with flood/drought - Livestock management during and after flood	
Location	Tambon Wang Man, Amphoe Wat Sing, Chainat Province	
Beneficiaries	Livestock farmers in Tambon Wang Man	
Implementing Agency	TAO, DLD	

Background/Concept

Most of small-scale livestock farmers have not enough knowledge about livestock management and feeding. They were seriously affected by the 2011 flood in forage production and lost animals. In order to build capability of livestock farmers to cope with disaster and to increase livestock productivity, it will be better to train livestock farmers by providing them with the designed 3-day training composed of livestock management, feed production and storage.

Expected Outcome

- Livestock farmers will be enlightened on how they should cope with disaster
- Livestock farmer group will work together to store forage and silage at community level
- Productivity of livestock will increase by learning proper livestock management and feeding
- Livestock farmer's income from animals will increase

Component (Input/ Activities)

The 3-day training shall be conducted inviting more than 30 livestock farmers. The training program shall cover livestock management, forage production and its storing, prevention of livestock diseases and processing of animal products etc.

Related Program, if any		Code

Cost (w/ Source)

THB 60,000 including costs of venue, meal etc. for 40 participants

Implementing Schedule

	2012	2013									
	Dec			Jan			Feb			Mar		
Training						■						

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Dec. 2012	- Materials of the training were prepared by JICA Expert. - Materials of the training were given to sub-contractor.
Jan. 2013	- The handbooks of the training were made by sub-contractor. - The dates of training were fixed. The training in Tambon Wang Man will be conducted on January 26 to 28, 2013 and in Tambon Singhanat will be conducted on February 3 to 5, 2013. - Sub-contractor held the training in Tambon Wang Man at Samranrajbumrung School, Tambon Wang Man, Amphoe Wat Sing, Chainat province. - Farmers participated in training for 54 persons. - The contents of training are as follows; • Pasture production, pasture management and the utilization. • Forage production and grass cultivation. • Hay making, silage making and the utilization. • Animal breeding, animal selection and beef cattle management for smallholder. • Animal health management and animal health care. • Prevention, countermeasures and risk management on disaster.
Feb. 2013	- Sub-contractor held the training in Tambon Singhanat at village headman's house, No. 57 Moo 1, Tambon Singhanat, Amphoe Ladbualuang, Ayutthaya province. - Farmers participated in training for 41 persons. - The contents of training are as follows; • Pasture production, pasture management and the utilization. • Forage production and grass cultivation. • Hay making, silage making and the utilization. • Animal breeding, animal selection and beef cattle management for smallholder. • Animal health management and animal health care. • Prevention, countermeasures and risk management on disaster.
Mar. 2013	

*Describe main findings about the project, including progress, problem, issues raised.

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	1. The activities make farmers know how to evacuate their animal. 2. Community learned about preparation to evacuate people and their animal.
Timing of Implementation (Pre-, During , Post-Flood)	The best timing of all activities should be in March to May (3 months).
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	1. Farmers received feed processing knowledge and knew how to cope with feed lacking problem. 2. Farmers can apply knowledge to manage their farming.
Replication and extension (role of stakeholder, cost share, etc.)	1. Farmers teach and tell all of knowledge to other communities. 2. Farmers extend their knowledge to others. 3. Farmers' activities in Tambon Wang Man will be a role model for replication of other communities. 4.
Sustainability (incl. O&M, benefit during normal time)	1. Farmers teach and tell all of knowledge to others. 2. Farmers continually evaluate and follow up all of activities.

PHOTOS

Registration of livestock farmers

Training was conducted by sub-contractor

Farmers participated in the training

Demonstration and Practical study

Farmers cooperated in map making

Lecturer team and farmers took photo together

PILOT PROJECT SHEET

Project Code	Sector	Flood Damage Reduction Measures in Agriculture and Livestock Sector
WM-AGRI-LVS-3	Program	Small-scale Livestock and Pasture Development
Title	Installation of a Bio-gas facility	
Purpose	Utilization of cattle and pig dung as a renewable energy source which is available all areas where cattle are raising. During flood the biogas facility will be able to use without using forestry resources. I t will contribute to reduce the cost for cooking fuel and to conserve forestry.	
Location	Tambon Wang Man, Amphoe Wat Sin, Chainat Province	
Beneficiaries	The facility will be installed at the backyard of a villager of Tambon Wang Man as a model of biogas facility.	
Implementing Agency	TAO DLD	

Background/Concept

Renewable biogas is useful with sustainability even in flooding period and after flood, and also contributes to preserve forest resources in addition to reduction of expenditure for fuel for cooking. In Tambon Wang Man, 2,900 cattle and 640 buffaloes are raised mainly for meat production. However, pig and cattle dung, by-product of raising, are not used efficiently despite its availability as a source of biogas. Efficient use of renewal sources locally available should be promoted since biogas facility can install at low cost.

Expected Outcome

- Effective use of renewable energy during and after flooding
- Reduction in living expenses for cooking at THB 600 to 900 a month
- Contribution to forest conservation

Component (Input/ Activities)

Input :

・ Installation of a biogas facility available for a family

Activities :

・ Guidance on efficient use of the biogas facility

Related Program, if any		**Code**

Cost (w/ Source)

THB 8,000 excluding the cost of digging done by a beneficiary himself.

Implementing Schedule

	2012	2013									
	Dec			Jan			Feb			Mar		
Installation of biogas facility						■						

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Dec. 2012	- The site for biogas was confirmed by the sub-contractor. - The site for biogas is located at Ms.Aratsaneya Nootapao's house No. 196, Moo 3, Tambon Wang Man, Amphoe Wat Sing, Chainat province. - The contractor was surveyed and verified by sub-contractor.
Jan. 2013	- The contractor has been selected and signed the contract. - The installation of biogas was started. - Team leader of the project, Chief of Singhanat TAO and land owner signed for the MOU. - The installation of biogas was completely finished.
Feb. 2013	- Beneficiary farmer can find swine dung for free, so she filled swine dung for the first time. The dung remained in the biogas storage for 7 days (7 days for swine dung and 21 days for cow dung). - Beneficiary farmer started to use gas from the biogas.
Mar. 2013	

*Describe main findings about the project, including progress, problem, issues raised.

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	Biogas should be extended useful life for coping with flood. Roof and fence should be constructed for coping with flood and using as sustainable facility.
Timing of Implementation (Pre-, During , Post- Flood)	1. The best timing of all activities should be in March to May (3 months). 2. The implemented biogas facility accords to the " Zero Waste Policy" of the Tambon Wang Man
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	1. Biogas help farmers save their money. The cost of biogas installation is worth the investment. 2. Farmers can use waste from their farm to achieve benefit. 3. Farmers can use waste that overflow to outlet tank as fertilizer. 4. Biogas is safe for farmer to use. 5. Biogas makes farmers have new livelihood and new source of income from animal raising.
Replication and extension (role of stakeholder, cost share, etc.)	1. Beneficiary farmer manages biogas as role model for replication of other communities. 2. Beneficiary farmer manages biogas as learning center. 3. Beneficiary farmer extends knowledge to others. 4. Mushroom cultivation group has a plan of biogas utilization to reduce their expenses for fuel
Sustainability (incl. O&M, benefit during normal time)	1. Roof and fence should be constructed for sustainable use. 2. The size of biogas should be suitable for household size. 3. The group continually evaluates and follows up the activities of biogas. 4. The group promotes biogas usability to farmers.

PHOTOS

Biogas under installation

Completed biogas

The inlet tank

Gas Pipeline

Gas Pipeline connected with stove in farmer's kitchen

Farmer started to use gas from the biogas

PILOT PROJECT SHEET

Project Code	Sector	Flood Damage Reduction Measures in Agriculture and Livestock Sector
WM-AGRI-LVS-4	Program	Small-scale Livestock and Pasture Development
Title	Silage Storage at Sub-center under DLD	
Purpose	To produce and store silage to distribute silage to damaged farmers to cope with flood and drought	
Location	DLD's sub-center, Dong Gain Luang, Baan Tung Gwang, Tambon Nongkun, Amphoe Wat Sing, Chainat province	
Beneficiaries	Animal Nutrition Research and Development Center (ANRDC) at Chainat and livestock farmers in and around Chainat province	
Implementing Agency	ANRDC at Chainat DLD HQ	

Background/Concept

During the last flood in 2011, DLD HQ and ANRDC deployed in 29 provinces in the country supported livestock farmers by supplying animal feed from their stock because the most serious issue was shortage in animal feed. The role of DLD HQ and ANRDCs is very important when disaster of flood/drought occurred. Animal feed in the form of silage is suitable to store feed for long time with good quality and convenient for transportation too.

Expected Outcome

- ANRDC's capability for supplying animal feed will be strengthened in a time of disaster.
- Livestock (cattle and goats/sheep) will be supported when flood/drought occurred in the security of feed source
- Farmer's income can be secured by supplying animal feed through ANRDC
- Storage of silage at sub-center under DLD will become a good model to strengthen feed storage in the country.

Component (Input/ Activities)

- Construction of two (2) silage storages
- Provision of equipment for silage making

Items	Qty	Specification
Silagestorage	2 houses	176㎡ x 4.0(H) m/house
Hay baler	2 units	Nam Heng co., Ltd
Plastic container	125	40kg capacity container

Related Program, if any		**Code:**

Cost (w/ Source)

Items	Qty	Cost (THB)
Silagestorage	2 houses(352㎡)	774,400
Hay baler	2 units	104,500
Plastic container	125	37,500

Implementing Schedule

	2012	2013		
	Dec	Jan	Feb	Mar
Construction of silage storages		■	■	
Provision of machinery		■		

RESULT OF MONTHLY MONITORING

Term	Findings (Progress/ Problems/Other Issues)
Dec. 2012	- The site for silage storage was confirmed by the sub-contractor. - The site for silage storage is located at Sub-Center of DLD's Chainat Animal Nutrition Research and Development Center, Dong Gain Luang, Ban Tung Gwang, Tambon Nongkun, Amphoe Wat Sing, Chainat province. - Farmers in Tambon Singhanat and Tambon Wang Man refused to accept hay baler. - 2 units of Hay baler were transferred to Chainat Animal Nutrition Research and Development Center. - 2 units of blower were provided to Chainat Animal Nutrition Research and Development Center. - The contractor was surveyed and verified by sub-contractor.
Jan. 2013	- The contractor has been selected and signed the contract. - The construction of hay/silage storage was started. - The construction of hay/silage storage was 40% complete. - 125 units of plastic case were provided to Chainat Animal Nutrition Research and Development Center.
Feb. 2013	- The construction of hay/silage storage was 100 % completed at the end of February. - Director of Chainat Animal Nutrition Research and Development Center planned to provide hay bales to beneficiary groups of Feed Production and Storage Pilot Project in Tambon Singhanat and Tambon Wang Man.
Mar. 2013	

*Describe main findings about the project, including progress, problem, issues raised.

LESSONS LEARNED

Aspect	Lessons Learned/ Necessary Improvement/ Comments
Possibility and Impact as Flood Countermeasures (Normal Flood/ Big Flood)	1. The activities relieve feed lacking problem in disaster period. 2. Chainat Center has place to store grasses to help farmers on flooding period. 3. Silage storage can be used as evacuation center on disaster period.
Timing of Implementation (Pre-, During , Post- Flood)	The best timing of all activities should be in March to May (3 months).
Acceptance of technique by community (cost, benefit, easiness, relevance to current practice)	1. The silage storage benefits community because it can store both of hay and silage. Cattle or buffalo have feed to eat all the year. 2. Chainat center is located near community. The area has never got flood. It is the source of grasses. Farmers are convenient to go to ask for help from Chainat Center.
Replication and extension (role of stakeholder, cost share, etc.)	1. Chainat Center promotes feed reservation. 2. Chainat Chainat manages silage storage as role model for replication of communities in Chainat province. 3. Chainat Center manages silage storage as learning center.
Sustainability (incl. O&M, benefit during normal time)	1. Chainat Center manages silage storage by assign a supervisor. 2. Chainat Center provides feed (hay / silage) for reserving feed in silage storage. 3. Chainat Center maintains and repairs feed storage. 4. Chainat Center promotes feed reservation to farmers.

PHOTOS

Civil work (excavating)


Construction work


Construction work


Construction work


Silage storage under construction


Silage storage under construction


Silage storage 100% completed

Tambon Disaster Resilient Plan of Nakhon Pa Mak TAO

Vision: *"Nakhon Pa Mak manages water systematically with balance between nature and community way of life. is model for sufficiency economy with strong committee to manage water, be the area for jasmine rice production and people have stable income under good environment and natural resources"*. Community maintains this vision.

Strategies

In order to achieve the above vision, seven strategic activities were proposed by community namely;

a) Promote people participation in flood and drought management
b) Improve water resources
c) Develop agricultural system appropriate flood and drought
d) Promote self-help activity during flood
e) Promote community tourism
f) Conserve environment and natural resources
g) Promote income generation activities

The community maintain and follow these seven strategies for flood and drought adaptation.

NPM-4-1

Activities

Activities are grouped into four after implementation of pilot activities namely

1) Pilot activities
2) Short term activities
3) Follow up activities from pilot project
4) Long term activity

Remarks :  Long-term plan  Completed activity  Urgent plan  Ongoing Plan

NPM-4-2

Nakhon Pa Mak Sub-district as the model ofor sufficient economy and well-being learning center supported by the recognized organizations for flood and drough management, source of good graded Thai jasmine rice, including the safe and secured occupations for living under the fertility of the natural resources and good environment

Promoting the participation of the people and community/ flood and drought management groups	Developing the natural water resources to reduce impacts from flood/ drough	Developing the agriculture systems related to the local potential and flood/ drought	Reviving the sufficient living and self-reliance concept during the flood/ drought	Promoting and developing tourism by the community	Promoting the conservation/ restoring the natural resources and environment to reduce global warming	Promoting and developing the markets for the quality products of the community
Strengthening the farmers in the community	Sam Ruan Gate Repairing	Promoting the organic jasmine rice cultivation	Seeking the methods of self-reliance on the production	Preparing the strategic tourism plan by the community	Reducing the burning of the straws and using the biological substances to reduce the global warming	Developing the markets/ jasmine rice processing
Tambon Water Management Committee	Building dam to store water in village Moo 2	Use the bio-fertilizer for rice planting to reduce the production cost	Disaster Resilient Plan	Developing the agro-tourism potential in the community	Camping to reduce the use of chemicals in agriculture	finding the networks of jasmine rice both demestic and foreign countries
Flood/ drought master plans	The Salu Monkey Cheek Projects in villages Moo 8 and 9	Expanding the planting areas and seed production of jasmine rice	Promoting the sufficient family	Boat racing, Eating Fish and Visiting Jasmine Rice Field Festival	Extening the concept of the water resource and fish conservation	promoting the jasmine rice 105 Nakhon Pa Mak
Setting the Water Friends Network	Dredging the swamps in 13 villages	Organic rice farming in 13 villages	Planting food crops for the family consumption	Developing the water quality and availability	Expanding the forest and green areas in the community	establishment of the fish processing groups
Building cooperation with factories	Reducing the outbreaks of weeds and rice pests	Publicizing knowledge about organic rice	Food Crop Seed Bank	Conducting research and development on the water supply for the community	Promoting the forest planting of the local trees (Anthocephlus chinensis Lamk.) A Rich. ex.	
Requesting for the budget to proceed the safety drinkign water in 13 villages	Research and development the medthods to reduce the weedy rice	Promoting the use of bio-fertilizer/ organic substance	Floating garden, hanging lemongraases and sweet basils	Expanding the water supply availability in the area	Local curriculum "Environment Agriculture"	
Safety drinkable water enterprises		Demonstrated plot planting short-aged plants	Making the sustaining area/ evacuation center		Conservation project for Kwai Wang Noi River and Krong Kreng Cana;	
		Demonstrating plots: planting 1 plot and harvesting 3 plots				